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The 9th International Innovation, Invention & Design Competition INDES2020

17th May – 10th October 2020

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MODUL PEDAGOGI PA4K: A PEDAGOGICAL MODULE OF ACTIVE LEARNING FOR FOSTERING 4CS SKILLS IN WHOLE NUMBERS AND BASIC OPERATIONS TOPICS

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ABSTRACT

Modul Pedagogi PA4K was developed as a guidance for primary mathematics teachers in fostering 4Cs skills (Critical Thinking, Communication, Collaboration and Creativity) by applying active learning activities. This module apply multiple-based of active learning activities such as problem-based, project-based, play-based, information and communication technology (ICT), singing-based as well as thinking maps which seemed to be interesting and effective in fostering 4Cs skills among pupils. The elements of the module comprising content standards, 4Cs skills and active learning activities were determined based on experts' consensus by using Fuzzy Delphi method. 16 experts with primary mathematics and pedagogy background were involved in this study. The module was validated by 6 experts and all the items have been accepted with high percentage, above 91%. In usability study of the module where 40 of standard 3 pupils were involved, the findings of paired t-test analysis show that there were significant increasing of pupils' 4Cs skills mastery after the module was applied in learning process. The module also achieve high average value of Cronbach's Alpha, 0.943 in reliability test. Therefore, the module possess high quality in contents, validity and reliability values. Thus, the module may be useful for teachers and pupils in understanding and mastering 4Cs skills in 21st century education.

Keywords: pedagogy module, active learning, 4Cs skills, whole numbers, basic operations

1. INTRODUCTION

Education goals that focus on three basic skills namely reading, writing and calculating seemed to be unable to meet high skills workplace demand in 21st century [1]. Therefore, pupils should be provided opportunities to capture and master 4Cs skills (Critical thinking, Communication, Collaboration and Creativity) to successfully adapt the real world situations [1].

In our education scenario, the process of fostering 4Cs skills in classroom context is still at minimum level [2]. Furthermore, there are still a lot of teachers who have inadequate knowledge on how to implement teaching and learning process based on 4Cs skills. As an attempt to improve this condition, providing module and teacher's guide are necessary in overcoming lack of skills regarding to 4Cs skills nurturing in pedagogy practices among the teachers [3].

2. MATERIAL AND METHOD

This module was designed and developed to foster 4Cs skills through implementation of active learning activities such as problem-based, project-based, game-based, ICT-based, singing-based, small group discussion and brainstorming. The elements of this module were determined by carrying out fuzzy Delphi method where 16 experts were involved.

2.1. Validity

This module has been validated by six experts. Table 1 shows the results of validity evaluation on this module.

Table 1. Validation Evaluation of *Modul Pedagogi PA4K*

Aspect	Average Score (%)	Experts' Evaluation
A. Objective	97.33	Accepted
B. Content	92.00	Accepted
C. Format and Language	94.67	Accepted
D. Presentation	92.00	Accepted
E. Usability	91.33	Accepted

The results in Table 1 shows that all the items in validation process have been accpeted by the experts with high average scores.

2.2. Reliability

Table 2 shows analysis of *Cronbach's Alpha* related to pupils' mastery in critical thinking, communication, collaboration and creativity after the module applied in teaching and learning process.

Table 2. Cronbach's Alpha Values in Evaluation of 4Cs Skills Mastery Level

Skill	Number of Items	Cronbach's Alpha
Critical Thinking	11	.940
Communication	12	.953
Collaboration	11	.940
Creativity	10	.937

According to Table 2, the coefficient of Cronbach's Alpha for each skill is high: critical thinking (.940), communication (.953), collaboration (.940) and Creativity (.937). Coefficient of Cronbach's Alpha greater than 0.7 indicates that the module possess high internal consistency [4].

2.3. T-Test Results

Table 3 shows paired t-test result that compare pre-test and post-test scores.

Table 3. Paired t-Test Analysis of Pupil's 4Cs Skills Mastery in Pre-test and Post-test

Skill	Pre-test Mean (M_1)	Post-test Mean (M_2)	Mean Difference	t-value	Sig.
Critical Thinking	2.60	4.51	-1.902	-57.475	.000
Communication	3.01	4.62	-1.621	-36.462	.000
Collaboration	2.82	4.64	-1.820	-27.470	.000
Creativity	2.52	4.46	-1.940	-35.511	.000

Significant at $p < .005$

There are significant difference of mean values before and after the module was used in the learning process. Hence, this module has passed the usability test and can be used in fostering 4Cs skills among pupils in mathematics class.

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