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Problem-Based Learning Methods: It is Effective for Developing Madrasa Teacher Social Competence in Teaching?

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ABSTRACT

Developing social competence of madrasa teachers are increasingly popular in the classroom, but of these teachers, mixed results (without clear reasons) are reported. This study aims to see if increasing the use of problem-based learning (PBL) by madrasa aliyah teachers in Indonesia increases their social competency in education. This study employed a quasi-experimental technique and data from problem-based learning (PBL) intervention program to investigate how PBL is connected with teachers' social competency and was analyzed using a t-test. In general, the social competence of madrasa teachers is solely treated as a predictor of the practice of teaching Islamic religious education. Still, we discovered that the greater use of PBL in learning can favorably affect the social competence of madrasa teachers. PBL is positively associated with student involvement and teaching in learning among the madrasa teacher social competency subscales. However, according to data analysis, students' favorable responses to Islamic religious education learning practices can moderate the link between PBL and the social competency of madrasa instructors. This study has significance for the PBL model's growth in strengthening the social competency of madrasa teachers learning Islamic religious education.

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1. INTRODUCTION (10 PT)

The ability of madrasa teachers to teach students as well as become professionals in social competences [1], [2], [3], [4] is associated with a variety of teacher attributes and behaviors [4], [5], [6]. Several theories, in particular, show how madrasa teachers' social competence influences their abilities and teaching techniques related to instructional practice [1], [7], [8], [9]. Furthermore, teacher social competency promotes self-development and improves educational institution quality [7], [10], [11].

Most research on the relationship between instructors' social competencies and learning practices, however, has employed cross-sectional data [1], [4], [10], [12]. This means that the data used in the study may be used to compare respondents but cannot explain changes across time, severely limiting the empirical potential to determine causality. Furthermore, a theoretical examination of teacher social competence reveals a reciprocal or cyclical relationship between classroom experience and teacher social competence [11], [13],

[14], [15]. As a result, changes in instructional practice may affect teacher social competence. According to another research, social competency in madrasa learning entails a process of self-development with social [15], [16], [17], [18].

These studies reveal that social competence is more psychologically investigated in the learning process but do not prove that problem-based learning is strengthened in madrasa teacher learning. This innovative research addresses madrasa instructors' social competency using a problem-based learning approach that varies from previous studies. This study investigates the relationship between the social competency of madrasa teachers and instructional learning practices using data from a problem-based learning (PBL) program intervention in Pekanbaru City, Riau, Indonesia. In 2019, the Riau Province Ministry of Religion provided PBL program interventions to four public madrasa aliyah in Pekanbaru City to engage madrasa teachers by transforming the learning strategy from teacher-centered lectures to student-centered PBL. The treatment group teachers were taught how to use PBL and were expected to use it in the classroom for one semester, while the seven control group teachers were not encouraged to change their teaching approaches. We used a quasi-experimental study approach with data from the program's instructors and students to investigate how increased use of PBL over one semester was related to changes in teacher social competency in madrasas in learning.

This study must evaluate the relationship between madrasa teachers' social competencies and instructional practices using data from problem-based learning (PBL) program interventions in teaching Islamic religious education to madrasa instructors as soon as possible. PBL, according to several theories, facilitates learning progression [19], [20], [21], [22], [23]. Furthermore, the usage of PBL can serve to build a high-quality, competitive learning environment for students, as well as a tradition of higher-order thinking [24], [25], [26], [27], [28]. As a result, this study aims to see how problem-based learning influences madrasa instructors' social competency in Islamic religious education.

2. RESEACRH METHOD

2.1. Participant

In this study, fourteen Madrasah Aliyah out of twenty-six in Pekanbaru City, Riau, Indonesia were in the treatment group, and seven were in the control group. The program's key goals include teachers from various madrasas who teach one of the four essential disciplines of Islamic religious education to Madrasa Aliyah students: Akidah Akhlak, Al-Qur'an Hadith, Fiqh, and Islamic Cultural History (grade XI). These requirements are met by 139 teachers that participate in the PBL program. The pre-treatment survey was completed by 78 percent of the treatment group instructors (56 out of 72), while the post-treatment survey was conducted by 67 percent (48 teachers out of 72). The pre-treatment survey response rate for the control group instructors was 55% (37 out of 67), while the post-treatment survey response rate was 49% (33 out of 67).

