Development of Teacher Creativity Models to Improve Teacher's Pedagogic Competency in the Educational Era 4.0

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A model of teacher creativity of the Early Childhood Education Program might be improved by developing models of innovativeness and teacher pedagogical and digital literacy competencies in the Educational Era 4.0. An effort is needed so that the pedagogical competence of teachers increases significantly by developing the creativity of teachers adapted to current needs. Based on observations, one of the reasons for the low competitiveness of teachers is their low pedagogical competencies and lack of Principal leadership support. Data analysis was performed using descriptive statistics, normality tests, homogeneity tests, linearity tests and simple and multiple regression. It was expected to be found that identification of appropriate creativity can improve the pedagogical competence of teachers in developing innovative learning models. The results showed that there is a positive relationship between teacher creativity and teachers' pedagogical competency with the strength of the relationship.

Key words: *Teacher creativity models, Teacher's pedagogic competency, Educational era 4.0.*

Introduction

Increasing the competitiveness of teachers in the millennial era is an important topic of discussion and how to work around this is the solution that is always sought. One of the qualities of graduates depends very much on the competence and innovativeness of teachers in schools. At the moment, the creativity and innovativeness of teachers are still not optimal. There are still many teachers who are not creative and greatly innovative to be able to develop appropriate learning models, design creative and innovative learning media and

interesting learning resources. Simple educational innovations can be interpreted as innovations in the field of education. Associated with the aforementioned things, a teacher is strongly influenced by internal and external motivation, one of which is the leadership of the Principal.

This research began with an increase in teacher innovativeness through the development of organisational culture, transformational leadership and teacher work motivation (Suharyati, 2016). Other studies related to the innovation of local culture-based historical learning models in the form of EduGame use multi-media (Farragher et al., 2000; Suharyati & Helena, 2018). Previous research concluded that teacher creativity is influenced by leadership roles and other factors, such as organisational culture and motivation. Challenges in the Educational Era 4.0 require teachers to change their mindset, values, behaviour and learning goals. An effort is needed so that the pedagogical competence of teachers increases significantly by developing the creativity of teachers adapted to the needs of the times. A low competitiveness of teachers is caused by a low pedagogical competence of the teacher and a lack of Principal leadership support. This study aims to: (1) find a creativity model that can motivate teachers to improve their pedagogical competencies, and (2) create a model of learning creativity to increase student motivation so that they can produce quality graduates.

The creative process — the sequence of thoughts and actions that leads to a novel, adaptive production — has been one of the key topics of creativity research during the past century (Todd, 2001). In his speech, the President of American Psychological Association, Guilford (1950) noted that there was a considerable agreement that the complete creative act involves four important steps, traditionally identified as (a) preparation, (b) incubation, (c) illumination, and (d) verification. Torrance in Ghanizadeh & Jahedizadeh (2016) suggests four skills to develop creativity: (1) creative fluency, producing a large number of ideas; (2) flexibility, variety in generating ideas; (3) originality, the ability in conducting unique and unusual ideas; and (4) elaboration, the act in developing ideas.

In addition, the pedagogic competence of a teacher will greatly influence the creativity and innovation of the teacher. Knowledge and capabilities needed in the Educational Era 4.0 are related to digital literacy. If a teacher has digital literacy skills and mastery of technology, then they will be able to search for interesting learning resources in cyberspace. They can also design learning media that is interesting and develop them into creative and innovative forms (Afrianto, 2018; Lase, 2019).

Nasir (2018) mentions many challenges that will be faced in the Educational Era 4.0. Firstly, the challenge to increase value and national work productivity, as well as growing the economy and equity, in an effort to keep and improve sustainability. Secondly, encouragement to study this Era, looking at improvement and change for a stronger society, from rural to modern-industrial and information-communication societies. As well as the

implications of improving and developing the quality of life of human resources. Thirdly, summons in the increasingly fierce global and national competition to make quality, innovative products as an outcome of thinking and knowledge of science, technology and art. Fourthly, the challenge of the appearance of new occupations in the field of science and technology, which replace the seizing and capturing in political and economic fields.

Competence is the ability of a person to exercise or perform a job or task that is based on skills, knowledge and attitudes supported by work in accordance with the demands of the job (Adnan, 2015). Spencer & Spencer (1993) reports that competency is an underlying characteristic of a person related to the effectiveness of individual performance on the job. Or the basic characteristics of individuals who have a causal relationship or a cause and effect with the criteria referenced, effective, excellent or superior performance in the workplace or at certain situations. The concept that is one's competence required in learning management is called the pedagogical competence. Spencer & Spencer (1993) also said competence is always related to the ability of a teacher associated with the level of understanding of learners, the learning process and self-actualization. Mulyasa (2007) stated that pedagogical competence is the ability to manage the learning of learners and includes an understanding of learners, instructional design and implementation, evaluation of learning outcomes, and the development of learners to actualise their potential.

