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How Does Learner-Centered Education Affect Madrasah Teachers' Pedagogic Competence?

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ABSTRAK

Berbagai penelitian menggambarkan bahwa kompetensi pedagogi lebih banyak diteliti secara psikologis dalam proses pembelajaran, namun belum mengungkap penguatan pembelajaran berbasis proyek dalam pembelajaran guru madrasah. Penelitian ini bertujuan untuk mengeksplorasi apakah peningkatan pemanfaatan pembelajaran berbasis proyek (PBL) oleh guru madrasah di Indonesia meningkatkan kompetensi pedagogi guru madrasah dalam pembelajaran. Jenis penelitian ini yaitu eksperimen, dan menggunakan metode eksperimen semu. Instrumen yang digunakan untuk mengumpulkan data yaitu kuesioner. Teknik yang digunakan untuk menganalisis data yaitu analisis deskriptif kualitatif, kuantitatif dan statistik inferensial. Subjek penelitian ini adalah guru dari madrasah yang mengajar salah satu dari empat mata pelajaran inti pendidikan agama Islam dengan total 139 guru. Hasil penelitian yaitu kompetensi pedagogi guru madrasah hanya dianggap sebagai penentu praktik pengajaran pendidikan agama Islam, selain itu kompetensi pedagogi guru madrasah dapat dipengaruhi secara positif oleh peningkatan penggunaan PBL dalam pembelajaran. Di antara subskala kompetensi pedagogi guru madrasah, PBL berhubungan positif dengan keterlibatan siswa dan proses belajar mengajar. Analisis dengan menggunakan data siswa menunjukkan bahwa respon positif siswa terhadap praktik pembelajaran pendidikan agama Islam dapat memediasi hubungan antara PBL dengan kompetensi pedagogi guru madrasah. Penelitian ini berimplikasi pada pengembangan model PBL dalam meningkatkan kompetensi pedagogi guru madrasah dalam pembelajaran pendidikan agama Islam.

ABSTRACT

Various studies illustrate that pedagogical competence is studied more psychologically in the learning process but has not revealed the strengthening of project-based learning in madrasa teacher learning. This study analyzes whether increasing the use of project-based learning (PBL) by madrasah teachers in Indonesia improves the pedagogic competence of madrasah teachers in learning. This type of research is experimental and uses a quasi-experimental method. The instrument used to collect data is a questionnaire. The technique used to analyze the data is descriptive qualitative analysis, quantitative and statistical inferential. The subjects of this study are teachers from these madrasas who teach one of the four core subjects of Islamic religious education in total of 139 teachers. The result of the study is that the pedagogic competence of madrasah teachers is only considered a determinant of the teaching practice of Islamic religious education. However, we found that the pedagogic competence of madrasah teachers can be positively influenced by the increased use of PBL in learning. Among the madrasah teacher pedagogic competence subscales, PBL positively relates to student engagement and teaching and learning. Analysis using student data shows that students' positive responses to Islamic religious education learning practices can mediate the relationship between PBL and the pedagogic competence of madrasah teachers. This research has implications for developing the PBL model in improving the pedagogic competence of madrasah teachers in learning Islamic religious education.

1. INTRODUCTION

The pedagogic competence of madrasah teachers is the ability to teach in themselves as well as the ability to become professional teachers (Irmawati et al., 2021; König et al., 2021; Murkatik et al., 2020; Rusilowati & Wahyudi, 2020) has been found to be associated with various teacher characteristics and behaviors (Karuniawati et al., 2021; Rusilowati & Wahyudi, 2020). In particular, various theories describe that the pedagogic competence of madrasah teachers determines the abilities and teaching methods related to instructional practice (Guillén-Gámez et al., 2021; König et al., 2021; Snoek, 2021; Suprayogi et

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al., 2017). In addition, the pedagogic competence of teachers contributes to self-professional development (Guillén-Gómez et al., 2021; McGarr & McDonagh, 2021; Snoek, 2021) and also improves the quality of an educational institution. However, most studies examining the relationship between teachers' pedagogic competence and learning practices have relied on cross-sectional data (Hamzah et al., 2020; König et al., 2021; McGarr & McDonagh, 2021; Rusilowati & Wahyudi, 2020). This means that the data used for the analysis can allow for comparisons across respondents, but cannot explain changes over time, severely limiting the empirical ability to identify causality. Furthermore, the theoretical discussion of teacher pedagogic competence implies that there is a reciprocal or cyclical relationship with classroom experience (Komar et al., 2021; Muna et al., 2021; Sukenti & Tambak, 2020).