The analysis in this study was based on skewed data, which indicates that some teachers and students only completed the pre-treatment or post-treatment surveys. For example, 57 (48.7%) of the 117 unique teachers in the sample completed both the pre-treatment and post-treatment surveys, whereas 36 (30.8%) completed only the pre-treatment survey and 24 (20.5%) completed only the post-treatment survey. As a result, in the final sample analysis for teacher survey data, the number of observations in the pre-treatment period was 93 (53.4 percent), and the number of comments in the post-treatment period was 81. (46.6 percent). In terms of student survey data, 1107 (87.3 percent) of a total sample of 1268 students completed both the pre-and post-treatment questionnaires, while 109 (8.6 percent) completed just the pre-treatment survey and 52 (4.1 percent) completed only the post-treatment survey.

According to a summary of basic teacher and student background characteristics, 82 percent of the 56 teachers in the treatment group were female, 38 percent had a master's degree or higher education level, and the average total teaching experience was 150.13 months (SD 99.39), or about 12.5 years, the average school year at the current school is 24.15 months (SD 41.81), or about two years, and 79 percent are on permanent contracts. There were no statistically significant differences between the treatment and control groups, according to the basic means t-test. During the pre-treatment period, 44 percent of the students in the treatment group were female, with a mean language score of 2.66. (Score range: 0 to 5; standard deviation: 1.48). T-tests at the start of the study revealed no statistically significant differences in gender composition or Islamic religious education ratings between the treatment and control groups. On the other hand, the therapy group had a higher proportion of children with parents with bachelor's degrees. To account for these differences explicitly, we included them as control variables in all regression models.

2.2. Choosing a Sample

The madrasas for the treatment and control groups were not chosen randomly, which might skew results and limit the extent to which causal conclusions can be established. Given the sample's representativeness, one treatment school is selected from one of the city's seven separate school districts, and an appropriate control school is picked from the same district. Control madrasas were found to be the same sex

as treatment schools (one sex in the madrasa and grade level) and within 2 kilometers of each other. Thus, in our sample, we have two madrasas (one experimental school and one control school) that are as close to one other regarding gender organization and geographic location as possible. Because Madrasa teachers and students did not freely or self-select into the treatment or control groups, the danger of selection bias was eliminated.

Although the research sample was not randomly picked, the differences in background characteristics between madrasa teachers and students in the treatment and control groups were slight. Furthermore, we show that the likelihood of being in the treatment vs. control group does not differ across instructors depending on the majority of observable characteristics. Students are all in the same situation. Each variable factor was controlled in all regressions. In terms of policy, the madrasas in our research are all located in the same city of Pekanbaru, which has a highly centralized education system in which madrasas are similar in terms of minimum teacher training and certification criteria curriculum and texts, teacher wages, and finances. Operational. The quasi-experimental study approach is validated by the relatively high degree of homogeneity between treatment and control schools.

2.3. Design

This study employed a quasi-experimental technique [30] to investigate the association between PBL and the social competency of madrasa instructors, collecting survey data from teachers and students in two periods: before and after the usage of PBL in the classroom for one semester. We primarily employ two empirical methods: the difference-in-difference design and instrumental variables estimated using a two-stage least squares technique. These two methodologies are frequently employed in policy assessment studies to examine the causal influence of policies on the variables of interest [31]. The dependent variable of interest in the study utilizing teacher data is a measure of teacher self-efficacy and its subscale. The dependent variables of interest in the study using student data were students' impressions of their teacher's attempts to foster curiosity, degree of class preparation, students' self-assessments about their class involvement, and self-assessments about how often they offered ideas in class. Because teacher and student data can only be connected at the school level, and the study only included 14 madrasas, analyzing the relationship between student and madrasa teacher factors is impossible. As a result, we first examined teacher data to see how PBL was related to teachers' social competency and its subscales. Following that, we reviewed student data to see how kids reacted to PBL. This allowed us to analyze whether the association between PBL and social competence was attributable to PBL-induced changes in pupils.

