The Effectiveness of VR Cuisine as a Teaching Aid for Special Needs Students Culinary Basic Certificate of Selayang Community College, Malaysia

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Abstract: Teaching and learning methods for students with special needs require a new approach to attract interest, increase motivation and help strengthen memory. Game-based learning using VR Cuisine is a 21st-century learning approach identified to fit those needs. VR Cuisine is used as a teaching aid for basic special education modules of Western cuisine. The effectiveness of VR Cuisine as a teaching aid was studied on attitudes, behaviors, and skills among special needs students of the Basic Culinary Certificate, Selayang Community College, Malaysia. Qualitative methods through interviews and observations were conducted where differences in respondents' behavior were observed and recorded to ensure the accuracy of the survey results. The study results found a positive increase in the game's level of knowledge, behavior, and usefulness. Through observation, respondents have a high tendency to memorize movements and imitate game steps during real situations. In conclusion, using VR Cuisine as a teaching aid positively impacts changes in attitudes and behaviors among students with special needs. Game-based learning methods effectively create a more interesting, fun, interactive, and engaging learning environment.
Keywords: Game-based learning; Virtual cooking games; Teaching and learning; Teaching aids

INTRODUCTION

Institutions of higher learning began to realize the importance of accessing education to those with special needs. This group requires attention and assistance in acquiring knowledge and skills. However, the country faces challenges because it cannot provide specific technical programs for students with special needs due to the lack of higher education institutions. Similarly, from inadequate learning infrastructure to support students with special needs, especially among groups with learning difficulties, they have short-term memory problems, especially remembering learning. Therefore, the common approach used by the instructors is to focus on teachers where students should listen to instructions and refer to a paper that has been placed visual material.

Today's information and communication technology (ICT) development is accelerating, affecting our national education system changes. In the era of Industrial Revolution 4.0 (RI 4.0), ICT has become an essential element in the teaching process. Game-based learning is one of the learning methods that utilized technology in the learning process.

Through observation among Selayang Community College lecturers who teach Culinary Basics students, special needs students, especially learning problems, need more attention and assistance to access education. Visual learning materials can help reduce the level of difficulty of their memory and, at the same time, create a more enjoyable learning environment (Fadzil, 2015). "Most students with special need have a short time frame of attention or focus on things including teaching and learning activities" (Rahman, 2011; Sulaiman & Omar, 2018; Zalizan, 2009)

Special education students need repetitive learning as well as repetitive instruction. Besides, they need a long learning time to understand something. This weakness affects the ability of students with special educational needs to store information in the short term (Rahman, 2011; Lin et al., 2011)

Special education students have different ways of thinking than mainstream students where they need different approaches in teaching and learning. Game-based learning using VR Cuisine is a 21st-century learning approach that is identified according to the requirements. This approach can increase student motivation and, in turn, create a more interesting and fun learning environment. Through this approach, the method of information delivery will be more straightforward (Azwadi & Saiful, 2017). VR digital technology can help students with special needs better understand the information presented in a fun learning environment (IDSA, 2003; Liu et al., 2020).

This study was carried out to perceived the effectiveness of using VR Cuisine as a teaching aid and its impact on attitudes, behaviors, and skills among students of special education Certificate of Culinary Basics, Selayang Community College, Malaysia.

Table 1. Respondent Demography

Respondent	Demography		
	Gender	*Age*	*Disability Category*
A	Male	18	Learning Problem
B	Male	18	Learning Problem
C	Male	19	Hearing Problem
D	Male	29	Hearing Problem

Figure 1. Respondents with special needs were interviewed before using the VR Cuisine game

Previous study

Educators have worked hard to integrate digital games into the educational environment, especially in teaching and learning, hoping that digital games could support and encourage students to participate in learning more actively, thus achieving targeted learning goals. The merger of digital games and learning environments has resulted in a method of learning called digital game-based learning (Razak & Connolly, 2013)

In the last 20 years, learning based on digital games has attracted much attention in the educational environment (Boyle et al., 2016; Huizenga, 2017). There is no proper definition for explaining learning based on digital games (All et al., 2015; Weng et al., 2018)T echnology, Engineering and Mathematics (STEM. However, learning based on digital games is usually defined based on many common features (Siew et al., 2016).

