THE EVALUATION OF THE QUALITIES OF MIND MAPPING MODULE

Tee Tze Kiong
Faculty of Technical Education, Universiti Tun Hussein Onn Malaysia

Jailani B. Md Yunos
Faculty of Technical Education, Universiti Tun Hussein Onn Malaysia

Hj. Baharom Bin Mohamad
School of Education and Social Development, Universiti Sabah Malaysia

Widad Bt Othman
Faculty of Education and Language, Open University Malaysia

Yee Mei Heong
Faculty of Technical Education, Universiti Tun Hussein Onn Malaysia

Abstract

Using Self-Instructional Modules within the technical education can be an alternative approach and make significant contributions. Modules are not just "job sheets' or "old style work units" or "chapters of books" with questions added (Meyer, 1988). Module is a planned series of learning activities designed carefully to assist the learners to accomplish certain specific objectives (Abdul Razak, 2005; Muhamad Sam, 2005; Shaharom, 1994; Klingstedt, 1971). An attempt to develop and implement a modular approach on mind mapping techniques was made in the secondary school. This paper will discuss various components of this modular approach by referring to Meyer Model. Fleiss's Kappa was used to determine the degree to which consensus agreement ratings vary from the rate expected by chance, with values greater than .60 indicating substantial non-chance agreement. Fleiss's Kappa for the inter-rater reliability score was $\kappa = .7167$, S.E. = .0990, 95% C.I. = .5226 to .9107, which can be taken to represent constant agreement among raters. Eight raters (content and design experts) used the instrument to rate the qualities of the module. Analysis of the raters showed an agreement on satisfactory level and above on all 34 items.

Keywords: Self-Instructional Module, Mind Mapping, Quality

Introduction

Caviglioli et al. (2002) affirmed that in this rapidly developing knowledge age, the prosperity of our country is dependent on having highly skilled knowledge workers. These workers must be able to think flexibly and creatively and for that they need the knowledge tools. But in most classrooms, students are still locked into the same instructional sequence with the same learning materials (Shaharom and Yap, 1993). Although individualized instruction may appear to be an easy solution, but there are many constraints within the school context. Therefore, using modules as a strategy for teaching and learning within the technical education can be an alternative approach and make significant contributions.

Meyer (1988) had succinctly argued that modules are not just "job sheets' or "old style work units" or "chapters of books" with questions added. Module is a planned series of learning activities designed carefully to assist the learners to accomplish certain specific objectives (Klingstedt, 1971). In this case, our job in education is to provide both the contexts for developing thinking, and the confidence and competence in using knowledge tools. Both can be supplied using visual tools (Caviglioli et al., 2002).

Buzan Mind Map is a powerful graphic technique and it is a very famous thinking tool. It converts long, monotonous information into an organized, colourful, and memorable diagram that works in line with your brain's natural way of doing things (Doss, et al., 2010). Doss et al. (2010) also stressed that mind mapping is fun. It makes learning easy. When u mind map, you can condense a lesson or a

chapter from a book onto a single page! Buzan Mind Map has a structure that radiates from the centre and uses lines, colour and images according to simple, brain-friendly concepts.

Buzan Mind Map

Buzan (2002) notes that a mind map is the easiest way to put information into your brain and to take information out of your brain – it's a creative and effective means to note-taking that literally "maps out" your thoughts. Furthermore, visual tools can help us become more engaged, enthusiastic and better thinkers (Caviglioli et al., 2002). Buzan expounded that mind map are particularly adaptive for reading, revising, note-taking and planning for exam efficiently. They are invaluable for gathering and ordering information, and for identifying the key trigger words and facts from:

(i) Reference, books, textbooks, primary and secondary source books.
(ii) Lectures, tutorials, course notes, research material.
(iii) Your own read.

Caviglioli et al. (2002) also described that visual tools free up short-term memory, enabling the thinkers to focus, concentrate and organize. Buzan (2005) highlighted mind maps will help you:

(i) Increase your speed of thinking
(ii) Give you infinite flexibility.
(iii) Explore the outer reaches of your thinking where original ideas abide.