2.4. Measurement

Various ways of assessing teacher social competency have been developed throughout the years [29]. In its shortened form, Tabak's Madrasa Teacher Social Competency Test is used in this study [29]. TKPGM is made up of a stable factor structure that is broad enough to encompass a wide variety of relevant teacher abilities for instructing. It is one of the most extensively used social competence tools for madrasa teachers and is included in the national madrasa teacher survey. The TKPGM questionnaire used in this study had 54 questions separated into three subscales of madrasa teacher social competence, with madrasa teacher social competence as the average of 10 subscales. Each of the 54 questions assesses madrasa instructors' competence to manage to learn and is graded on a 4-point Likert scale ranging from "not at all" to "A" a lot." The subscales of madrasa teacher pedagogic competency include (a) social competence of Madrasa teachers in learning, (b) social competencies of Madrasa teachers in learning management (c) and social competencies of Madrasa teachers in engagement. Cronbach's Alpha was utilized to analyze the instrument's internal consistency, which resulted in (a 0.93) for the complete device.

We utilized a dummy variable created from the instructor's self-reported use of "many problems in progress" reported on a four-point Likert scale to quantify PBL frequency: 1) Never or hardly never; 2) Occasionally; 3) Frequently; 4) In all or almost all lessons The variable was categorized as 0 if the instructor reported using PBL "never or almost never" or "occasionally," and one if the teacher reported using PBL "frequently" or "in all or virtually all lessons." The student survey's measure of PBL frequency was built similarly to the madrasa teacher survey.

We examined student assessments of their teacher's amount of effort to promote student interest, level of class preparation, students' level of engagement in class, and frequency of brainstorming with other students in the category for student outcomes. All metrics are reported on a four-point Likert scale: 1) Strongly disagree; 2) Disagree; 3) Agree, and 4) Agree strongly. In addition, to measure students' intellectual competence, we provide an Islamic religious education exam with five questions and possible scores ranging from 0 to 5.

2.5. Procedure

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Pre-semester training sessions precede the PBL program's deployment during the madrasa semester. Between June and July 2020, teachers from the seven treatment madrasas received 30 hours of training (over four days) on how to use PBL in their classrooms. Six doctors who specialize in researching and implementing PBL lead the sessions. A pair of professors oversee each madrasa's training meeting. Learning the fundamental ideas of PBL, formulating inquiry questions for PBL, understanding the roles of instructors and students, and building and arranging courses comprise the training curriculum. One professor concentrates on the first two parts of training for each pair of lecturers in charge of training for two madrasas, while the remaining lecturers focus on the latter two.

2.6. Data examination

Missing scores in madrasa teacher survey data varied from 0.6 percent to 2.3 percent across all factors and periods. The two variables in the student survey data had two missing values each, giving a 0.08 percent loss rate. To address missing instances, average imputation is utilized. In addition, the mean value of the relevant variable from the appropriate school and respondent period is used to replace each missing value. Although it was not stated in the study, there was no significant difference in the results compared to the analysis done after excluding the list of respondents with missing values from the regression model.

Using a difference-in-difference methodology [32], [54], we first assessed the PBL program's treatment impact. The difference-in-difference technique captures the treatment effect by comparing the change in the mean over time of the outcome variable for the treatment group to the difference in the standard over time for the control group. The necessary assumption is that changes in outcome variables for the treatment and control groups will be similar across time in the absence of therapy. This is known as the parallel trend assumption because it requires temporal trends in outcome variables to be parallel in both groups before treatment. He should be aware that the beliefs demand identical movements, not the rate of outcome variables. If this assumption is correct, the difference in change over time between the treatment and control groups is regarded as a treatment-caused effect [32]. Empirical validation of the premise of parallel trends necessitates data collection at many periods before treatment. We cannot, however, directly test the assumption of similar developments because we only have data for a single time before and after therapy. Nonetheless, given the relatively high degree of homogeneity between the treatment and control groups, any variations in trends in the outcome variables are unlikely to be related to factors other than the PBL program intervention. The empirical model [33] used to get the difference-in-difference estimate is as follows:

$$Y_{ijt} = \beta_0 + \beta_1 \text{Treat} \times \text{Post} + \beta_2 \text{Treat} + \beta_3 \text{Post} + X_{ijt} + \epsilon_{ijt}$$

