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Does Sending Teachers Abroad Enhance Their Quality and Ability?*

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Abstract

It is widely acknowledged that teacher quality is one of the crucial factors in improving student achievement. However, empirically validated strategies for improving the quality of existing teachers are not necessarily apparent. We investigate the effect of the Japanese education policy which sends teachers abroad to overseas educational institutions on teacher quality and ability. We find that, on average, dispatched teachers report 0.2 and 0.4–0.6 standard deviation improvements in their self-assessed curriculum management skills and cross-cultural understanding, respectively, over a decade, compared to their non-dispatched counterparts. Notably, less experienced teachers are more likely to improve self-assessed curriculum management skills, whereas more experienced teachers tend to become confident in their school administration skills. Interestingly, dispatched teachers feel more confident about their cross-cultural understanding regardless of their years of experience. Overall, sending teachers abroad is an effective strategy to develop their skills, which are increasingly important as globalization progresses.

Keywords: Teacher quality, foreign teaching experience, curriculum management, administrative operation of the school, cross-cultural understanding

JEL classification: I21, J24, M53

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1. Introduction

Since Hanushek (1971) studied teacher effects on student outcomes, many studies have investigated the impact of teacher quality on student outcomes and acknowledged its important role in improving student achievement.[1] Hanushek (2011) estimates that a teacher with one standard deviation higher quality above the average generates marginal gains of over $400,000 per year in the present value of students' future earnings when the class size is 20. Chetty et al. (2014b) indicate that each child would gain approximately $39,000 in total undiscounted lifetime earnings if they are instructed by a teacher whose value added is one standard deviation above the mean instead of the median teacher. Furthermore, recent studies have examined the effects of teachers on students' non-cognitive skills (Jackson, 2018; Kraft, 2019).

As Fryer et al. (2022) summarize, there are three categories of approaches to improving teacher quality: (i) hiring better teachers, (ii) providing incentives to teachers to enhance student achievements, and (iii) training existing teachers. Regarding the first approach, the literature indicates that identifying effective teachers ex-ante is challenging. For example, Rockoff et al. (2011) collect information on various predictors of effectiveness, including teaching-specific content knowledge, cognitive ability, personality traits, and feelings of self-efficacy, while and find significant relationships between student and teacher outcomes for only a few of these predictors. On the second approach, reviews indicate that incentivizing teachers improves somewhat teacher quality on average, but the results are mixed (Fryer, 2017; Pham et al., 2021). Finally, despite the numerous studies on training existing teachers, there is no consensus on what factors improve teacher quality. Therefore, examining the effectiveness of specific training programs on teacher quality can offer meaningful insights that can help address these issues.[2]

[1] See review articles on teacher effects by Hanushek (1986), Hanushek and Rivkin (2006), Hanushek and Rivkin (2010), and Jackson et al. (2014).

[2] In related work, Garet et al. (2008) evaluate the impact of the professional development intervention

We investigate whether sending teachers to overseas educational institutions, an educational policy in Japan that can be regarded as training for existing teachers, enhances their quality and ability. These institutions are educational facilities established overseas to provide education equivalent to that offered in Japan. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan sends several hundred teachers to some of these facilities each year. With globalization, the environments of schools and classrooms are changing, and teachers' global experiences are becoming more important.

In student contexts, many studies have highlighted the beneficial effects of studying abroad. In European countries, studying abroad fosters an increased interest in foreign cultures, work opportunities overseas, and living abroad (Parey and Waldinger, 2011; Di Pietro, 2012; 2015; Oosterbeek and Webbink, 2011). Using a randomized control trial, De Poli et al. (2018) demonstrate even a short-term study abroad program in Italy affects non-cognitive abilities. In non-European countries, Higuchi et al. (2022) find that the Japanese scholarship program for youths to study abroad positively impacted a wide range of outcomes, including English proficiency, international posture scores, and perceived communication competence in a foreign language. Correspondingly, an overseas teacher education program can be promising for enhancing teacher quality. These teachers experience instruction adjusted to the local context, engage in school management, and live abroad. These experiences may improve teacher quality and abilities related to curriculum management, administrative operation of the school, and cross-cultural understanding. We contribute to the literature by examining the effects of sending teachers abroad on their quality and abilities.

Specifically, we conducted an online survey of elementary and junior high school teachers with ten or more years of service. The survey asked about self-awareness of teacher quality and

commissioned by the U.S. Department of Education on improving reading instruction. Through a field experiment, the authors find that the intervention affected teachers' reading knowledge and practice but did not significantly impact student test scores. Randel et al. (2011) reach a similar conclusion by estimating the effect of another professional development intervention through a field experiment.

ability related to curriculum management, administrative operation of the school, and cross-cultural understanding not only as of 2021 but also as of 2011. Then, we can compare the changes in these outcomes between those who did and did not go abroad under the program (hereafter, "dispatched" and "non-dispatched" teachers, respectively) using the difference-in-differences (DID) method. However, if a teacher is sent to an overseas educational institution depending on unobservable teacher characteristics, such as motivation, and these characteristics affect the growth of their outcomes, the DID approach may be biased. To address this, we use propensity score matching as a robustness check.[3]

We find that, on average, dispatched teachers enhance their self-assessment of curriculum management skills by about 0.2 standard deviations and cross-cultural understanding by 0.4–0.6 standard deviations compared to non-dispatched counterparts over a decade. Notably, less experienced teachers are more likely to develop self-assessment of curriculum management skills, whereas more experienced teachers tend to become more confident in their school administration skills. Conversely, dispatched teachers feel more confident about their cross-cultural understanding regardless of their years of experience.

