Applications of Interpretive Structural Modeling for Walking Digital Gallery Physical Education and Health Model

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Universiti Malaya, Fakulti Pendidikan, Universiti Malaya, 50603, Kuala Lumpur
Email: zie1011@hotmail.com, saedah@um.edu.my, syedkamaruzaman@gmail.com, kasful@um.edu.my

Abstract
This paper presents the development of Walking Digital Gallery for Physical Education and Health primary's school subjects. The study adopted the Interpretive Structural Modeling (ISM) method to develop the model that can be use by teachers. 8 panel of experts was choosen in this research to complete the ISM procedure. Findings from phase 2 have produced a model element consisting of 21 elements of teaching. All these elements are related to each other to form a model of teaching implementation. The panel of experts also agreed that the activities in the model can be divided into 4 stations and clusters to facilitate the interpretation of the role of each of these elements and this is in accordance with the concept of the Walking Digital Gallery Physical Education and Health model.
Keywords: Model, Interpretive Structural Modeling, Physical Education and Health subject, Walking Digital Gallery

Introduction

According to Veloo & Ali (2016), Physical Education and Health (PEH) has been a key subject since 1989. The PEH subject is also a compulsory subject as it aims to create a healthy, active and productive future generation. The subject also emphasizes the knowledge and skills aspects of the experience gained through the PEH indirectly enabling students to adopt a healthy culture and lifestyle.

In addressing the PEH curriculum, the Circular Letter from the Office of the Director General of Education Malaysia number 5/1998 stated that Physical Education subjects are core subjects and should be implemented as provided for in the Education Act 1996 (Ali et.al, 2014). And, to meet the national aspirations, the Physical Education and Health Education (PEH) subjects in schools also underwent many changes in line with the current educational development and needs. In 2003, PEH subjects in primary and secondary schools have undergone revision of the curriculum with emphasis on knowledge, skills and self-esteem to prepare for current and future challenges. Teaching and

learning need to be enhanced to be more effective in meeting the needs of the students, parents and nation. This revised curriculum emphasizes the content of the curriculum text and the more effective delivery method (BPPM PJK, 2019)

The education curriculum in Malaysia is also undergoing a strengthened and improved transformation process known as the Primary School Curriculum which was implemented in 2011. The curriculum emphasizes from knowledge based curriculum to standard based curriculum. The Secondary School Standard Curriculum is implemented in stages beginning with Year 4 using the Curriculum and Assessment Standard Document (BPPM PJK, 2019). The Primary Education of Physical Education and Health Education curriculum is also undergoing refinement and review.

Statement of Problem

In the latest developments of the education world, each subject has its own issues and challenges, including the PEH subjects. Students are found to be less interested in physical activity because they think that Physical Education subjects have no academic value and unhealthy. Such a reason has been used by students to avoid engaging in any of the activities related to PEH in schools. Some of students who are not involved in sports activities as they focus on outstanding achievement in the examination (Salleh, 2018). Previous studies also have shown that parents consider Physical Education activities to be a waste of time for their children, and feel that the implementation of the PEH directly has nothing to do with the UPSR exams (Ali, et.al, 2014). The emphasis on parents is more on the academic side and less on the response (Salleh, 2018). The study by Syed Ali (et al., 2014) found that 80% of parents agree that Physical Education is a waste of time, does not guarantee the future and does not help in the examination. So, they concider that the subject is not really important.

The subject also faces a significant drop in interest rates in the pursuit of exams. This is particularly troubling when Malaysians themselves do not care about the importance of Physical Education subjects because they are not subject to examination and bring merit to the school's scoring system (Husain, 2014). Aside from being a subject that has no academic value, Physical Education subjects are found to be less interested, boring and exhausting by the students. Husain and Ab. Hadi (in Husain, 2014) also found that 35.4% of students' perceptions stated that Physical Education subjects were sometimes boring and exhausting. In addition, the study also showed that 18.2% of students were not interested in the curriculum of the PEH because among others, it was due to the poor teaching of teachers. Wee, Khor and Jamatul (2004) found that only 6.2% of primary school who teach PEH, are majors in PEH. Therefore, 'non-field' teaching seems to be the norm, encompassing not only inadequate teaching but non-teaching scenarios. It worsens by the lack of teaching time for a teacher is sometimes filled with PEH subjects, because administrators feel that all teachers can teach this subject. This is supported by Husain (2014) teaching that the PEH subject cannot be effectively implemented due to time constraints, lack of equipment, inadequate facilities and inadequate teachers or inexperienced teachers teaching PJK subjects. Therefore, the teaching and learning methodology should be adapted to the needs of the 21st century to make students more interested in learning subject and will not be a subject left behind.