Where I , J , and t denote the individual (either instructor or student), school, and period, respectively. Individual I in school j at time t : y_{ijt} is the dependent variable of interest, such as social competency for madrasa instructors or student replies. Based on the mean and standard deviation of group scores, all dependent variables are normalized to have a mean of 0 and a standard deviation of 1. This was done to make interpretation more accessible, particularly regarding how the results changed compared to the control group. If it is more significant than one, the responder is a nursing school student, and if it is less than one, the respondent is a madrasa student. If time t is the post-treatment period (i.e., after the fall 2020 semester), Post equals 1; otherwise, Post equals 0. (i.e., before the intervention). $\text{Treat} \times \text{Post}$ [34] is an interaction between treatment indicator variables and the period. X_i is a vector control variable that includes individual characteristics like responders. They had gender, education level, overall teaching experience (in months), recent teaching experience at madrasas (in months), and kind of employment contract for madrasa instructors. In addition, they included the student's gender, parental education level, eldest child status, and test math results for pupils. ϵ_{ijt} is an error word that is grouped at the school level.

In addition to adopting PBL in the classroom, treatment group instructors received PBL consultations throughout the semester, which may be associated with teacher self-efficacy independently. Although we discovered that the usage of PBL by treatment group instructors rose considerably after treatment, any treatment effects found using the difference-in-difference methodology may be ascribed partly to consultation. We employ a two-stage least squares instrumental variable estimate method to tackle this problem. This method allows us to empirically quantify the changes in PBL use generated by PBL programs and examine how these exogenous changes are related to madrasa instructors' social competency.

3. RESULTS AND DISCUSSION

3.1. Result

3.1.1. Teacher analysis

Table 1 shows the influence of the PBL program on madrasa instructors' social competence and subscales, as measured by the design differences indicated in (Equation (1)). The first column reveals that the

PBL program is connected with a 0.942 standard deviation rise in the social competence of madrasa instructors (p 0.01). Column 2 reports that the PBL program has a significant relationship with the social competence of madrasa teachers in instruction, with a standard deviation of 1.011 (p 0.01), and Column 4 reports that the PBL program has a significant relationship with social competence in engagement, with a standard deviation of 0.899 (p 0.01). The results in column 3 reveal that the PBL program has no significant influence on madrasa instructors' social competency in classroom management. This suggests that the positive impact of PBL programs on the overall social competence of madrasa instructors is driven by social competence in teaching and student involvement. PBL had the most significant influence on teachers' social competence in engagement among the madrasa teacher social competence subscales, as should be predicted given that the important change represented in treatment was modifications in instructional practice.

The results of the instrumental approach factors on the influence of adopting PBL on the social competence of madrasa instructors and their subscales are presented in Table 2. Column 1 of the Panel contains the findings of the first stage regression (Equation (2)). (b). By 44.6 percentage points (p 0.05), the intervention program raised the chance of applying PBL in the classroom either "frequently" or "in all or virtually all topics." This demonstrates that the PBL intervention program generates significant changes in how teaching occurs in the classroom. Table 2's panel (a) displays the results of the second stage of the instrumental-variable approach regression (Equation (3)). The projected PBL frequency values from the first-stage regression estimates were gathered and placed into the deterioration to estimate Equation (3). Exogenous increases in the usage of PBL were related to an increase in the social competence of madrasa instructors by 2,270 standard deviations (p 0.1) in column 1 of the panel (a). PBL also increased self-efficacy in instruction and engagement by 2.115 standard deviations (p 0.1) and 2.016 standard deviations (p 0.05), respectively. PBL was shown to have no significant influence on social competency in classroom management, as in the difference-within-difference estimate.