The Need of Teaching Thinking Skills in Secondary School

Wilson and Murdoch (2008) argued that even when we ask higher-order questions or when we select powerful content to activate thinking, the way we work with pupils can often result in only a minority of pupils being involved in the dialogue. Therefore, a Self-Instructional Module is important here to help every single student to study on their own pace (Meyer, 1988). The Outline Perspective Plan, which was tabled and approved in Parliament in April 2001, required the Education System to be reviewed to ensure that Malaysian students are taught explicitly to acquire and use several of thinking skills (Rajendran, 2008). Research findings support the teaching and learning of thinking skills. Based on research findings, thinking skills instruction enhances academic achievement (Rajendran, 2008).

1. **Deficiency Model**

   Meyer (1988) identified there are three widely used ways (Deficiency model, Competency model and Conceptual model) to determine need in education and all are relevant to the design of modules. Deficiency model was been applied in this research. This approach stresses the noun rather than the verb, is to define need as a gap between "what is" and "what should be", or expressed in another way, as the gap between what is observed and what is desired.

   The deficiency model is useful in the design of modular programmes to help with the selection of a subject or subjects to be modularized or to identify special areas of need within a subject to establish priorities for developing specific modules. An analysis of need using the deficiency model involves the following steps.

   (i) Identification and description of the optimal results, products or outputs expected of a particular situation, organization, institution or programme.
   (ii) Investigation and description of the present products.
   (iii) Identification of the "gaps" between present and optimally desired products.
   (iv) Selection of the most critical gap for closure.

A preliminary research with the purpose to identify the level of higher order thinking skills among lower secondary students on Living Skills subject in Malaysia was been carried out. The higher order thinking skills test (SEA test) was modified and distributed to 384 students throughout the whole country to access the higher order thinking skills level as defined by the upper three categories of the Bloom's Taxonomy of Educational Objectives: Analysis, Synthesis and Evaluation. The results showed that all three higher order thinking skills levels among the students were at low level (analysis = 27.34%, synthesis = 28.64% and evaluation = 30.31%). Due to the low level of higher order thinking skills among lower secondary students in technical subject, we proposed a new approach by using instructional module for individualized learning to deliver the thinking skills learning task due to many limitations on teachers and schools.

Meyer Model for Developing Module

In this paper, Meyer Model is being referred as the main source in developing the Buzan Mind Map module.

1. **Partial or Complete Systems**

   While some programmes may be completely modular and others may be only partially taught by means of modules instruction (Meyer, 1988). Several approaches are possible:

   (i) Completely modularized programmes: It is possible to organize a complete programme of training by means of modular instruction. The advantage is that students take responsibilities for their learning across the total programme and have a standardized approach to organizing their studies. In such a course it frequently occurs that each module is to be covered by the average student in a given time – say one module per week. Students do not proceed to a new module until they have mastered the previous one in the series. This can be accommodated provided students are retested for mastery as frequently as needed and only on those specific elements which they fail to master on an earlier try.

   (ii) Partially modularized programmes: In spite of the obvious advantages if a fully modularized programme, difficulties of initial production may make this impractical at first. A compromise is to start by modularizing only one or two subjects within a total certificate or diploma course or even to produce modules for selected topics within a single subject. When partially modularizing it is important to choose the subjects or topics to be modularized only after undertaking a careful analysis of need.

   (iii) Compulsory versus elective units: Some courses may contain key subjects or selected subjects may include units of work which are basic, and so must be made compulsory for all students. These courses, however, may also provide optional electives to cater for individual differences in say interest or aptitude. Some of the electives may provide extension or enrichment experiences and some may be remedial. Modules can cater for this core plus elective type structure in two ways. Firstly, the "core" elements can be modularized to ensure uniform standards, and secondly, the range of electives can be broadened by offering a wider choice of modules as parallel alternatives.

