Enhancing Professional Knowledge and Self-Concept Through Self and Peer Assessment Using Rubric: A Case Study for Pre-Services TVET Teachers

Alias Masek[1], Affero Ismail[2], Muhammad Nurtanto[3], Suhaizal Hasim[4]

[1]Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia, 86400 Batu Pahat, Johor, Malaysia
[2]Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia, 86400 Batu Pahat, Johor, Malaysia
[3]Faculty of Teacher and Training Education, Universitas Sultan Ageng Tirtayasa, 42124 Kota Serang, Banten, Indonesia
[4]Faculty of Technical and Vocational Education, Universiti Tun Hussein Onn Malaysia, 86400 Batu Pahat, Johor, Malaysia
[1]aliasmasek@uthm.edu.my
[2]affero@uthm.edu.my
[3]mnurtanto23@untirta.ac.id
[4]suhaizal@uthm.edu.my

Abstract: Teacher education is aimed at developing reliable and skilled teachers, especially in this rapidly evolving educational environment. The transfer of technology to a boundless environment influences much of the teaching pedagogy in today's education system. While we observe it, the teachers are the ones that create the image of our community. It is therefore necessary for the education system of teachers to prioritize the expertise of teachers in a range of fields, such as content, skills, pedagogy, and technology. This study manipulates the rubric assessment as the intervention of educating the teachers to enhance their professional knowledge and self-concept through self and peer assessment. An experimental using single group with pre-test and post-test has been carried out. Self-concept was assessed by pre-test and post-test using a questionnaire, while professional skills were evaluated on a continuous basis through self-evaluation and peer assessment using the teaching simulation rubric. This is noticed that the student's self-concept was not significantly improved by the application of the strategy. Nonetheless, the results showed a trend of increasing on students' scores with or fluctuating levels, which could be related to individual performance of professional skills. The implication is that the use of rubric with self and peer assessment practice could expedite students' professional skills development as a teacher.

Keywords: Professional Knowledge, Self-Concept, Self and Peer Assessment, Pre-Services, TVET

Alias Masek

Faculty of Technical and Vocational Education,
Universiti Tun Hussein Onn, Malaysia, 86400
aliasmasek@uthm.edu.my

1. Introduction

Previous study has given much focuses on the content knowledge (CK) and pedagogical content knowledge (PCK) [1-3], within the boundary of teacher education, but the role of self-concept and its relationship to pedagogical performance (professional knowledge) have mostly been neglected areas , of research in teacher education field. Previous research has proven that students' learning is influenced by teacher's pedagogical skills , where pedagogical skills is anchored by professional knowledge. An exemplary pedagogical skills must first reach at pedagogical equilibrium "', which will only be achieved when teachers have controlled the four major areas; first, content knowledge that resolving the what to teach; second, organizing teaching that resolving how to teach and assess; third, organizing learning that resolving why questions from students' point of view on what and how teacher teaching; and fourth, students attitude resolving learner motivation, consent and behaviour.

As teacher strives to achieve teaching with pedagogical equilibrium, multiple skills are necessary

to be mastered and be applied during teaching and learning, to satisfy the four components as suggests [6]. While teaching in front of students in classroom, it cannot be denied that having adequate content knowledge is important as in the first area, while the second to fourth area is relevant to pedagogical knowledge and skills. The skills that are compulsory for teachers to competence that determine teaching effectiveness [7], as well as help students to remain focus, interest and engagement in learning process [3]. Controlling the second and the third areas and the last part need a high self-concept to resolve learner attitude. Missing of these necessary skills in teacher might drive learning to a dull and boring process.

In mastering professional skills, a pre-service teacher needs to build their own self-concept before getting ready to stand up and facing their students[9]. Self-concept is associated to motivation to apply their professional knowledge learnt at the previous study level [9]. It is an individual perception about her/himself relate to performance[10,11], and the adaptation of an individual to the academic environment [10,12]. Therefore, the relationship between the self-concept, academic achievement (professional knowledge) and their respective influences with each other cannot be ignored [10]. In confronting the new situation, teacher depends on their prior knowledge and skills [6]. Teaching experience is a crucial, but pedagogy is a basic skill, so that a new teacher can act accordingly, as well as planning teaching toward learning outcome achievement.

Pre-services teachers have to make a critical judgement when using rubric to determine how much their peer's teaching was satisfying the rubric criterion [13]. The critical judgment was based on what pedagogical skills they have learnt, how they understood the rubric and what they observed during peer teaching simulation. While observing their peers in performing teaching simulation, they will internally reflect to their personal skills in pedagogy, and thus should improve their pedagogical skills performance, especially after reflective comments session. A good reflection (feedback comment) can only be provided to peers when they have a high-level of self-concept. Otherwise, it was very difficult to give a say to other peers.