3.1.2. Student analysis

The beneficial relationships shown between madrasa instructors' social qualities and PBL may be mediated by the impact of PBL on pupils. Students are put in one classroom at Madrasa Aliyah Pekanbaru, while instructors in charge of different courses arrive in separate classes at other times to teach their respective subjects; hence grade level analyses relating to student and teacher outcomes are not possible. Students and instructors can communicate at the madrasa level, but the school-level study would lack statistical power because our data only includes twelve madrasas. As a result, we can only estimate the link between PBL student reports and student replies and conclude indirectly that any influence identified in the student data may be connected to the positive association discovered in the madrasa teacher data between PBL and instructors' social competency.

Table 3 shows the estimated difference-in-difference calculated using equation (1) and student survey data. Estimates were derived for the entire sample and the madrasa subsample, which consisted of the three treatment group madrasas with the highest PBL increases and the matching control madrasas. According to the teacher and student surveys results, instructors from Madrasa Aliyah Negeri 1, Madrasa Aliyah Negeri 2, and Madrasa Aliyah Negeri 4 increased their usage of PBL the most following the PBL program. Column 2 of the panel (a) reveals that the PBL intervention program resulted in a 0.155 standard deviation rise in the perception of attempts to gain teachers' interest (p 0.1). The PBL program had no statistically significant link with other student factors. We discovered that the PBL program improved the madrasa teacher's impression of interest by persuasion effort by 0.360 standard deviations (p 0, 05) in panel (b), where the study was confined to the three care schools where PBL rose the highest and their matched control madrasa. This demonstrates tremendous growth.

Tabel 1
Problem-based learning and social competence: Difference-in-Differences estimates.

	(1)	(2)	(3)	(4)
Dependent variable:	Social competence of madrasa teachers	Social competence in instruction	Social competence in management	Social 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)

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Student math score	0.046	0.103	0.089	0.067
	(0.165)	(0.136)	(0.160)	(0.157)
Female	0.091	0.202	0.088	0.020
	(0.473)	(0.452)	(0.497)	(0.315)
MA and above	0.082	0.022	0.077	0.083
	(0.304)	(0.264)	(0.311)	(0.237)
Total teaching experience	0.004**	0.003**	0.003*	0.003*
	(0.002)	(0.001)	(0.002)	(0.001)
Experience at current school	0.001	0.002	0.000	0.002
	(0.002)	(0.003)	(0.002)	(0.002)
Permanent	0.724*	0.559	0.662	0.674**
Observations	(0.378) 174	(0.338) 174	(0.446) 174	(0.777) 174
R-squared	0.222	0.319	0.131	0.212

Note: If the post-treatment period is 1, the pre-treatment period is 0; Treatment: coded 1 if in the treatment group, 0 if in the control group; Average math test results for school-level kids (scores 0e5) Female: coded 1 if female, 0 if male; MA and above: coded 1 if the highest education level is S2 or higher, 0 otherwise; Total teaching experience and current school experience in months Permanent: coded 1 if the employee is permanent, 0 if the contract is temporary. The dependent variable was normalized to have a mean of 0 and a standard deviation of 1, based on the mean and standard deviation of the control group. The average of three self-efficacy subscales was used to determine teacher self-efficacy (instruction, student engagement, classroom management). The survey questions for assessing the social competency subscale of madrasa instructors were answered on four points: The Likert scale (1: "Not at all" to 4: "A lot"), with four questions posed for each subscale. Standard mistakes congregate at the school level. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 4 summarizes the results of the variable instrumental technique. Estimates for the total sample (Panel (a)) and the subgroup of the three madrasas with the most considerable improvement in PBL and their matching control schools (Panel (b)) are shown separately. PBL boosted the impression of madrasa teacher interest induction efforts by 0.792 standard deviations (p 0.1) and the extent to which students communicated ideas with each other in a class by 0.995 standard deviations (p 0.1) in Panel (a). There is no statistically significant association between instructor class preparation and student class participation. When the analysis was limited to three madrasas that experienced the most tremendous increase in PBL and their matched control madrasas, increased use of PBL was associated with a 0.674 standard deviation increase in perceptions of classroom preparation teachers (p 0.1), a 1.010 standard deviation increase in perceptions of the madrasa teacher's interest in persuasion efforts (p 0.1 0.01), and a standard deviation increase in students' sharing of ideas in class.

1

Table 2

Problem-based learning and madrasa teacher social competence: Two-stage least squares estimates.

