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Validation of Multimedia Elements Based on Art Context Toward Technical and Vocational Education in the 21st-Century

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Abstract : This research investigates the validity of art-based multimedia components in teaching and learning (T&L) in Technical and Vocational Education Training (TVET) in 21st-century education. Therefore, this research identifies issues that must be resolved, particularly regarding T&L learning in the 21st century. The researcher discovered no learning standards based on the multimedia elements based on art context in this study. Consequently, educators need to be more innovative in implementing T&L for students. This study was conducted at Universiti Tun Hussein Onn Malaysia (UTHM) and the University of Technology MARA (UiTM). For data analysis in this research, the Fuzzy Delphi Technique was used. This research included (5) experts in the interview study and (9) experts with at least ten years of expertise in instrument validation using the Fuzzy Delphi methThe the Fuzzy Delphi appr determined each, the average value of Threshold 'd' and a consensus percentage of at least 75% in expert group validated. The approval of specialists is required in four areas: execution, idea, presentation, and environment. Developing multimedia aspects based on the context of art in T&L for TVET must be broadened to produce T&L guidelines for future educators, particularly in 21st-century education.

Keywords : Multimedia Element, Art context, Teaching and learning, Technical and vocational education, and training, 21st-century education.

1. Introduction

According to experts, multimedia is a teaching and learning resource that integrates components of text, graphics, animation, visuals, music, and videos, such as CD-ROMs, computer games, and computer programs invented in the 1980s (Khedif, Engkamat, & Jack 2014). Multimedia is defined by Gopalan, Bakar, Zulkifli, and Alwi (2018) as the use of computers to provide text, images, video, animation, and sound. Thus, it may assist instructors in browsing, interacting, creating, and communicating. In addition, multimedia may assist educators in moving in this direction by using multimedia components to develop multimedia apps for interactive TVET education. Thus, the multimedia component has significantly transformed the media business. Moreover, multimedia technology may integrate the benefits of

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television as an audio-visual instrument and printing press technology and improve multimedia technology in interactive form computers.

There is a need to investigate how the context of art in multimedia components used for T&L might influence TVET learning. According to Garcia, Renoust, and Nakashima (2019), the current education system has evolved swiftly due to technology-based learning strategies. Incorporating instructional technology into T&L may enhance the process by focusing on the topic's essential information while saving time, energy, and money. The evolution of education cannot be separated from the globalization of science and technology. Therefore, the government must increase the quality and amount of education provided to children. Instead, domestic investment often needs to improve the quantity and quality of schooling.

The development of education is inextricable from the globalization of science and the expansion of technology. Consequently, the government must increase the number and quality of education provided to pupils. However, the quantity and quality of education are sometimes regulated by domestic expenditure. According to Harun and Munzir (2020), more learning facilities and support infrastructure should be needed. These impediments must be addressed since the advancement of education is vital for determining students' learning results. This research determined how using art in multimedia products -based on assuring interactivity- may enhance teaching at TVET colleges.

Consequently, adopting T&L materials to the learning aspects of the 21st century might affect TVET students. The education system must improve students' desire and enthusiasm to study to produce a generational shift. Therefore, educators must implement new approaches and strategies that should be applied to pupils. Therefore, this research was done to produce art-related multimedia components for TVET.

2. Background And Problem Statement

The future generation of problem-solvers will comprise educators who use multimedia components of the art context of this work. Using multimedia-based learning resources in the classroom has beneficial effects compared to conventional techniques. Through the T & L process, students who employ multimedia components based on art context would become a generation of problem-solvers who think critically and creatively. According to Lehtonen, Salonen, and Cantell (2019), rationalizing the supply of T&L resources that may drive students to study is vital for preparing students for the difficulties of the twenty-first century. Using multimedia components based on content and artistic context as T&L learning tools has favorable benefits compared to conventional Learning.