Mirzagitova & Akhmetov (2015) concluded that the pedagogical educational environment set off a factor of formation of professional competence of future teachers. It is said that teachers must focus on discipline, implementation and fact. There must be clarity, logic in the shaping and procedure of activities, and that they are relevant for school implementation. A good relationship is ensured between the teacher and student by proposing the concepts of democracy and an advanced kind of learning especially in the early childhood programs (Sugiyarto, & Ali, 2019; Liakopoulou, 2011; Suciu & Mata, 2011). There should be information about the organisation of modern educational projects and expansions for students on the interactions of many subjects of teaching and learning (Akeshova et al., 2013). The teacher should create primary teaching and learning programs, and school teachers and students will get all elements of the learning situations (Esquivel, 1995; Fullan, 2014; Suarmika, 2018). McClelland (1993) emphasised that competence is the basis of a personal characteristic that is the deciding factor in the success or failure of a person doing a job in a given situation. Therefore it is important to focus on internal factors, but it is also a proportional combination of external and internal conditions to achieve the most constructive result. A modern teacher, who is easily adaptive in the changing conditions, encourages a child 'to see the sun' (Rahman, 2014).

Education Era 4.0 flags the requirements of society in an innovative era. It conforms to the changing behaviour with the special characteristics of parallelism, connectivism (Goldie, 2016), and visualisation. This learning management asks teachers to master and develop their

learning ability to apply the new technology, which will help their learners to adapt to the changes in society. Sinlarat (2016) says this is a new learning system, allowing the teacher and the learner to grow their knowledge and skills for life, not just to know how to read and write. They can live in a society and be equipped with the best of their ability. Education Era 4.0 is not just an education. It is the era in which teaching and learning should adapt to the changes in social and economic conditions to increase the human capital need. There must be a difference in teaching and learning models, which is not seeking to set up the 3 R's skills of reading, writing and arithmetic, to encourage the young generation to live in a happy society rather than to create standards and life skills that answer to the new era of Education 4.0.

Living in the era of Education 4.0 the teacher and learner should master innovative skills other than owning 21st-century skills. These consist of leadership, collaboration, creativity, digital literacy, effective communication, emotional intelligence, entrepreneurship, global citizenship, problem-solving and teamwork. It also needs the skills of building an intelligent nation or people who have critical thinking, creativity and innovation, cross-cultural understanding, information and media literacy, and career and learning skills (Puncreobutr, 2016).

Skills for innovating include: the process of seeking the possibilities in innovative design; selection of the best way to produce; and leading the most worthy way that helps to gain benefits from the innovation. Each process requires different skills such as: critical thinking; design and selective thinking; productive and problem-solving thinking; entrepreneurial thinking; responsible thinking; social-consciousness thinking; and scenario thinking (Marinela & Andreescu, 2011).

Methods

The research method used was quantitative research by distributing creativity instruments and teacher pedagogical competency instruments. The stages of developing teacher creativity models to improve teacher pedagogical competencies, based on digital literacy, were divided into four major stages namely: planning, implementation, data processing, research results, and program sustainability.

The population of the study was teachers in Early Childhood Education Programs in Bogor City, Indonesia. The samples were permanent teachers who were active in teaching. The instruments used in the teacher creativity model include: (1) indicators of teacher creativity and (2) the formation of creative learning models. The research method used in conducting quantitative research was by distributing teacher creativity model instruments and (3) engineering innovative learning models.

Data analysis was performed using descriptive statistics, normality tests, homogeneity tests, linearity tests, and simple and multiple regression. Therefore it is expected to be found that identification of appropriate creativity can improve the pedagogical competence of teachers in developing innovative learning models.

Results and Discussion

Table 1: Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TS	0.127	33	0.192	0.960	33	0.255

a. Lilliefors Significance Correction

Table 2: Tests of Normality

Kolmogorov-Smirnov[a]			Shapiro-Wilk		
Statistic	df	Sig.	Statistic	df	Sig.
0.110	33	0.200*	0.969	33	0.462

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

The description of the data from the results of this study can be described as follows.

A. Teacher Creativity

The description of the data shows the significance value (p) of the Shapiro-wilk test is 0.255 ($p > 0.05$). Based on the Shapiro-wilk normality test the data is normally distributed as seen in Table 1.