(a) Second stage				
Dependent variable:	(1)	(2)	(3)	(4)
	Social competence of madrasa teachers	Social competence in instruction	Social competence in management	Social competence in engagement
Predicted PBL	2.270*	2.115*	1.143	2.016**
	(1.190)	(1.159)	(0.945)	(0.949)
Post	0.122	0.421	0.250	0.378
	(0.646)	(0.636)	(0.509)	(0.522)
Treat	0.841**	0.768**	0.603**	0.597**
	(0.334)	(0.325)	(0.288)	(0.259)
Observations	174	174	174	174

1

(b) First stage

Dependent variable: Problem-based learning	(1)
Post - Treat	0.446**
	(0.158)

4

Post	0.194 (0.131)
Treat	0.013 (0.066)
Observations	174
F-statistic	14.89

Problem-based learning: The dummy variable is coded 1 if problem-based learning is used "often" or "in all or virtually all lessons," and 0 if it is used "never or almost never" or "sometimes." Panel (a) PBL prediction is the same as Panel (b) regression PBL prediction; Post: coded 1 if the period is post-treatment, 0 if it is pre-treatment. Treatment is marked 1 if you are in the treatment group and 0 if you are in the control group. All regressions took the following factors into account: Gender: female is coded 1 while male is coded 0; Teacher education level: coded 1 if the highest education level is S2 or higher, 0 otherwise; In months, total teaching experience and present school experience Permanent employee: code 1 if permanent employee, 0 if contract employee. Based on the mean and standard deviation of the control group, the second stage dependent variable was standardized to have a mean of 0 and a standard deviation of 1. The average of three subscales of madrasa teacher social competence was used to determine madrasa teacher social competence (instruction, student involvement, classroom management). Madrasa instructors' social competence subscale was assessed using a four-point Likert scale (1: "Not at all" 4: "A lot"), with four questions posed for each subscale. Standard mistakes tend to congregate at the school level. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 3:
Problem-based learning and student outcomes: Difference-in-differences estimates.

(a) Sample: All schools

Dependent variable:	(1)	(2)	(3)	(4)
	Teacher preparation	Teacher inducement	Share idea	Class participation
Treat Post	0.090 (0.086)	0.155* (0.084)	0.159 (0.114)	0.093 (0.079)
Observations	2266	2266	1944	2266
R-squared	0.013	0.011	0.011	0.072
Dependent variable:	(1)	(2)	(3)	(4)
	Teacher preparation	Teacher inducement	Share idea	Class participation
Post Treat	0.240 (0.130)	0.360** (0.090)	0.214 (0.157)	0.027 (0.114)
Observations	1146	1146	988	1146
R-squared	0.012	0.018	0.011	0.059

Note: All dependent variables were standardized to have a mean of 0 and a standard deviation of 1, based on the mean and standard deviation of the control group. Teacher inducement: students' general perception of the teacher's efforts to encourage participation (1: "Strongly disagree" ~ 4: "Strongly agree"); Teacher preparation: students' general perception of teacher preparation for class (1: "Strongly disagree" ~ 4: "Strongly agree"); Sharing ideas with classmates: the extent to which ideas are shared with classmates during class (1: "Not at all" ~ 4: "A lot"); Class participation: self-assessment of enthusiastic class participation (1: "Strongly disagree" ~ 4: "Strongly agree"). All control regressions were as follows: Gender: coded 1 if female, 0 if male; Teacher education level: coded 1 if the highest education level is S2 or more, 0 otherwise; Total teaching experience and current school experience in months; Type of work: coded 1 if permanent worker, 0 if temporary contract. Top 3 PBL Madrasa refers to 6 treatment madrasa and its rival madrasas where the increase in the use of PBL is among the largest (top 3) among the treatment schools. Standard error clustered at school level. ***p < 0.01, **p < 0.05, *p < 0.1.

Table 4:
Problem-based learning and student outcomes: Two-stage least squares estimates.