Lately, the globe has been confronted with several uncertainties that make it more difficult to foresee diverse events. The surge and wave of the Fourth Industrial Revolution (IR 4.0), now sweeping the globe, is also expected to prompt changes in the Malaysian educational system. According to research by Wening & Santosa (2020), 73.2% of educators in Malaysia strongly agree with adapting the learning environment to 21st-century education standards. Demonstrates that educators collaborate with its implementation, although most need more abilities to promote mainstream education, particularly for TVET students. According to Afif's (2019) research, sixty percent of instructors still need to become fluent in 21st-century learning approaches, particularly visual arts instruction. They were seen in the absence of learning techniques in the classroom. Teachers need to be more confident in their teaching skills. Thus, the need for more comprehension has impaired the comprehension of multimedia aspects.

Art ideas make it challenging for educators to connect an idea with a T&L and diverse notion. Educators identify frequent errors in learning-related problem-solving, including ideas, arrangements, abilities, and comprehension. Most educators are irresponsible because, while addressing difficulties in Learning, they need to stress the manner and delivery of Learning via multimedia components. Ultimately, it may facilitate student comprehension and motivate them to study in the classroom. Therefore, mastery of multimedia aspects should be prioritized to guarantee students a reasonable degree of academic success. Thus, to guarantee that educators may grasp education in the 21st century through Learning.

Furthermore, it might impact pupils. With that, educators will ensure that Learning goes perfectly. The delivery of information through multimedia components based on the art environment is structured in an ordered and systematic manner. Creating this development may influence students'

learning techniques and skills through educational values and technical skills critically and imaginatively, particularly for TVET instructors.

3. Methodology

Design research is a research approach that can provide researchers with reliable and helpful information on multimedia elements based on art context (Saffie & Rasmani, 2016). In this study, the researcher used the Fuzzy Delphi technique to combine multimedia elements based on art context in T&L for technique and vocational education. The views and consensus of the expert will determine the objectives in the form of an appropriate assessment in the validation of the informer's expert confirmation.

Qualitative research is an unstructured method of data collection. Therefore, this method has been used in a preliminary survey study among educators with the expertise to identify the need to develop multimedia elements based on art context. Qualitative research has identified several elements that are suitable for research. Hence, these elements cannot be deciphered based on figures in quantitative data alone.

This study was conducted at Universiti Tun Hussein Onn Malaysia (UTHM) and the University of Technology MARA (UiTM).

3.1 Respondent Selection Procedure

STEP 1: Selection of Expert for interview

A total of 5 experts have been selected. The study sample consists of 5 experts experienced in developing multimedia elements based on art context in T&L towards 21st-century learning. They have skills and expertise in multimedia elements and art context in T&L. Table 1 is the expert interviewed by the researcher in the first step in the Fuzzy Delphi technique.

Table 1: Number of Experts in the Study in the First Step

Expert	Gender	Age	Knowledge about Teaching and learning (T&L)	Experience
Expert 1	Man	35 Years old	10 Years	5 years T&L in Time based Media
Expert 2	Man	45 Years old	25 Years	20 years T&L in Time Based Media
Expert 3	Women	48 Years old	27 Years	21 teaching year using multimedia elements in print
Expert 4	Man	40 Years old	20 Years	20 years of experience teaching creative multimedia

The themes from the interviews of (5) experts formed a questionnaire instrument.

STEP 2: Selection of Expert for Instrument Fuzzy Delphi

The questionnaire was answered by nine experts from public university lecturers specializing in multimedia and arts. All these specialists were experienced and particularly experienced in T&L to TVE. Table 2 represents the number of experts in the second step of the study.