Efforts to improve pre-service teachers' self-concept have been done a lot by providing a diverse learning approach, but the results have been not encouraging a positive impact. The study results [14], revealed that self-concept of pre-service teachers have been left much room for improvement. This indicates that self-concept that has not been in optimal condition will affect the pre-service teachers' academic ability, because there are several aspects in self-concept that is directly related to academic ability and professional knowledge. To foster teacher trainee with good professional skills, a rubric assessment is used to quickly learn and understand all aspects of pedagogy. Pedagogical skill is a new and quite subjective for these group of students from multiple background. Therefore, this study was to determine the effect of using rubric assessment through self and peer assessment on increasing pre-service teachers' self-concept and pedagogical skills.

2. Research Method

An experimental using single group with pre-test and post-test was implemented [15]. Self-concept was measured using pre-test and post-test using questionnaire, while professional skills was measured using self and peer assessment using rubric in ongoing teaching simulation.

2.1. Context and content

A total of 16 pre-service teachers had been enrolled in the MBE 10303 Pedagogy in TVET, as to complete their first semester out of three semesters for awarding Master of Technical and Vocational Education from one of the universities in the Southern Peninsular of Malaysia. The pre-service teachers' who enrolled in this program were from multiple backgrounds from electrical engineering, chemical engineering, sport sciences, Agriculture etc. They were all matured students whose age ranging from 24 to 28 years old. Pre-service teachers graduated from this programme was eligible to apply for a teacher position in school since this program fulfils the professional education component and thus has been recognized by the Public Service Department of Malaysia.

Pedagogy in TVET is three credit hours subject and one of the professional education courses within the programme curriculum. This course is focus on the teaching profession role, concept of teaching and learning, teaching models, skills, approaches, and strategies. The element of teaching in TVET also introduced using the vocational and didactic concept. Learning domains and thinking skills are also included in this course, as well as preparing for

teaching practices element by developing a lesson plan, perform teaching simulation and develop an evaluation matte.

2.2. Treatment Procedure

This course requires 14 weeks of lecture session with additional two weeks of final examination. The first seven weeks was dedicated for the theoretical part delivery for professional education (pedagogy). The next seven weeks, teaching and learning session was implemented using short lecture, self, and peer reflection. They were given assessment rubric for guidance. They were asked to prepare 10 minutes teaching simulation to apply all pedagogical knowledge that had been taught in the first 7 weeks, accumulate of a total treatment to 14 weeks, see table 1.

Table 1 : Treatment on professional knowledge development

Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Activity	Theoretical part lecture							Short lecture/self/peer reflection + assessment rubric							Final exam	

The pre-service teachers' take turn to perform 10 minutes mock teaching in front of class. At the end of the mock teaching session, all pre-service teachers were asked to provide reflection comments to their peers for improvement, then rated them mainly based on the assessment rubric. The pre-service teachers were then asked to rate themselves using the similar rubric.

2.3 Instrumentation

Self-concept (pre-test and post-test instrument), Robson self-concept questionnaire (SCQ) was used to gauge students' self-concept state before and after treatment . Robson SCQ consist of 30 items; students need to indicate their perceived of attitude and belief about themselves according to 0 (disagreement) -7 (completely agree) agreement scale. The norm for the score was according to previous study , 140 (SD=20) was estimated for the normal sample mean.

Professional knowledge rubric assessment (self and peer assessment instrument), Rubric assessment was comprising of five major parts of teaching component: Part A, Planning (6 items),

Implementation (10 items), Personality (4 items), Portfolio (4 items) and Reflection (1 item). Items were using one to five-mark weightage on each item with a total mark of 125. This instrument has been used by the faculty to evaluate students' who undergoing teaching practicum. Students have been trained and familiarized to use the rubric scoring in the first 4 teaching simulations by their peers, before feedback were given by lecturer to improve their scoring.

3. Findings and Discussion

The class comprises of 6 (37,5%) male and 10 (62.4%) female students, from multiple background from Chemistry engineering, electrical engineering, agriculture, mathematic, business, and Sports education.

3.1 Self-concept score

Result indicated that mean score for pre-test was 130.24 (Standard Deviation, SD=23.81), slightly increased to post test result of 135.69 (SD=19.56). Data were tested for normality, result indicated the skewness was within the range of normal distribution (pre-test = .478; post-test = .076) from +2 to -2 [17] , granted the assumption to run using parametric test. Therefore, further analysis using paired t-test, indicated that the mean score for pre-test and post-test data was not significantly difference at 95% confidence interval. This make an interpretation that students self-concept was not have significant increased by using the approach that had been used in this study. Data analysis are indicated in Table 2 and Table 3.

Table 2 : Descriptive analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	16	88.00	178.00	130.24	23.81
Post-test	16	105.00	171.00	135.69	19.56

Table 3: Paired t-test result

	Mean	Std. Deviation	Std. Error Mean	95% CI		t	df	Sig.
				Lower	Upper			
pre - post	-4.68750	25.21565	6.30391	-18.12397	8.74897	-.744	15	.469

Self-concept was not significantly difference before and after treatment might be justified when students have already had a good self-concept after the first four teaching simulation session for familiarizing students with the rubric and teaching simulation process. In addition, students had already understood each criterion since the content was taught in the previous seven weeks of lectures session and get

along with their peers during that times. Students will have confident and increase motivation to use rubric after quite several times using it [18]. In addition, relationship amongst students has been established, so that they can have a say to their peers without heart feeling.