Walking Digital Gallery

Cooperative and collaborative learning strategies are widely used in the teaching and learning process. Student-centered learning activities encourage active participation of students in various

types and forms of group activities. Among them are the 'Think pair share'; 'Think pair square'; 'Gallery walk'; 'Round table'; 'Round robin'; 'Brainstroming'; and more (BPPM PJK, 2019).

Gallery Walk is one of the most exciting 21st century learning activities to take place. Gallery Walk is a discussion technique that allows students to work in small groups. They can share ideas and answer meaningful questions, scenarios or texts. It also benefits students where students can share ideas and be exposed to other people's ideas, speak, listen, consult, and build consensus among them. Gallery Walk is also referred to as a method that gives students the opportunity to move actively throughout the learning session compared to the regular or traditional learning process. In addition, it can also involve the use of technological equipment such as mobile phones and gallery which will showcase pictures, graphics, sentences, posters of various sizes and stations for activities to be carried out (Mccafferty & Beaudry, 2017). Therefore, based on privileges and advantages of Gallery Walk, with addition in using digital equipments such as computers, tablets, smart phones, software, digital video, digital games, websites including social media, mp3 and e books (Cambridge Dictionary, 2017) will be implemented in the model. Therefore, this model is known as the Walking Digital Gallery (WDG).

Application of Interpretive Structural Modeling (ISM)
According to Warfield (1976), Interpretive Structural Modeling (ISM) is a technique that specifically designed to support the human brain in managing information and ideas in a clear structure through a targeted problem perspective. ISM is also a computer-based teaching and learning process that enables individuals and groups to develop a model or map of the relationships between elements involved in a given issue based on experience and expert knowledge. In other words, this technique is a free context, regardless of the content of the situation, allowing individuals or groups to collaboratively make decisions if the contextual and contextual elements of the relationship are identified (Abdullah & Siraj, 2014). In addition, ISM is also referred to as a management decision-making tool that links individuals or groups' ideas to facilitate a comprehensive understanding of complex situations by using the relationship map between many elements involved in complex decision situations.

In a way, ISM solves complex problems by allowing experts to focus on two ideas at a time. The ideas and relationships between them are discussed in the framework of the problem under investigation. The end result of the ISM Process is a visual relationship between ideas and information. This map will reveal the basic concepts of the problem that are important for experts to discuss, understand, and make the right decisions.
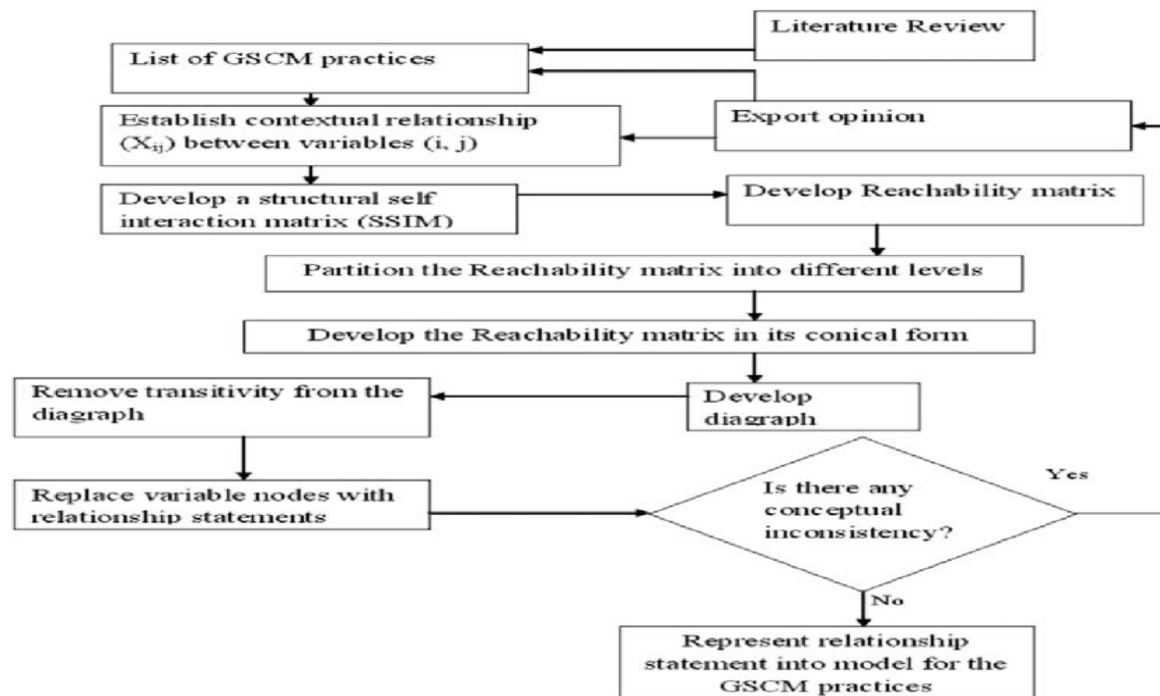
Figure 1: ISM Process (Kannan et.al, Resources, Conservation and Recycling 54, 28-36 , 2009)