Based on the two definitions of "expert" provided above, the researcher determined the selection of experts for the study based on three criteria:

Table 2 :
Number of experts in the study in the second step

Expert	Position	Expertise	Experience in the field of expertise
Expert 1	Associate Professor	Classification Feature Selection	9 Years
Expert 2	Senior lecturer	Technical and Vocational Training Education	9 Years
Expert 3	Senior lecturer	Laptops and Mobile Technologies Teachers Professional Development Interactive Whiteboard Technologies Augmented Reality Gamification	9 Years
Expert 4	Senior lecturer	Art and design, art education	21 Years
Expert 5	Malaysian painter	Panting Major, art education	37 Years
Expert 6	Senior Lecturer	teaching creative multimedia	20 Years
Expert 7	Senior Lecturer	teaching in creative multimedia	30 Years
Expert 8	Lecturer	Fine art lecturer in time-based media	10 years
Expert 9	Senior lecturer	Time-based media in art	15 years

- teaching for more than five years
- familiarity with the use of multimedia media elements in the classroom
- implementation of technical subjects in the 21st-century learning environment

(9) experts will answer the questions. Specialists will evaluate the answers to the questionnaire in developing multimedia components. Vocational at the university level or the group implementing TVET directly. Only (9) experts are used in this study since the researchers only seek validation via focus groups.

3.2 Fuzzy Delphi Technique

The fuzzy Delphi technique is newly introduced in Malaysia's education context (Huang, Koopialipoor & Armaghani, 2020). Kaufman and Gupta introduced this method in 1998 (Mohd, Siraj & Hussin 2018). The fuzzy Delphi technique is not new but is a questionnaire developed from the findings of the Delphi technique (Norman & Ghazali, 2022). A total of nine experts consented that the Fuzzy Delphi technique was used in developing multimedia elements based on content art in T&L for TVE. The Fuzzy Delphi technique was chosen because the researchers felt it best to obtain consent to develop elements.

The main objective of the Fuzzy Delphi technique was to obtain high-quality feedback on problems and questionnaires given to a team of experts. In addition, the Fuzzy Delphi method was used for this research owing to the need for more confidence in the validity of the Delphi technique approach for choosing the most qualified expert. The use of the Delphi technique will result in the boredom of reviewing. According to Saido, Siraj, DeWitt & Al-Amedy, (2018), the weakness of the Delphi technique is that the number of experts needs to be more significant to evaluate or measure something big. Due to the problems, the Delphi technique used, Delphi technique was developed to solve the problem. Delphi's instrumentation used open-ended interviews with five experts in the first step. Then in the second step, the questionnaire generated from the interviews of five experts was answered by nine experts, including five experts who were interviewed in the first step. The total number of experts that contributed to the multimedia components for TVE that were based on the themes and locations of T&L. All experts have reached a consensus if the d value is $d < 0.2$. If the d value is $d > 0.2$, the researcher must do a second round. At this step, the researcher has obtained the agreement of the expert group, known as the consensus group. At this step, if the consensus of the experts taken by the researcher reaches more than 75%, then the consensus group has reached an agreement. On the other hand, if the agreement of the experts taken by the researcher reaches less than 75%, then the researcher must do a second round to ensure a consensus group. According to the study of Mustapha, Awang, Mahmud & Mohd (2022), they have used nine more relevant and sufficient experts to obtain reliable data for the study; therefore, this study has used nine experts to obtain percentages in Fuzzy Delphi.

A. Linguistic Scale Selection

In this study, the researcher has chosen a five-point linguistic scale consisting of strongly agree, agree, moderately agree, disagree, and strongly disagree.

Table 3 : Five-point linguistic scale

Consent Level	Likert scale	Fuzzy scale		
Strongly Agree	5	0.7	0.9	1
Agreed	4	0.5	0.7	0.9
Moderate Agree	3	0.3	0.5	0.7
Do not agree	2	0.1	0.3	0.5
Strongly disagree	1	0	0.1	0.3

B. Get The Average Value

The average value was determined according to the formal value set. The following is the formula used in obtaining the average value:

$$d(\tilde{m},\tilde{n})=\sqrt{\frac{1}{3}\left[(m_1 - n_1)^2+(m_2- n_2)^2+(m_3- n_2)^2\right]}$$

C. Verifying the Value Of "D" (Threshold Value)

A consensus has been established by all experts if the d value is d 0.2. The researcher must repeat the process if the d value is $d > 0.2$.