2. **The Fundamental Characteristics of Modules**

   Based on Meyer (1988), modules meet the conditions necessary for effective learning. This occurs because modules have certain fundamental design characteristics which have emerged through the application of ideas from the theory of learning. In summary these characteristics are as follows:

(i) Essentially self-contained
(ii) Self-instructional
(iii) Concern for individual differences
(iv) Statement of objectives
(v) Optimal association, sequence and structure of knowledge
(vi) Utilization of a variety if media and methods
(vii) Information provided on progress (feedback)
(viii) Immediate reinforcement of responses
(ix) Active participation by the learners
(x) Mastery evaluation strategy

3. The Components of a Module

Most modules are designed on similar principles and Meyer (1988) listed the components of a module as bellow:

(i) Instructional on how to use the module
(ii) Statement of purpose and aim
(iii) List of pre-requisite skills
(iv) List of instructional objectives expressed in performance terms
(v) Diagnostic pretest
(vi) List of equipment and other resources required
(vii) Sequenced instructional activities
(viii) Mastery post test

4. Steps in Design and Development

Figure 1 shows the steps in design and development of a module.

5. Evaluation, Trialing and Validation of Modular Materials

In spite of the care taken in the initial design of a module no one can be certain of its true educational effectiveness until it has been tried out with representative students (Meyer, 1988).

(i) Overall Steps in the Trailing Procedure

The trailing and validation of draft learning materials, including modules, usually follow a three steps process including Step 1: Judgment by peers; Step 2: Trail with small group of students, and Step 3: Trail with a representative class or classes. At each stage data are collected and used to modify the material. The data may suggest the need for a total rewrite which implies the preparation of what is virtually a new draft which needs to be put through one or more phases of the process a second time. More often, however, the data indicate where amendments need to be made before the process proceeds to the second or third stage. Figure 2 shows the steps in trialing a draft module. In this paper, discussion will be focused on step 1: Judgment by peers only.