(a) Second stage - All schools

Dependent variable:	(1)	(2)	(3)	(4)
	Teacher preparation	Teacher inducement	Share idea	Class participation
Predicted PBL	0.457 (0.438)	0.792* (0.439)	0.995* (0.603)	0.472 (0.429)
Observations	2266	2266	1944	2266

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Dependent variable:	(1)	(2)	(3)	(4)
Teacher preparation		Teacher inducement	Share idea	Class participation
	(0.348)	(0.355)	(0.433)	(0.303)
Observations	1146	1146	988	1146
Dependent variable: Problem-based learning	(1)	(2)		
	All schools	PBL top 3		
Treat Post	0.196*** (0.038)	0.357*** (0.052)		
Observations	2266	1146		
F-statistic	346.90	295.38		

Note: Regression in Panel (b) is limited to the top 3 treatment madrasas in terms of increased use of PBL as well as corresponding control madrasas. PBL predictions in Panel (a) are obtained from the first stage regression in Panel (c), Column 1; PBL predictions in Panel (b) were obtained from the first stage regression in Panel (c), Column 2. Teacher induction: student motivation general perceptions of teacher efforts to encourage participation (1: "Strongly disagree" ~ 4: "Strongly agree"); Teacher preparation: students' general perceptions of class preparation teachers (1: "Strongly disagree" ~ 4: "Strongly agree"); Sharing ideas with classmates: the extent to which ideas are shared with classmates during class (1: "Not at all" ~ 4: "A lot"); Class participation: self-assessment of enthusiastic class participation (1: "Strongly disagree" ~ 4: "Strongly agree"). All regressions controlled for the following: Gender: coded 1 if female, 0 if male; Teacher education level: coded 1 if the highest education level is S2 or more, 0 otherwise; Total teaching experience and current school experience in months; Permanent employee: coded 1 if permanent employee, 0 if temporary contract. Standard error clustered at the madrasa level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3.2. Discussion

In this study, we investigate if increasing the usage of PBL by madrasa aliyah teachers in Indonesia increases their social competency. According to estimates produced using a difference-in-difference design and an instrumental variable approach, the PBL curriculum had a favorable influence on the social competence of madrasa instructors. In addition, difference-in-difference design analysis of student data revealed that the PBL program positively influenced students' views of the degree of effort a teacher expended to pique students' interest. PBL was positively related to madrasa teachers' perceptions of class preparation, efforts to induce madrasa teacher interest, and the frequency with which students shared ideas in class when estimated using an instrumental variable approach on the subset of schools with the most significant increase in PBL use.

The positive relationships between PBL and madrasa teachers' social competencies suggest that learning practices are not just the product of madrasa teachers' social competencies, as is commonly assumed, but may also contribute to changes in madrasa teachers' social competencies. Based chiefly on cross-sectional data analysis, academics tend to regard madrasa instructors' social competency as a factor of the learning method approach [9], [29], [35], [36], [53]. This study gives empirical evidence for alternative understanding; it may also be for learning techniques to influence madrasa teachers' social competency. Data analysis using the quasi-experimental PBL approach spanning two time periods gave more evidence for determining causality than earlier research based on cross-sectional data. This study introduces teaching practice as a moderating element impacting madrasa teachers' pedagogy, contributing to the literature on teacher social competency development [18], [37], [38], [39], [52].

Experience may have a significant role in strengthening the social competence of madrasa instructors, according to the three primary sources of building social competence of madrasa teachers founded on social cognitive theory. When instructors consider their performance as madrasa teachers effective, they achieve experience mastery. PBL may result in a more favorable educational experience for pupils, resulting in a rise in the social competency of madrasa instructors [5], [40], [41], [42], [43]. Due to data constraints, we did not directly analyze the link between pupils and madrasa instructors' social competency. The favorable links were shown between PBL and student results, on the other hand, indicate the likelihood of mastery experiences [12], [36], [44], [45], [46]. Among the three madrasas that saw the most significant increase in PBL, there was a positive and statistically significant change in how they carried out their teacher's efforts to stimulate interest and preparatory classes, as well as an increase in the frequency with which they shared ideas with other students

in the class. If expressed to teachers, students' good opinions of instructors in the classroom can help teachers who appreciate the effectiveness of their own teaching. Furthermore, participation in course content is likely tied to contributing thoughts in class. Positive impressions of Madrasa instructors and increased interaction in the classroom by sharing ideas likely to lead to mastery experiences that promote teacher social competency.