The Purpose of the Study
The purpose of this study is to develop a Walking Digital Gallery curriculum model for PEH subject.
Study Questions:
This study attempts to answer the following research questions:
1. What is the ideal elements for the Walking Digital Gallery model for PEH primary school subjects?
2. What is the design of the Walking Digital Gallery for PEH primary school subjects?

Research Methodology
In the context of this study, ISM is used to help a line of experts reach consensus in formulating the relationships between elements within the Walking Digital Gallery model. The following are the steps or stages in the ISM procedure (Janes, 1988) that will form the basis for the development of the Walking Digital Gallery for PEH primary school subjects:

Step / Stage	Description
1) Identify the issue to be studied	This stage is intended to identify issues or elements to explore using ISM. The first step to do is to make the Nominal Group Technique (NGT) to identify issues and problems within a workshop to facilitate brainstorming ideas. 8 selected experts were choosen to complete the task in NGT and also ISM procedure. The experts comprises of people with knowledge and experience in pedagogy, curriculum, PEH,

	and also in educational technology. This workaround will determine the agreed upon elements that experts need to outline in order to understand the relationships between those elements.
2) Decide and define contextual and phrase relationships	This stage is to determine the shape of the elements to be generated. These include relationship phrases and contextual phrases needed in ISM.
3) Develop a structural self-interaction matrix (SSIM)	Concept Star software was used In this stage. The experts will vote on the relationship of the elements that already installed in the software. The voting process will continue until all elements have been installed and a model is installed.
4) Generating model	A model generation is performed once all the elements are installed and selected. The ISM software itself will complement the mathematical calculation process including the Structural Self-Interaction Matrix (SSIM) as well as the Initial Reachabilty Matrix for ISM software users.
5) Display ISM model	At this stage, the model that has been developed will be presented to the experts for review and modification if needed
6) Discuss the structure and amend it if necessary	The final model will be presented to the expert once the renovation and approval process has been completed

Table 1: Steps in ISM procedure

Findings
1) In the first stage of ISM
At the beginning of the NGT session, 25 elements of the activity were presented to the experts for evaluation. As a result of discussion and analysis by experts, there are some elements that need to be removed. The experts then agreed to accept 21 elements for the model. This answers the first research question, what are the elements of the Digital Travel Adventure model that fit. Table 2 shows the expert consensus on the 21 agreed elements.