D. 75% Consensus

The researcher has now secured the consensus of the expert group, also referred to as the consensus group. At this stage, the consensus group has agreed if

the percentage of experts who agree with each other is greater than 75%. On the other hand, the researcher must do a second round to ensure the consensus group if the level of agreement among the experts they recruited falls below 75%.

E. Defuzzification

For the defuzzification process, 3 formulas can be used to determine the score for the item. The formula is as follows:

i. $Amax = 1/3 * (m^1 + m^2 + m^3)$

ii. $Amax = 1/4 * (m^1 + m2 + m^3)$

iii. $Amax = 1/6 * (m^1 + m^2 + m^3)$

Therefore, the researcher has chosen formula (i) to obtain defuzzification. At this step, the researcher has been able to determine the score or position according to the agreement of the experts. Table 3.6 shows more simply the use of the Fuzzy Delphi technique that has been used at each step by the experts.

3.3 Data Analysis

In this questionnaire, there were ten items in each element that had to be answered by nine experts who use multimedia elements based on art context in teaching. This questionnaire is related to developing multimedia elements based on art context in teaching for TVET in the 21st century. The Delphi technique states that if the expert agreement is more than 75%, each item will either be discarded or adopted in the study.

Expert Consensus Analysis for Implementation in Multimedia Elements

Items for implementation in multimedia elements. In this item, the expert group's confirmation percentage is 100.00% for the whole item. However, have different threshold values. Items A1 and A2 have a threshold value of d= 0.139. This shows that the expert group accepts the items. Items A3 and A8 have a threshold value of d= 0.124. This shows that the expert group accepts the items used to verify the issued items. When item A5 has a threshold value of d=0.087 and item, A10 has a threshold value of d=0.057. In addition, the threshold value for items 06 and 07 has the same value of d= 0.112. Lastly, the threshold value for item A8 of d= 0.124 shows that the highest threshold value is for items A1 and A2, while the lowest is for item A10. For the overall value of threshold value of d=0.114 in table 4.

Table 4 : Implementation of Multimedia Elements

No.	Item	The threshold value, d	Percentage of Expert Group agreement %
A1	The easy-to-read text is used	0.139	100.0
A2	Text used like Arial is easier to understand	0.139	100.0
A3	Use various text sizes as creativity	0.124	100.0
A4	Use professional colors	0.123	100.00
A5	Animation can create a cheerful atmosphere	0.087	100.00
A6	3D animation can improve student understanding	0.112	100.00
A7	Audio that can give students a break from reading	0.112	100.00
A8	Audio that can make students have a curious attitude	0.124	100.00
A9	The use of images in the correct composition	0.123	100.00
A10	An image that can give balance	0.057	100.00
	Construct value	0.114	100.0

Expert Consensus Analysis for Concepts In Multimedia Elements

Table 5 shows items for concepts in multimedia elements that have 97.8% Association of expert group agreement and have a threshold value of d= 0.129 of the constructed value. For items, B1 and B2 have 88.9 & the percentage of confirmation of the expert group

Table 5 : Concepts in Multimedia Elements

No.	Item	The threshold value, d	Percentage of Expert Group agreement %
B1	Text that follows the learning theme	0.135	88.9
B2	The text presented needs to be felt by the students	0.172	88.9
B3	Using text fonts according to development	0.124	100.0
B4	Use attractive colors through the text	0.124	100.00
B5	Animation should follow the learning subject	0.124	100.00
B6	3D animation can give a touch of real soul	0.105	100.00
B7	Audio that can help give a sense of touch	0.123	100.00
B8	Audio that follows the importance of learning	0.123	100.00
B9	The use of images that give understanding in the form of touch	0.139	100.00
B10	An image that can give balance	0.123	100.00
	Construct value	**0.129**	**97.8**

from the entire item has a value of 100.00% and has a threshold value of d= 0.135 for item B1, while item B2 has a threshold value of d= 0.172. Therefore, item B9 has a threshold value of d= 0.139, d item B6 has a threshold value of d= 0.105. While for the threshold value for items B3 and B5, the value is d= 0.124. Therefore, items B7 and B8 have a threshold value of 0.123, indicating that the entire item was accepted in the confirmation of the expert group.