Thus, teacher pedagogic competence itself may be an outcome that is influenced by changes in instructional practice. Other research reveals that pedagogic competence implies the process of self-development with professionalism in learning at madrasas (Efendi, 2021; Hamzah et al., 2020; Muna et al., 2021; Sukenti et al., 2021). The various studies illustrate that pedagogic competence is more psychologically researched in the learning process, but has not revealed the strengthening of project-based learning in madrasa teacher learning. This research is a new thing where the pedagogic competence of madrasa teachers is given a solution with a project-based learning method that is different from previous research. Thus, to explore empirically the relationship between the pedagogic competence of madrasah teachers and instructional learning practices, this study uses data from a project-based learning (PBL) program intervention that took place in Pekanbaru City, Riau, Indonesia. In 2019, the Ministry of Religion of Riau Province provided four public madrasah aliyah in Pekanbaru City with PBL program interventions to encourage teachers in madrasas by changing the learning method from teacher-centered lectures to student-centered PBL. In the PBL program, the treatment group teachers were given training on how to apply PBL and asked to use it in the classroom for one semester, while the seven control group teachers did not receive any encouragement to change their learning practices. With data pooled on teachers and students from the program, we used a quasi-experimental research method to assess how increased use of PBL over one semester was associated with changes in teacher pedagogic competence in madrasas in learning. This research is very urgent to be carried out in order to empirically analyze the relationship between the pedagogical competence of madrasa teachers and instructional practices using data from project-based learning (PBL) program interventions in teaching Islamic religious education for madrasa teachers. Based on previous research, PBL in various theories provides development in the learning process (Guo et al., 2020; Miller et al., 2021; Santyasa et al., 2020; Sukenti & Tambak, 2020; Syakur et al., 2020). The application of PBL can develop a quality and competitive learning atmosphere and environment, as well as the development of a tradition of higher-order thinking for students (Abuhaid, 2020; Kim, 2020; Pérez & Rubio, 2020; Safaruddin et al., 2020; Wu & Wu, 2020). Thus, the focus of this study is to explore the following: the use of project-based learning affects the pedagogic competence of madrasa teachers in Islamic religious education.

2. METHODS

A total of fourteen Madrasah Aliyah in Pekanbaru City, Riau, Indonesia participated in this study, seven of which consisted of a treatment group and seven a control group. The main targets of the program are teachers from these madrasas who teach one of the four core subjects of Islamic religious education: Akidah Akhlak, Al-Qur'an Hadith, Fiqh, and Islamic Cultural History, to students from Madrasah aliyah (grade XI). A total of 139 teachers who meet these criteria participate in the PBL program. The response rates of the treatment group teachers for the pretreatment survey were 78% (56 teachers out of 72) and 67% (48 teachers out of 72) for the post-treatment survey. The control group teacher response rates were 55% (37 teachers out of 67) for the pre-treatment survey and 49% (33 teachers out of 67) for the post-treatment survey. The analysis for this study was conducted based on disproportionate data, meaning that some teachers and students only participated in either the pre-treatment or post-treatment surveys. To assess the relationship between PBL and the pedagogic competence of madrasah teachers, this study used a quasi-experimental method using survey data collected from teachers and students in two periods; before and after the use of PBL in the classroom for one semester. We mainly use two empirical methods: the difference-in-difference design and the instrumental variables through a two-stage least squares estimate (Angrist & Pischke, 2008). For the analysis using teacher data, the dependent variable of interest is a measure of teacher self-efficacy and its subscale. Therefore, we first analyzed teacher data to assess how PBL was associated with teachers' pedagogic competence and its subscales. Next, we analyzed student data to evaluate how students responded to PBL. This made it possible to indirectly assess whether the relationship between PBL and pedagogic competence might be related to PBL-induced changes in students. This study uses the short form of the Madrasah Teacher Pedagogic Competency Test

developed by (Tambak, 2021). TKPGM consists of a factor structure that is stable and broad enough to cover a wide range of relevant teacher abilities for teaching. The questionnaire for the TKPGM used in this study consisted of 54 items which were divided into three subscales of madrasah teacher pedagogic competence, with madrasah teacher pedagogic competence as a whole being the average of ten subscales. Each of the 54 items measures the extent to which madrasah teachers feel they have the ability to manage learning and is rated on a 4-point Likert scale. For student outcomes, we measured their perceptions of their teacher's level of effort to stimulate student interest, level of class preparation, students' own level of participation in class, and their own frequency of brainstorming with other students in the class. All measures are reported on a four-point Likert scale: 1) Strongly disagree; 2) Disagree; 3) Agree; 4) Strongly agree. In addition, to assess the academic ability of students, we provide an Islamic religious education exam consisting of five questions, with possible scores ranging from 0 to 5.