Learning based on digital games is considered to have the potential to improve academic performance. This method can provide exciting learning experiences, challenging abilities, encourage participation and motivation. Its also increasing students' interest in subjects taught by teachers, thus improving academic performance. (Meredith, 2016). Implementing digital games in the learning process helps increased student engagement and fostered a "rewarding, fun, and memorable experience" (Myers, 2020)

METHOD

Qualitative methods through interviews and observations were conducted where differences in respondents' behavior were observed and recorded to ensure the accuracy of the survey results. Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions (Watson et al., 2011)

Four respondents were show in table 1 among students were taken as samples based on the student's capacity category. Two of them had learning problems (learning disabilities and autism), while two others had hearing problems. These respondents were interviewed before and after using VR Cuisine gaming equipment. Interview sessions have been recorded.

The data is collected beginning with demographic information about the respondent's name, age, and disability category. Then, data from recorded interviews and observations were transcribed for coding and categorized according to the theme.

FINDING AND DISCUSSION
Finding(s)

The findings of the study can be divided into before and after the use of VR Cuisine games. Observations and interviews were made on respondents' behavior before and after the completion of the game session. Respondents were interviewed, and data were recorded. Respondents were required to play individually and then repeat the steps of cooking preparation in the kitchen.

Variable A: before the game

Respondent A was able to answer the kitchen rules but not wholly directly. Instead, respondent A answers directly without dismantling the ingredients and how to cook in an orderly manner. Respondent B could not answer the question even though he knew two rules and did not explain the rules. Respondent B only managed to mention two ingredients for the preparation of omelet dishes and failed to respond regarding the steps of preparation of dishes.

Respondent C did not remember the list of ingredients for preparing the omelet but tried to answer and list only three dress rules, namely hats, aprons, and kitchen cloths. Student C could only list one main ingredient and failed to respond to any preparation process. Respondent D initially did not understand the question, but he tried to explain the rules of use in the kitchen, and as a result, 4 out of 5 lists of rules could be stated. Respondent D managed to state four types of omelet ingredients but felt less confident and unable to explain the preparation steps.

Table 2. Interview session results about Respondent Attitude and Knowledge before using VR Cuisine game

Sub Theme	Selected statements
Attitude (Respondent A, C & D)	
Be aware of safety procedures	• Before entering the kitchen must wear, apron, a hat aahhh shoe safety boots aaa. Before entering the kitchen must wear all (A) • I don't remember much aaaa I remember the other two because I don't remember (B) • I went into the kitchen to cook ..I forgot .. I didn't wear clean kitchen clothes, hat, apron, I don't have a mustache to tidy up my face jer (C) • I wear kitchen clothes, pants, shoes, hat, apron and clean and tidy (D)
Knowledge (Respondent Not Complete)	
Recognize Ingredients	• Eggs, onions, salt (A) • Egg, oil (B) • First oil, meat, eggs, then jer (C) • Oil, eggs, salt, and onions (D)
Remember the cooking step	First, put the oil in the pan, then break the eggs, then add the onion, salt and stir until well blended and pour into the pan (A)

Figure 2. A respondent with special needs was using the VR Cuisine game

Perception before using the game show in table 2. Variable B: after playing with VR Cuisine

Respondent A can list all the rules of the dress before entering the kitchen. Respondent A can name the ingredients and explain the cooking steps. Respondent B has a change from not remembering and can name and list the rules. Respondent B can name the ingredients and explain the steps of cooking an omelet. Respondent C can directly mention the rules of entering the kitchen. Respondent list the cooking steps. Respondent D can tell the rules in full. Respondent D can name the ingredients and the preparation steps efficiently and accurately.

Figure 3. Respondents were interviewed and provided feedback after using the VR Cuisine game