B. Teacher Pedagogical Competence

The significance value (p) in the Shapiro-Wilk test is 0.462 ($p > 0.05$), as shown in Table 2. Therefore based on the Shapiro-Wilk normality test the data is normally distributed. Both the teacher creativity and teacher pedagogical competence variables data have a normal distribution after the Shapiro-Wilk test was applied.

Table 3: ANOVA

			Sum of Squares	df	Mean Square	F	Sig.
TS * TSPEDA	Between Groups	(Combined)	5795.303	21	275.967	4.947	0.005
		Linearity	4928.384	1	4928.384	88.341	0.000
		Deviation from Linearity	866.919	20	43.346	0.777	0.700
	Within Groups		613.667	11	55.788		
	Total		6408.970	32			

Based on Table 3, the following Anova test results were obtained:

a. The significant value (sig) of the Deviation from Linearity Sig is 0.700 > than 0.05. Therefore it can be concluded that there is a significant linear relationship between the teacher pedagogic competence variable (X) with the teacher creativity variable (Y).

b. The calculated F value is $0.777 < F^{table}$ 2.05. Because the F count is smaller than the F^{table}, it can be concluded that there is a significant linear relationship between the pedagogic variable (X) and the creativity variable (Y).

Table 4: Correlations

		TS	TSPEDA
TS	Pearson Correlation	1	0.877**
	Sig. (2-tailed)		0.000
	N	33	33
TSPEDA	Pearson Correlation	0.877**	1
	Sig. (2-tailed)	0.000	
	N	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

Based on Table 4, the following correlation results are obtained:

a. The sig. (2-tailed) value between the variables of teacher pedagogic competence and teacher creativity is 0.000 < 0.05. This shows a significant correlation between teacher pedagogic competence and teacher creativity variables.

b. The value of r arithmetic (Pearson Correlations) for the variables of pedagogic relationship with Creativity is 0.877 > r table 0.344. Therefore there is a relationship or correlation between the pedagogic and creativity variables.

The relationship between teacher creativity and teacher pedagogic competency can be seen in the results of the correlation test, which had a correlation coefficient of 0.877. The diversity that exists in the quality of teacher creativity has a relationship with teacher pedagogic competency. It can be seen from the coefficient of determination of 0.344 that the teacher creativity can explain the diversity that exists in the teacher pedagogic competency with a contribution of 33%. In comparison, 67% is influenced by other factors outside the teacher's creativity.

A teacher should self-development their pedagogical competence as a future teacher, which is a conscious activity by the student of the pedagogical in early childhood education programs (Geber et al., 2014). Teachers, especially early childhood teachers, must have a developed ability of creativity. The ability of students who are aged 4 to 6 years needs to be improved by providing virtual knowledge. For example, a child will not understand the concept of the Coronavirus (COVID-19) that is spreading. This concept is complicated to understand. Therefore the teacher must be able to use a visual explanation. They must be able to use teaching aids, explain in plain language and be understood by that aged child. (Kusnandar, 2008: p. 78) states that the teacher must master several things namely: a) understanding the characteristics of students from physical, moral, social, cultural, emotional and intellectual aspects; b) mastering learning theories and concepts of teaching and learning; c) developing related curricula; d) organising development activities that educate; e) utilising information technology; f) facilitating the progress of talented learners; g) communicating effectively, empathically and politely with students; and h) using an assessment and evaluation learning process. Teachers are directed on mastering their own initiative, psychology and pedagogical knowledge, improvement of professional abilities, pedagogical abilities, and professional-significant qualities (Mirzagitova, 2014).

Competence is the ability to carry out their duties and responsibilities. Educator competence can be classified as a field of knowledge, general knowledge and formation pedagogic. Pedagogic is one competency that must be mastered by the teacher. The ability to manage to learn and build good communication with children shows a pedagogic ability that can determine a successful learning process. In terms of competence, caregiver pedagogy is a basic ability that must be owned by a caregiver including understanding the basics of nurturing, skilfully carrying out nurturing and behaving according to the psychological needs of children (Dadan, 2017).

Conclusion

The results showed that there was a positive relationship between teacher creativity and teacher pedagogical competency, with the strength of the relationship ry = 0.344. This reflects an improvement in teacher pedagogical competency by increasing teacher creativity. Indicators show either that it was well maintained and developed or it did not show improvement. The results of this research show that teacher creativity is driven by a high pedagogical competence of the teacher. Pedagogic competencies needed in the Educational Era 4.0 are the ability of teachers to master technology, one of which is digital literacy, for example, making google classroom, digital comics, multi-media learning media, and more. To reach this stage, the teacher needs to complete digital literacy training. Due to limited funds, this study cannot proceed to the discussion phase of learning models.

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