This study has shortcomings that should be addressed in future research. First, the use of a subject-near assessment of madrasa teacher social competency is the first possible shortcoming of this study. Some academics suggest that madrasa teachers' social competency should be developed in conjunction with the unique teaching situation, such as the subject being taught [36], [47], [48], [49], [50]. Although the extra predictive value and generalizability of such characteristics have not been identified, further research using different measures of madrasa teacher social competency may result in more robust estimations. Second, this study employed self-reported teacher social competency indicators from teachers. Simply measuring instructors' evaluations, on the other hand, might lead to positive or negative self-assessment bias, distorting and underestimating the link between teachers' social competencies and others. Several data sources to assess social competencies, such as teacher and student evaluations, can lead to more accurate and stable results [47], [51], [52], [53]. Third, the primary findings have limits in terms of generalizability. This study had a limited sample size and was only done in schools in the Pekanbaru Metropolitan City. In addition, the response rate to the madrasa teacher survey is poor. As a result, generalizing the findings to national or international levels may have limitations. Future research should broaden the scope and quantity of madrasa professors to acquire more generalizable results. Finally, this study only looked at the influence of PBL after it had been in place for one semester. The instructional technique may be broadened to acquire complete knowledge of how PBL influences the social competency of madrasa instructors (e.g., more than one semester). Long-term impacts should also be evaluated using outcomes recorded at subsequent periods.

According to estimates generated using a difference-in-difference design and an instrumental variable method, the PBL program had a favorable influence on the social competency of madrasa instructors in Islamic religious education learning. In addition, difference-in-difference design analysis of student data revealed that the PBL program positively influenced students' views of the degree of effort a teacher expended to pique students' interest. Finally, estimating an instrumental variable approach on the subset of schools with the most significant increase in PBL use discovered that PBL was positively related to teachers' perceptions of class preparation, attempts to elicit teacher interest and the frequency with which students shared ideas in class.

This study provides empirical evidence for alternative understanding; it might also be used to impact the social competency of madrasa instructors in studying Islamic religious education via learning activities. Data analysis using quasi-experimental approaches spanning two time periods gave more support for causal interpretation than earlier research based on cross-sectional data. This study adds to the literature on the development of madrasa teachers' social competencies in Islamic religious education learning by including teaching practice as a mediating element that impacts their social competence. This study aims to create a theory of "problem-based learning on the social competency of madrasa instructors" in studying Islamic religious education. The Ministry of Religion of the Republic of Indonesia can generally develop the conclusions of this study in all madrasas learning at madrasas. This study only looked at the influence of PBL after it had been in place for one semester. The length of applying the instructional technique can be prolonged to acquire more full knowledge of how PBL influences the social competency of madrasa instructors (eg, more than one semester). Long-term impacts should also be evaluated using outcomes recorded at subsequent periods. So, in the madrasa teaching profession, developing madrasa teacher self-efficacy in language learning through a capable PBL process is critical.

4. CONCLUSION

According to estimates generated using a difference-in-difference design and an instrumental variable method, the PBL program had a favorable influence on the social competency of madrasa instructors in Islamic religious education learning. In addition, difference-in-difference design analysis of student data revealed that the PBL program positively influenced students' views of the degree of effort a teacher expended to pique students' interest. Finally, estimating an instrumental variable approach on the subset of schools with the most significant increase in PBL use discovered that PBL was positively related to teachers' perceptions of class preparation, attempts to elicit teacher interest and the frequency with which students shared ideas in class. This study provides empirical evidence for alternative understanding; it might also be used to impact the social competency of madrasa instructors in studying Islamic religious education via learning activities. Data analysis using quasi-experimental approaches spanning two time periods gave more support for causal interpretation than earlier research based on cross-sectional data. This study adds to the literature on the development of madrasa teachers' social competencies in Islamic religious education learning by including teaching practice as a mediating element that impacts their social competence. This study aims to create a theory of "problem-based learning on the social competency of madrasa instructors" in studying Islamic religious education. The Ministry of Religion of the Republic of Indonesia can generally develop the conclusions of this study in all

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