Table 3. Interview session results after using VR Cuisine game

Sub Theme	Selected statements
Attitude (Respondent A, B, C & D)	
Be aware of safety procedures	• Wear kitchen clothes, aprons, safety boots, kitchen towels, and hats (A) • Can remember shirts, hats, aprons, towels, and shoes (B) • Kitchen clothes, shoes, hats, aprons, kitchen towels (C) • Remember Chef's shirt, apron again two towels, shoes and hat (D)
Knowledge	
Recognize Ingredients *Respondent: A & D Complet, B & C need to play again before listing the ingredients*	• Yes I can mention the list of ingredients such as oil, onion, green vegetables, mushrooms, eggs, cheese, salt, and pepper (A) • Can remember such as Onion oil, chili, eggs, pepper, and salt (B) • I'm trying ... Oil, Eggs. Salt, onion, black pepper, capsicum (C)
Remember the cooking step *Respondent: A,B,C and D*	• First, heat the oil, add the onion, add the capsicum, add the egg, black pepper and lastly add the cheese, then 30 seconds, lift and serve (A) • Put oil, put onion, put a little chili, tomato, cheddar cheese, mix it, and add pepper last time. We're ready to lift (B) • First, put the pan ...... hmmm heat ... then the oil, then the eggs, salt, wait for it to cook, put it in a plate (C) • Oil, onions, eggs, vegetable salt green color name, cheese wait 30 seconds

Table 4. Respondents cooking ability results in Learning aid Theme through observation after using VR Cuisine game

Sub Theme	Selected statements
Respondent A, B, C, and D	
Observations and correspondent responses after the use of VR Cuisine	• This student can perform cooking and prepare an omelet in the correct form Just a little salted (C) • Very interesting that the student can prepare dishes properly and follow the steps in the game VR Cuisine. • I can remember, and it was very easy after playing and did not need the help of a lecturer to teach me (D)
Product Of Food	• This student can do cooking activities with a little help (A) • This student, before the game, is less confident, and after playing, he can prepare an omelet dish with the proper steps, but the appearance needs to be improved (B) • This student can cook efficiently, but it tastes too salty (C) • This student can prepare meals easily without the help of a lecturer (D)

Cooking ability after playing VR Cuisine game

Respondent A cooks an omelet according to the correct order and according to the recipe standard. After playing VR Cuisine, Respondent B can perform an Omelette cooking demo with a bit of help from the lecturer. Next, respondent C can perform cooking in the proper order and the suitable form. Finally, respondent D can prepare the correct cuisine and adapt the steps in the VR Cuisine game.

Discussion(s)

The study results found that the use of VR Cuisine games positively affected students with special needs. VR Cuisine games influence students 'mastery of learning. Through the game method of delivery can be varied. The presentation of information through visuals with the help of Virtual Reality technology affects students with special needs. VR Cuisine games as teaching aids have indirectly allowed them to explore while learning. This game also improves their thinking and decision-making skills.

VR Cuisine game has been designed for users to have the opportunity to learn repeatedly. This method

is particularly suitable for students with special needs who have short-term memory problems. The game-based learning approach using VR Cuisine as a teaching aid can stimulate cognitive thinking and enhance motivation and interest to deepen culinary knowledge. It was found that these students need time and space to build understanding and explore what they have learned because they have limited cognitive abilities.

Before using the VR Cuisine game in learning, it was found that students facing a problem recall the rules in the kitchen and steps on how to cook. However, after using the VR Cuisine game, it was found that students could recall and describe well what they have learned. It was also found that students' confidence and focus on the learning session increased by using this game. The students 'enjoyment in exploring the learning content in the VR Cuisine game was observed. It was found that students were excited and eager to play repeatedly because they feel fun. This positive development can indirectly change the attitude and interest of students towards learning cooking. Learning through games can change behavior, interest, and attitude towards learning (Mawas et al., 2019)

The use of VR Cuisine games in learning sessions helps special education students become technology literate. Through this game, students can stimulate their auditory and observational senses. Game-based learning can make students more creative, more focused and, in turn, can maintain students' interest in the learning process (Muhammad et al., 2013)

CONCLUSION

Teaching aids are critical in the teaching and learning process, especially for special education students. The traditional method in teaching and learning for special needs students is not enough. A new approach with a touch of technology would give a new experience for them. Technology can be a tool to enhance performance in academics among special needs students, especially those with learning disabilities. Digital games can help contribute to teaching and learning goals.

VR Cuisine games as teaching aids can change the passive attitude towards excitement among special needs students and create a more engaging learning environment. It also provides positive experiences and perceptions among these students. Students' skills can be improved through this game-based learning method, and the learning content can also be mastered well. Thus, game-based learning can improve student achievement.

For future research, a larger sample size should give more precise results and a greater understanding of the effectiveness of using a game-based learning

method. In addition, the impact of using this method should also be observed among students of a variety of genders and racial groups as the findings might be varied.

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