Expert Consensus Analysis for Presentations in Multimedia Elements

Table 6 shows items for presentations and multimedia elements that have the confirmation of a group of experts as much as 100.00% of the constructed value while for the threshold value as much as d= 0.114 for the overall value. While for the percentage of all items, the expert group's agreement got 100.00% for all items. The threshold value of items C1, C2, C3 and C10 have a value of d= 0.124. While the threshold value of items C4 and C5 has a value of d= 0.087. Items C6 and C9 have a value of d= 0.112, and the last item for C7 and C8 has a value of d= 0.123. This shows that the whole item is less than 0.2. This shows that the experts accept the whole item.

Table 6 : Presentation in Multimedia Elements

No.	Item	The threshold value, d	Percentage of Expert Group agreement %
C1	Text that follows the purpose	0.124	100.0
C2	The text delivered must meet the purpose	0.124	100.0
C3	Using the text format according to the learning session	0.124	100.0
C4	Using appropriate colours through	0.087	100.00
C5	Animation needs to follow the era of development in learning	0.087	100.00
C6	3D animation can give a realistic presentation	0.112	100.00
C7	Audio can help impact learning	0.123	100.00
C8	Audio needs to keep up with the times of learning	0.123	100.00
C9	Clear images in learning sessions	0.112	100.00
C10	The video provides an increased understanding of learning	0.124	100.00
	Construct value	**0.114**	**100.0**

Expert Consensus Analysis for Events in Multimedia Elements

Table 7 for the event item in the multimedia element has 100.00% and has a threshold value of d= 0.116 for the overall construct value of the item. For each item's percentage, 100.00% was obtained for the percentage of expert group agreement. However, the threshold value has different values for items D1, D2, D3, D8, D9 and D10, which have d= 0.124. At the same time, items D5 and D6 have a threshold value of d= 0.87. The last threshold value for item D7, which has a value of d= 0.112, shows that the entire item is accepted by the consensus of experts in the development of this element.

Table 7 : Events In Multimedia Elements

No.	Item	The threshold value, d	Percentage of Expert Group agreement %
D1	Timely text	0.124	100.0
D2	The text presented must meet the standards of learning	0.124	100.0
D3	Using text format according to learning objectives	0.124	100.0
D4	Using the appropriate colors according to the situation in the presentation of the video	0.124	100.00
D5	The animation should follow the learning method	0.087	100.00
D6	3D animation can emphasize an interesting presentation	0.087	100.00
D7	Audio can help improve student understanding	0.112	100.00
D8	Audio that follows the latest learning times	0.124	100.00
D9	Images that can give more clarity during learning	0.124	100.00
D10	Videos give presentations according to learning	0.124	100.00
	Construct value	**0.116**	**100.0**

4. Findings And Discussion

Based on the research, the researcher found that it is essential to develop multimedia elements based on art context in T&L that can provide maximum impact in the education of the 21st century. In developing elements to produce multimedia-based teaching media in the future, the researcher suggests four elements of context art: implementation, concept, presentation, and event to ensure the quality of teaching and learning media. In this study, the researcher also obtained the value of m1, m2, and m3. The value can be seen in tables 8,9,10 and 11. In table

Table 8 : Implementation Art Context Based Multimedia Elements

ITEM	M1	M2	M3	FUZZY SCORE (A)
A1	0.633	0.822	0.956	0.804
A2	0.633	0.822	0.956	0.804
A3	0.589	0.789	0.944	0.774
A4	0.656	0.844	0.967	0.800
A5	0.656	0.856	0.978	0.830
A6	0.633	0.833	0.967	0.811
A7	0.638	0.833	0.967	0.811
A8	0.611	0.811	0.956	0.798
A9	0.656	0.844	0.967	0.800
A10	0.700	0.889	0.989	0.859
				0.813

8, the researcher found that the overall value for implementing context art based on multimedia elements showed a fuzzy score of 0.813.