3.2 Professional knowledge scoring mark using peer assessment

A total of 12 students (student A to student L in table 4.) out of 16 have performed 10 minutes teaching simulation in front of their peers, throughout seven weeks period during class time. The rest of the students were assessing their peer's pedagogical skills using rubric assessment based on their knowledge taught in the previous seven weeks of lecture. An observation on the data indicated a pattern of increment were observed on students' scoring for the seven weeks, and the pattern for the data indicated inconsistency or fluctuate on scoring (student D, F, H and J), might be due to individual's performance in professional skills, which reflect to an individual's learning paces and ability to catch up.

Table 4 : Raw data of students score on teaching simulation based on peer assessment

Weeks	1	2	3		4		5		6		7	
No	A	B	C	D	E	F	G	H	I	J	K	L
1	80	88	88	86	84	80	80	80	86	88	90	96
2	89	88	88	87	86	86	85	85	86	86	88	88
3	94	93	93	-	90	85	92	90	92	92	90	97
4	84	88	92	92	81	83	88	88	-	82	87	89
5	90	90	92	90	85	90	90	90	91	90	90	-
6	-	88	90	90	90	85	85	92	92	92	90	92
7	94	96	97	95	94	94	96	94	93	90	96	97
8	87	92	94	92	90	85	93	95	92	91	96	96
9	90	94	96	92	93	90	91	90	94	-	92	90
10	86	-	92	91	85	90	92	88	92	91	92	95
11	81	85	86	87	85	85	86	86	85	85	90	88
12	94	91	-	90	90	86	93	90	94	96	94	92
13	71	80	84	76	-	80	82	81	85	84	85	90
14	92	92	92	90	85	85	93	-	91	90	94	94
15	-	-	-	-	90	90	-	93	95	94	92	90
16	92	93	93	92	92	91	92	92	92	92	-	93
Average	**82.34**	**84.44**	**85.75**	**84.0**	**87.50**	**86.56**	**89.50**	**89.19**	**90.88**	**89.82**	**91.31**	**92.63**

Findings indicated that student's self-concept have not significantly increased even after students have undergone seven weeks of teaching and learning of professional knowledge using self and peer reflections, that was done based on a set of rubric assessment. Students with a positive self-concept have a positive perception of themselves. Students' individual self-concept was significantly related to their individual achievement emotions[19]. [9]According , a positive increment on self-concept is associated to motivation to apply their professional knowledge learnt in the previous study level. This contradict findings might be explained by the training for professional knowledge, whereby students was a solely teachers (probably first degree) enrolled for in a pre-services teacher programme and study a professional knowledge, compared to respondents in this case were amongst students with first degree (previous education level) in multiple areas, and enrolled for further study in the master of technical and vocational education, who are matured enough. In addition, the treatment period in this case was 14 weeks that focusing on professional knowledge training.
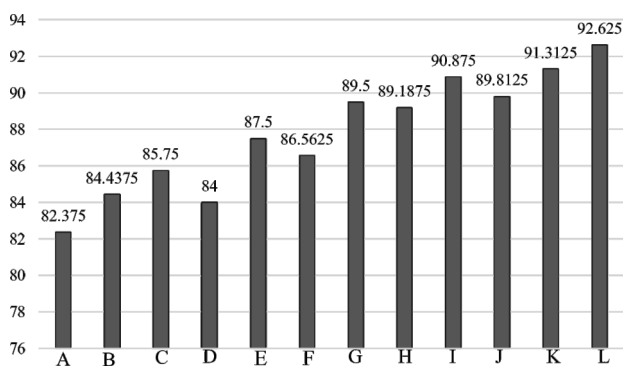
Fig.1:Bar graph of peer scoring of teaching simulation

An observation on the data indicated that a pattern of increment on students' scoring for the seven weeks, and the pattern of the data indicated fluctuate on weekly scoring. This study consistent with previous research ", whereby self-concept that has not been optimal affect the students' academic ability, which is true in this case. ", stressed that several aspects in self-concept that is directly related to academic ability must be taken into consideration, including knowledge of professional knowledge and critical thinking skills. The relationship between students' cognitive appraisals and characteristics of the learning environment and learning setting has been evaluated which has found that high levels of teacher diagnostic skills coupled with high levels of intellectual self-concept, associated with high enjoyment . This explains that teacher's roles are also important in developing student's self-concept and giving opportunity for the teachers to develop themselves a quality teacher '

4. Conclusion

Student's professional knowledge and self-concept are crucial in developing teacher's character in the aim of bringing quality education to the society. This study emphasis on the substantial effect of self and peer evaluation through rubric assessment. Educators from different parts of the world are supporting the use of rubrics as an instructional tool and highlighting the enormous contributions that rubrics can make in the teaching-learning paradigm. Rubric assessment, while being used as a peer-assessment tool contributes to the enhancement of students' skills and competency. The tacit and specific knowledge required in the session indirectly triggered student's existing knowledge, thus increase their understanding on the subject.

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