Table 2: *Findings of the Walking Digital Gallery PEH Model Elements*

RANK	ELEMENT	SCORE	%	RATING
1	Create an interactive learning environment	53	94	ACCEPTED
2	Apply planning skills to students	52	94	ACCEPTED
3	Instruct students to form their own small groups	52	94	ACCEPTED
4	Provides presentation guidelines	52	94	ACCEPTED
5	Implement communication skills among students	52	94	ACCEPTED
6	To guide students' existing knowledge of the subject of PEH	51	91	ACCEPTED
7	Guide students in preparing the presentation	51	91	ACCEPTED
8	Encourage students to express themselves using digital tools	51	91	ACCEPTED
9	Apply teamwork skills	51	91	ACCEPTED
10	Apply decision-making skills	51	91	ACCEPTED
11	Guide students in designing the storyboard of the Walking Digital Gallery PEH	51	91	ACCEPTED
12	Applying rationalization skills	51	91	ACCEPTED
13	Helps students upload their Walking Digital Gallery PEH assignments through social media platforms	50	89	ACCEPTED
14	Apply the skills of making conclusions in each of the activities of the Walking Digital Gallery PEH	50	89	ACCEPTED
15	Implementing research skills in Walking Digital Gallery PEH	50	89	ACCEPTED
16	Apply digital usage skills	50	89	ACCEPTED
17	Provides conclusion via e-RPH	50	89	ACCEPTED
18	Guiding students to come up with the idea of the Walking Digital Gallery PEH assignment	49	87	ACCEPTED
19	Help students choose the E-Learning app for Walking Digital Gallery PEH	49	87	ACCEPTED

| 20 | Provides digital facilities for PJK Walking Digital Gallery PEH | 48 | 85 | ACCEPTED |
| 21 | Guide students using search engine applications with digital tools | 48 | 85 | ACCEPTED |

* Percentage acceptance ≤ 70 percent

Findings Table 2 shows all 21 elements that have been accepted for inclusion in the Walking Digital Gallery model of PEH. The percentage of elements evaluated is at the appropriate level for use. According to Dobbie et al. (2004) the condition of acceptance of an element is that the percentage of votes must exceed 70%. Therefore, it is clear that all elements are acceptable and suitable for use as model elements.

2) The ISM's second-level analysis of the type of ISM that will be built determines the context and contextual phrases it wants to structure in the ISM. Findings of the phrases that are relevant to the context of the study are as follows:

Relationship Phrases: *'need to be implemented before ...'*

3) Third and fourth level insights: This stage is an important step in developing a model. The findings of this step answer the second question of the study, which is based on the expert consensus, what is the design of the Walking Digital Gallery PEH. At this stage the compiled elements will be presented using Concept Star software. The expert will vote until all elements have been installed and a model is built. A schematic view of the model can be seen in figure 2 below:
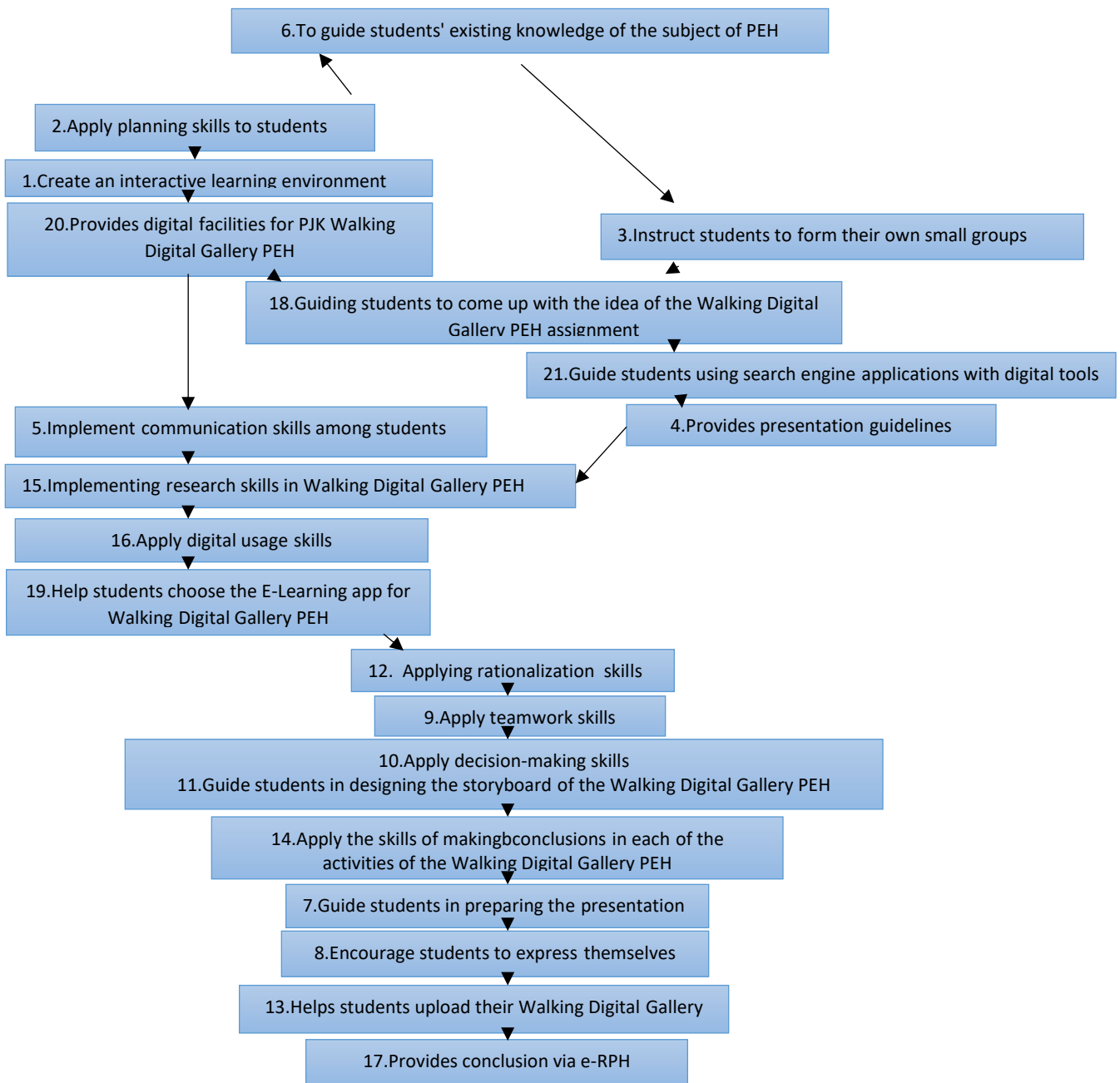
Figure 2: Walking Digital Gallery Physical Education and Health Model

4) The final findings of Stages 5 and 6, the discussion and the structural amendments show that the line of experts has agreed to maintain without making any amendments to the design of the model. They also has confirmed the resulting model. Based on Figure 2, the finding shows that element 6 'To guide students' existing knowledge of the subject of PEH' is in the highest position before the other elements. In other words, element 6 has a higher driving power than any other element. According to Abdul Rahman (2014), driving power is the power that drives an activity or other element to achieve a goal by itself. Thus element 6 influences the other elements in achieving the goals of the model.

Discussion

To answer the first question of the study – all the elements of the Walking Digital Gallery for PEH model were created based on expert opinion and discussion through the NGT technique. It has been done in the first stage in the ISM procedure. The findings show that all 21 elements are accepted and included in the model as shown in Table 2. The most important element is element 6 'to guide students existing knowledge of the subject of PEH'. Meanwhile, the element 17 'Provides conclusion via E-RPH' element is in the last position as shown in Figure 2.

To answer the second question of the study - the findings of the study can be seen in Figure 2. The model that has been developed is in line with Bloom's Taxonomy theory whereby the stages of human learning must be initiated by knowledge and followed by other stages with knowledge and followed by other stages (Anderson, Krathwohl & Bloom, 2001). With the help of the Concept Star ISM software, each element is matched to each other using a hierarchical method based on pairing techniques until all of these elements are paired and voted on by experts, thus building the PEH model.

Conclusion

Based on the findings of this study, the model is comprised of 21 key elements that are a combination of expert interviews, extensive reading of the literature review and expert consensus views through the phases. As such, this model is expected to assist teachers in particular in conducting more interactive learning and facilitating sessions and may benefit various stakeholders in the field of general education. The results of the expert agreement also clearly indicate the role of the teacher only as facilitator and motivator. The integration of information technology and media makes it compatible with pedagogy as well as teaching techniques that will facilitate and support students to succeed in 21st century learning (Rosdin & Ali, 2019). For further study, the researcher proposes to develop specific modules according to the model.

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