The findings of this study can support the study of Sutiah, Slamet, Shafqat & Supriyono (2020), which states the development of multimedia elements based on art context, there is a difference in learning methods between the use of multimedia elements after validation based on art context. Illustrates that art content can help students improve academic achievement during learning sessions. Table 9 shows a concept based on multimedia elements.

Table 9 :
Concept Art Context Based Multimedia Elements

ITEM	M1	M2	M3	FUZZY SCORE (A)
B1	0.544	0.744	0.911	0.733
B2	0.589	0.778	0.922	0.763
B3	0.611	0.811	0.956	0.793
B4	0.611	0.811	0.956	0.793
B5	0.611	0.811	0.956	0.793
B6	0.700	0.878	0.978	0.852
B7	0.656	0.844	0.967	0.822
B8	0.656	0.844	0.967	0.822
B9	0.633	0.822	0.956	0.804
B10	0.656	0.844	0.967	0.822
				0.825

The findings of this study also show that there is an increase in TVET who learn by using multimedia elements based on art content compared to traditional methods. Using multimedia elements also increases students' knowledge and understanding of academics. Educators can repeatedly use multimedia elements based on this art content if they do not fully master it. According to Farjon, Smits & Voogt (2019), when educators successfully understand and know the correct use of multimedia elements in T&L and can improve student achievement in subjects will increase. With this, educators can solve problems involving art content in T&L well after mastering multimedia elements based on art content without needing expert instruction. Therefore, this aligns with the goals of TVET, where the educator is a facilitator, and learning should happen centered on students and materials in table 10 presentations based on multimedia elements.

Table 10 :
Presentation Art Context Based Multimedia Elements

ITEM	M1	M2	M3	FUZZY SCORE (A)
C1	0.589	0.789	0.944	0.774
C2	0.611	0.811	0.956	0.793
C3	0.589	0.789	0.944	0.774
C4	0.656	0.856	0.978	0.830
C5	0.656	0.856	0.978	0.830
C6	0.633	0.833	0.967	0.811
C7	0.656	0.844	0.967	0.822
C8	0.656	0.844	0.967	0.822
C9	0.633	0.836	0.967	0.811
C10	0.611	0.811	0.956	0.793
				0.806

The study's conclusions demonstrate that TVET can be increased by increasing the proportion of specialists who confirm the production of multimedia elements based on artistic content. Possible because teachers are aware of the ideas that students need to master in T&L for TVET and how to apply multimedia tools based on artistic material to solve difficulties. The two items employed can be compared using matrix analysis, allowing the appropriateness of each element to be shown. The findings show that the expert who was interviewed and the reading from the journal stating that the aspects should be employed and fit with the T&L were compared after the researcher read through the literature and used the interview software inside the classroom. It is possible to determine which elements cannot be used and have low levels of agreement by performing a matrix analysis. Table 11 illustrates this by showing how the events in the art context construct are built using multimedia components.

Table 11 :
Event art context based multimedia elements

ITEM	M1	M2	M3	FUZZY SCORE(A)
D1	0.611	0.811	0.956	0.793
D2	0.589	0.789	0.944	0.774
D3	0.611	0.811	0.956	0.793
D4	0.611	0.811	0.956	0.793
D5	0.656	0.856	0.978	0.830
D6	0.656	0.856	0.978	0.830
D7	0.633	0.833	0.967	0.811
D8	0.611	0.811	0.956	0.793
D9	0.611	0.811	0.956	0.793
D10	0.611	0.811	0.956	0.793
				0.800

The findings show that lecturers have yet to reach the minimum level of mastering the use of art content and context. However, the researcher found that some lecturers must use multimedia elements correctly in class, making students less focused on T&L with expert confirmation. With this, the verification of multimedia elements based on art content needs to be combined because it can help educators undergo T&L better and further strengthen the learning events used for educators.