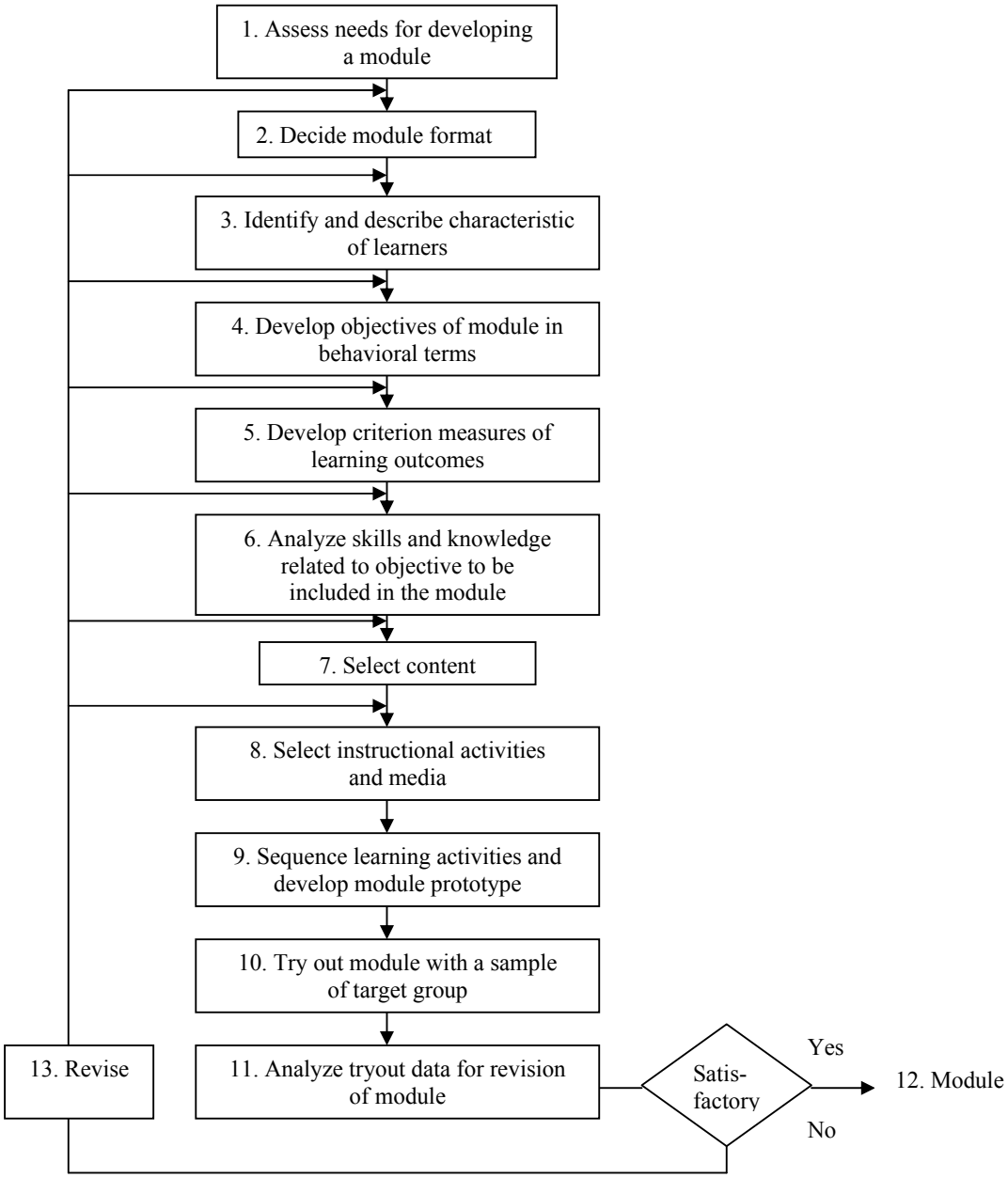

Figure 1: A Flow Chart for the Design and Development of a Module

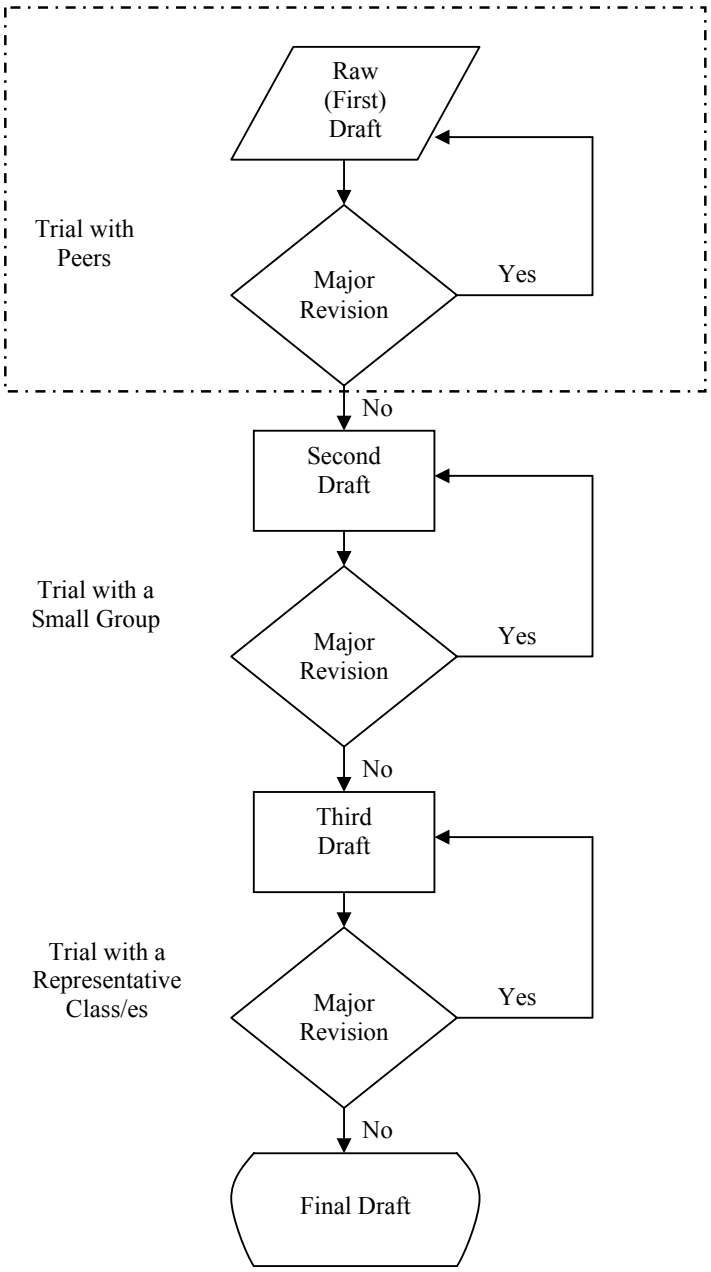

Figure 2: Steps in Trialing a Draft Module

Reliability

According to Lee (2006) and Wood (2007), the Kappa coefficient with the value 0 indicates agreement due to chance alone and 1 indicates perfect agreement. If the Kappa coefficient is .70 or greater, the rate pairs can be said to exhibit greater reliability; if less than .70, then the rater pairs may be said to exhibit lesser reliability Landis and Koch, 1977). Fleiss's Kappa was used to determine the degree to which consensus agreement ratings vary from the rate expected by chance, with values greater than .60 indicating substantial non-chance agreement. Fleiss's Kappa for the inter-rater reliability score was $\kappa = .7167$, S.E. = .0990, 95% C.I. = .5226 to .9107, which can be taken to represent constant agreement among three raters.

Findings

Table 1: Rating scale for the evaluation of the qualities of Buzan Mind Mapping Module

Title: Buzan Mind Mapping Module				
QUALITY 3 = VS = Very Satisfactory 2 = S = Satisfactory 1 = U = Unsatisfactory 0 = VU = Very Unsatisfactory	Rating			
	VS (3)	S (2)	U (1)	VU (0)
Need	**6**	2		
Purpose	**6**	1	1	
Introduction	**6**	2		
Knowledge and skills required	**5**	3		
General aims	**5**	3		
General objectives	**5**	3		
Specific objectives	**5**	3		
Content is directly relevant	**6**	2		