3. RESULT AND DISCUSSION

Results

Multicultural The effect of the PBL program on the pedagogical competence of madrasah teachers and their subscales, estimated through the design differences expressed in (Equation (1)) as shown in Table 1.

Table 1. Project-based learning and pedagogic competence: Difference-in-Differences estimates

Dependent variable:	Pedagogic competence of madrasa	Pedagogic competence in instruction	Pedagogic competence in management	Pedagogic competence in engagement
Post Treat	0.942 (0.299)	1.011 (0.272)	0.509 (0.327)	0.899 (0.242)
Post	0.012 (0.202)	0.318 (0.184)	0.028 (0.235)	0.013 (0.166)
Treat	0.740** (0.245)	0.811** (0.263)	0.588** (0.250)	0.571*** (0.179)
Student math score	0.046 (0.165)	0.103 (0.136)	0.089 (0.160)	0.067 (0.157)
Female	0.091 (0.473)	0.202 (0.452)	0.088 (0.497)	0.020 (0.315)
MA and above	0.082 (0.304)	0.022 (0.264)	0.077 (0.311)	0.083 (0.237)
Total teaching experience	0.004 (0.002)	0.003 (0.001)	0.003 (0.002)	0.003 (0.001)
Experience at current school	0.001 (0.002)	0.002 (0.003)	0.000 (0.002)	0.002 (0.002)
Permanent	0.724 (0.378)	0.559 (0.338)	0.662 (0.446)	0.674 (0.272)
Observations	174	174	174	174
R-squared	0.222	0.319	0.131	0.212

Based on Table 1 the first column shows that the PBL program is associated with an increase in the pedagogic competence of madrasah teachers by 0.942 standard deviations ($p < 0.01$). Column 2 reports that the PBL program has a significant relationship with the pedagogical competence of madrasah teachers in instruction with a standard deviation of 1.011 ($p < 0.01$), and Column 4 reports that pedagogical competence in engagement is significantly related to the PBL program of 0.899 standard deviations ($p < 0.01$). The results in column 3 show that the PBL program has no significant effect on the pedagogic competence of madrasah teachers in classroom management. This indicates that pedagogic competence in teaching and student engagement drive the positive impact that PBL programs have on the pedagogic competence of madrasah teachers as a whole. Among the madrasah teacher pedagogic competence subscales, PBL had the strongest impact on teachers' pedagogic competence in engagement, which might be expected, given that the central change reflected in treatment was changes in instructional

practice. The results of the instrumental approach variables on the impact of using PBL on the pedagogic competence of madrasah teachers and their subscales is show in Table 2.

Table 2. Project-Based Learning and Madrasah Teacher Pedagogic Competence: Two-Stage Least Squares Estimates

Dependent variable:	Pedagogic competence of madrasa teachers	Pedagogic competence in instruction	Pedagogic competence in management	Pedagogic competence in engagement
(a) Second stage				
Predicted PBL	2.270 (1.190)	2.115 (1.159)	1.143 (0.945)	2.016 (0.949)
Post	0.122 (0.646)	0.421 (0.636)	0.250 (0.509)	0.378 (0.522)
Treat	841** (0.334)	0.768** (0.325)	.603** (0.288)	0.597** (0.259)
Controls	YES	YES	YES	YES
Observations	174	174	174	174
(b) First stage				
Post Treat	0.446 (0.158)			
Post	0.194 (0.131)			
Treat	0.013 (0.066)			
Controls	YES			
Observations	174			
F-statistic	14.89			

Based on Table 2 the results of the first stage regression (Equation (2)) are found in column 1 of Panel (b). The intervention program increased the likelihood of implementing PBL in the classroom either "often" or "in all or almost all subjects" by 44.6 percentage points ($p < 0.05$). This provides further evidence that the PBL intervention program causes significant changes in the way teaching takes place in the classroom. Panel (a) of Table 2 reports the estimates of the second stage of the instrumental-variable approach regression (Equation (3)). The predicted PBL frequency values obtained from the first-stage regression estimation were collected and entered into the regression to estimate Equation (3). In column 1 of panel (a), an exogenous increase in the use of PBL was associated with an increase in the pedagogic competence of madrasah teachers by 2,270 standard deviations ($p < 0.1$). Self-efficacy in instruction and engagement was also found to be positively influenced by PBL, increasing by 2.115 standard deviations ($p < 0.1$) and 2.016 standard deviations ($p < 0.05$), respectively. As was the case in the difference-within-difference estimate, PBL was found to have no significant effect on pedagogic competence in classroom management. The positive associations found between madrasah teachers' pedagogic competencies and PBL could be mediated by the effect that PBL has on students. At Madrasah aliyah Pekanbaru, students are placed in one classroom, and teachers in charge of different subjects come in different classes at different hours to teach their respective subjects, so grade level analyzes linking student and teacher outcomes cannot be carried out. Students and teachers can connect at the madrasah level, but because our data contains only twelve madrasahs, the school-level analysis would lack sufficient statistical power. Because of this, we can only estimate the relationship between PBL student reports and student responses, and indirectly conclude that any effect found in the student data may be related to the positive association found between PBL and teachers' pedagogic competence in the madrasah teacher data. Then in Table 3 reports the estimated difference-in-difference obtained through equation (1) using student survey data. Estimates were obtained for the entire sample as well as for the madrasah subsample consisting of the three treatment group madrasah in which PBL increased the most and their respective control madrasahs matched.