The study results show that experts have approved the elements analyzed in this study. The number of

items received by the expert group for the development of multimedia elements based on art context can be seen in table 12.

The multimedia elements identified in the study are text, graphics, audio, video, and animation linked to the art context in terms of implementation, concept, performance, and events intended for use in T&L for TVET in 21st-century education. Table 11 shows art context items experts have confirmed for developing multimedia elements based on art context.

In discussion the researcher has confirmed multimedia elements based on art context in T&L to go through this study; the researcher suggests that future researchers who want to research the development of multimedia elements based on art context in T&L for TVET can be expanded to other contexts. For example, educators in TVET cannot overcome the problem of art context-based learning by using multimedia elements. In that case, the researcher can detect that the educator needs to master multimedia elements in depth. Allows educators to be exposed to the development of multimedia elements based on art context for TVET lecturers.

Table 12 : Items Received By Experts For Art Context Elements

	Context			
	Implementation	**Concept**	**Performances**	**Environment**
TEXT	- easy to use - Arial text is easy to understand	- learning themes - perceived by students - text font according to development - Use attractive colors	- the purpose of use - meet the purpose of delivery - text format	- passage of time - meet standards - intended text format
GRAPHICS	- creativity	- give understanding in the form of touch - can provide balance	- suitable color - clear image	- clearer presentation
AUDIO	- professional	- a sense of touch feeling - according to the importance of learning	- impact on students - the era of learning time	- student understanding - latest time
VIDEOS	…..	- gives a real soulful touch	- increase understanding of learning	- suitable colors according to the method - performance by event
ANIMATION	-exact composition	- according to the learning subject	-developmental era - a real show	- interesting presentation - according to the learning method

In addition, the researcher also recommends that future researchers use various teaching techniques that involve multimedia elements based on art contexts, such as emphasizing the presentation and concepts used to teach. The creativity of an educator in improving student achievement is one of the steps to producing a generation that masters the art context in T&L with excellence.

Future researchers can also examine whether there are weaknesses or obstacles in multimedia elements based on art context in T&L during learning. These weaknesses and obstacles can be used as references and guides for educators and students to improve academic achievement in TVET 21st-century education. In addition to this, it can also encourage educators to improve their weaknesses and increase motivation in educators to master multimedia elements based on art contexts in order to improve academic achievement among students.

5. Conclusion

Overall, the development of multimedia elements based on art content is a validating study that needs to be in T&L in 21st-century learning. However, there is less research done on art content in T&L for Technical and Vocational Education (TVET), especially in 21st-century learning. This aims to confirm multimedia elements based on artistic content in T&L for TVET in 21st-century learning. This study uses unstructured interview methods and has used the Fuzzy Delphi technique. In the first phase, the researcher conducted interviews with five lecturers who have expertise in the field of multimedia and art. After getting the findings from the interviews, the researcher conducted a matrix analysis to obtain themes to develop the instrument. In the second phase, a total of nine experts have confirmed the items that have been issued and these experts include five experts who have been interviewed. The research data has been analyzed using the Fuzzy Delphi Method to obtain the average values of m1, m2, and m3, 'd' Threshold value, 75% consensus of expert group confirmation, and Fuzzy Evaluation. Findings for the first phase of 80 items from 8 elements but in the sensory element three items have been rejected but the percentage of the whole construct is accepted. Next, the entire item was accepted by the expert group for the

implementation, concept, presentation, and event items. As for the implications of this finding, it can contribute to TVET teaching staff. The contribution of multimedia elements based on art content for TVET to 21st-century learning can help educators in the T&L guidelines that will be implemented. In conclusion, the development of multimedia elements based on artistic content in T&L for TVET needs to be continued to create guidelines in T&L for educators in the future.

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