Logical learning sequence	**5**	2	1	
Defined category	**5**	3		
Units	**5**	3		
Activities are appropriate	1	**6**	1	
Active participation and response	1	**7**		
Learning activity into small steps	4	**4**		
Input-process-output cycles	**5**	3		
Feedback questions and answer	4	**4**		
Feedback questions answered clearly	4	**4**		
Feedback questions interpreted	**5**	3		
Feedback statements.	**5**	3		
Reinforcement statements	3	**4**	1	
Visual elements	2	**6**		
Bridge passages	2	**6**		
Instructions	3	**5**		
Layout	2	**6**		
Humour	3	**5**		
Consolidation passages	2	**6**		
overview of all main points	**5**	3		
Post test includes at least one item for each specific objective	4	**4**		
Form and wording	4	**4**		
Post test questions answered	**5**	3		
Results of the post test interpreted	**5**	2	1	
Motivate	3	**5**		
Length of time	**5**	3		
Well integrated	4	**4**		

Eight raters (content and design experts) used the instrument to rate the qualities of the Buzan Mind Mapping Module. Analysis of the raters showed an agreement on satisfactory level and above on all 34 items.

Conclusion

Self-instructional modules are very useful to educators and students. By using Buzan Mind Mapping module, students are able to learn the mind map technique and apply it in study especially while taking notes and doing revision. Moreover, students could learn on their own pace by using this self-instructional module.

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