Base on Table 3 responses from the teacher survey and student survey showed that teachers from Madrasah Aliyah Negeri 1, Madrasah Aliyah Negeri 2, and Madrasah Aliyah Negeri 4 had the largest increase in the use of PBL after the PBL program. Column 2 of panel (a) shows that the PBL intervention program led to an increase in the perception of efforts to attract teachers' interest by 0.155 standard deviation ($p < 0.1$). There was no statistically significant relationship between the PBL program and other student variables. In panel (b), where the analysis was limited to the three care schools in which: PBL increased the most and their matched control madrasahs, we found that the PBL program increased the

madrasa teacher's perception of interest by persuasion effort by 0.360 standard deviation ($p < 0, 05$). This shows very good development. Separate estimates are reported for those obtained with the entire sample (Panel (a)) and the subset of the three madrasah with the greatest improvement in PBL and their matched control schools (Panel (b)). Estimates obtained through the instrumental variable approach are reported in Table 4.

Table 3. Project-Based Learning and Student Outcomes: Difference-in-Differences Estimates

Dependent variable	Teacher preparation	Teacher inducement	Share idea	Class participation
(a) Sample: All schools				
Treat Post	0.090 (0.086)	0.155* (0.084)	0.159 (0.114)	0.093 (0.079)
Controls	YES	YES	YES	YES
Observations	2266	2266	1944	2266
R-squared	0.013	0.011	0.011	0.072
(b) Sample: PBL top 3 schools				
Post Treat	0.240 (0.130)	0.360** (0.090)	0.214 (0.157)	0.027 (0.114)
Controls	YES	YES	YES	YES
Observations	1146	1146	988	1146
R-squared	0.012	0.018	0.011	0.059

Table 4. Project-Based Learning and Student Outcomes: Two-Stage Least Squares Estimates

Dependent variable	Teacher preparation	Teacher inducement	Share idea	Class participation
(a) Second stage - All schools				
Predicted PBL	0.457 (0.438)	0.792* (0.439)	0.995* (0.603)	0.472 (0.429)
Controls	YES	YES	YES	YES
Observations	2266	2266	1944	2266
(b) Second stage - PBL top 3				
Predicted PBL	0.674* (0.348)	1.010*** (0.355)	0.724* (0.433)	0.075 (0.303)
Controls	YES	YES	YES	YES
Observations	1146	1146	988	1146
(c) First stage				
Dependent variable:	All schools		PBL top 3	
Project-based				
Treat Post	0.196*** (0.038)		0.357*** (0.052)	
Controls	YES		YES	
Observations	2266		1146	
F-statistic	346.90		295.38	

Discussion

In this study, we analyse whether increasing the use of PBL by madrasah aliyah teachers in Indonesia improves the pedagogic competence of madrasah teachers. Estimates obtained using a difference-in-difference design and an instrumental variable approach found that the PBL program had a positive effect on the pedagogical competence of madrasah teachers. Also, analysis of student data using a difference-in-difference design found that the PBL program positively affected students' perceptions of the level of effort a teacher exerted to provoke interest. Estimation using an instrumental variable approach on the subset of schools with the strongest increase in PBL use found that PBL was positively related to madrasah teachers' perceptions of class preparation, efforts to induce madrasa teacher interest,

and the frequency with which students shared ideas in class. The positive associations found between PBL and the pedagogical competence of madrasah teachers indicate that learning practices are not only the result of madrasah teachers' pedagogical competence, as is generally perceived, but can also lead to changes in madrasah teachers' pedagogical competences. Based largely on analysis using cross-sectional data, researchers tend to treat the pedagogic competence of madrasah teachers only as a determinant of the learning method approach (M. Ritonga et al., 2021; Suprayogi et al., 2017; Tambak, Ahmad, & Sukenti, 2020; Tambak, Ahmad, Sukenti, et al., 2020). This study provides empirical evidence for alternative understanding; it could also be for learning practices to influence the pedagogic competence of madrasah teachers. Analysis of the data collected over two time periods with the quasi-experimental PBL method provided greater support for interpreting causality than previous studies based on cross-sectional data. This study introduces teaching practice as a mediating factor influencing the pedagogy of madrasah teachers, contributing to the literature seeking to understand teacher pedagogical competency development (Lobczowski et al., 2021; A. W. Ritonga, 2021; Tambak et al., 2021; Tambak, Ahmad, Sukenti, et al., 2020).

From the three main sources of developing pedagogic competence of madrasah teachers rooted in social cognitive theory, it is possible that experience plays a major role in improving the pedagogic competence of madrasah teachers. It is in line with previous researcher that found experience mastery occurs when teachers view their performance as madrasah teachers to be successful. It is possible that PBL leads to a more positive educational experience among students, leading to an increase in the pedagogic competence of madrasah teachers (Hussein, 2021; Owens & Hite, 2020; Tambak et al., 2021; Untari et al., 2020). The other study also found there are positive associations found between PBL and student outcomes support the possibility of mastery experiences (Amin et al., 2020; Hussin et al., 2018; Sari et al., 2019). Among the three madrasahs that experienced the greatest increase in PBL, were shown to have a positive and statistically significant change in the way they carried out their teacher's efforts to provoke interest and preparatory classes, and also increased their frequency of sharing ideas with other students in the class. Students have more positive perceptions of teachers in the classroom, if conveyed to teachers, can contribute to teachers who understand their own teaching to be effective. Also, sharing ideas in class is likely related to involvement in course material. Madrasah teachers' positive perceptions and more involvement in the classroom through sharing ideas tend to lead to mastery experiences that increase teacher pedagogic competence. This study is not without limitations which should be addressed in future research. First, the potential limitation of this study is the use of a subject-netr measure of madrasah teacher pedagogical competence. Some scholars argue the need to develop the pedagogical competence of madrasah teachers in a closer relationship with the specific teacher context such as the subject being taught (Akharraz, 2021; Chaijum & Hiranyachattada, 2020; Ljung-Djärf et al., 2014; Sukenti et al., 2021). Although the additional predictive value and generalizability of such constructs have not been determined, the use of various measures of madrasah teacher pedagogic competence in future research may lead to more robust estimates. Second, this study only used teacher self-reported measures of teacher pedagogic competence. However, simply assessing teachers' own assessments can lead to positive or negative self-assessment bias, which can distort and underestimate the relationship between teachers' pedagogical competencies and others. Drawing on multiple data sources to measure pedagogic competence, such as using teacher and student ratings, can allow for more reliable and stable measurements. Third, there are limitations with regard to the generalizability of the main findings. The sample size of this study was relatively small, and the study was only conducted in schools in Pekanbaru Metropolitan City. Also, the madrasah teacher survey has a relatively low response rate. Thus, there may be limitations in generalizing the findings to national or international levels. Future studies should aim to expand the sample of madrasah teachers, both in scope and number, to obtain more generalizable findings. Finally, this study only assessed the impact of PBL immediately after it was implemented for one semester. To gain a more complete understanding of how PBL affects the pedagogical competence of madrasah teachers, the instructional approach can be expanded (eg more than one semester). Also, long-term effects should be assessed through outcomes measured at later time points.

4. CONCLUSION

This study provides empirical evidence for alternative understanding; it could also be for learning practices to influence the pedagogic competence of madrasah teachers in learning Islamic religious education. Analysis of the data collected over two time periods by quasi-experimental methods provided greater support for causal interpretation than previous studies based on cross-sectional data. This study introduces teaching practice as a mediating factor that affects the pedagogic competence of madrasah teachers, a contribution to the literature that seeks to understand the development of madrasah teachers'

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pedagogic competencies in Islamic religious education learning. The implication of this research is to develop the theory of "project-based learning on the pedagogic competence of madrasa teachers" in Islamic religious education. The findings of this study can be universally developed by the Ministry of Religion of the Republic of Indonesia in all madrasas in learning at madrasas. This study only assessed the impact of PBL immediately after it was implemented for one semester. To gain a more complete understanding of how PBL affects the pedagogic competence of madrasah teachers, the duration of using the instructional approach can be extended (eg more than one semester). Also, long-term effects should be assessed through outcomes measured at later time points. So, madrasa teacher self-efficacy is a crucial thing to be developed in language learning through a capable PBL process in the madrasa teacher profession.

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