The remainder of this article is organized as follows. Section 2 provides the policy background of overseas educational institutions. Section 3 describes the details of our survey and dataset. Sections 4 and 5 present the empirical framework and results, respectively. Finally, Section 6 discusses the main findings and conclusions.

2. Policy Background

Overseas educational institutions of Japan are educational facilities established overseas to provide education similar to that offered in Japan for Japanese children residing overseas as

[3] Although many studies on teacher effects measure teacher quality by the "value-added approach," which measures the teacher's marginal contribution to student achievement, we adopt the natural experimental approach based on teachers' self-awareness of outcomes because we could not access data on student achievement. See Chetty et al. (2014a; 2014b) for a discussion of the validity of the value-added approach.

stipulated in the School Education Act (Act No. 26 of 1947). As of April 2021, the facilities included 94 Japanese schools, 228 supplementary Japanese schools, and seven private overseas educational institutions. Japanese schools and private overseas educational institutions of Japan are full-time day schools certified by MEXT to have courses equivalent to elementary, junior high, or high schools in Japan. Supplementary Japanese schools provide Japanese language, arithmetic (mathematics), and other classes for Japanese children who attend local or international schools on weekends, after school, and at other times, but not during the day when schools operate.

To support overseas educational institutions, MEXT sends several hundred teachers to Japanese schools and supplementary Japanese schools each year, and more than one thousand teachers sent from Japan are working in overseas educational institutions.[4] There are three types of detachment: "incumbent detachment," whereby recommended incumbent teachers by the board of education having jurisdiction or educational institution are sent, "senior detachment," whereby retired teachers under 63 years old as of application are sent, and "pre-detachment," whereby temporary teachers aiming to become regular teachers are sent. More than 70% of the detachment is the "incumbent detachment." In principle, the period of the detachment is two years, with a maximum extension of two years. Since dispatched teachers are selected from among applicants, it should be noted that there may be some differences between the characteristics of dispatched and non-dispatched teachers.

Dispatched teachers must adjust their classes according to local contexts. They interact with other teachers from different backgrounds, engage in school management more directly, and live abroad as a minority. These experiences are expected to enhance teacher quality and abilities related to curriculum management, administrative operation of the school, and cross-cultural understanding.

[4] As of 2021, there were approximately 650,000 teachers working in public elementary and junior high schools in Japan.

3. Data

3.1 Data Details

We conducted an online survey of elementary and junior high school teachers with ten or more years of service from December 13, 2021, to January 17, 2022. For dispatched teachers, we distributed the URL for the survey to all elementary, junior high, and secondary schools (for 7th through 9th grades) in Japan. For non-dispatched teachers, we distributed it randomly to 5% of the above schools, with allocation based on the number of schools by prefecture and government-designated cities.[5] While the survey was voluntary, 4,765 teachers (1,818 dispatched and 2,947 non-dispatched teachers) responded.[6]

The survey asked about self-awareness of abilities related to curriculum management, administrative operation of the school, cross-cultural understanding (as outcomes), years of service as a teacher, gender, age, experience of going abroad before working as a teacher, and the period of detachment (for only dispatched teachers). Because we asked about the outcomes as of not only 2021 but also 2011 on a ten-point scale, we could compare the changes in the outcomes of dispatched and non-dispatched teachers for these ten years. Table 1 lists the outcome questions. To clearly isolate the impact of detachment, we excluded the data of dispatched teachers who detached in 2011 or before from our dataset. We also excluded a dispatched teacher whose dispatch period was five years because this was an erroneous response. Furthermore, we excluded teachers with more than 41 years of experience from the dataset because if the teacher had been teaching since before 1980, we could not ascertain the

[5] In Japan, boards of education are established by region. Prefectural boards of education have jurisdiction over those of municipalities in their area. Those in government-designated cities, which are major cities, have the same authority as prefectural boards of education over teacher recruitment and transfer. Our survey procedure was as follows: MEXT issued an administrative communication including the URL of the survey to prefectural and government-designated city boards of education. Each board sent it to the municipal boards of education under their jurisdiction, and then the boards sent it to each school in the municipality.

[6] The exact response rate is unclear because the number of sent-out teachers as a percentage of active teachers is unclear, but is estimated to be approximately 20% based on the number of recent dispatchers and the number of teachers with more than 10 years of experience.

exact number of years of experience.[7]

3.2 Descriptive Statistics

Table 2 presents summary statistics for the key variables. The differences in the mean outcomes of dispatched and non-dispatched teachers in 2011 are less than approximately 0.00–0.30 points, except for that of the administrative operation of the school (6). By contrast, the means of the outcomes of dispatched teachers in 2021 are 0.48–1.45 points higher than those of non-dispatched teachers. This suggests that the detachment to overseas educational institutions may enhance teachers' abilities related to curriculum management, administrative operation of the school, and cross-cultural understanding.

However, if the attributes differ greatly between dispatched and non-dispatched teachers, we cannot identify the causality of detachment from a simple comparison of mean values. Notable attributes are gender and experience of going abroad before working as a teacher. While 69.9% of dispatched teachers were male, this ratio was 47.3% in non-dispatched teachers. Moreover, 87.0% of dispatched teachers had gone abroad before becoming teachers, whereas 48.6% of the non-dispatched teachers had never gone abroad. Furthermore, dispatched teachers were somewhat younger than non-dispatched teachers because we limited the data to dispatched teachers who were sent on detachments in these ten years. In a later analysis, we control for these attributes to eliminate biases from the differences in these attributes.

4. Empirical Framework

4.1 Difference-in-Differences Estimation

We first estimate the impact of detachment to overseas educational institutions on teacher

[7] Among the sent-out teachers, 18 teachers who answered that the school to which they were sent was "others" were excluded from the analysis because they were not considered to be sent by MEXT. Essentially, 661 sent-out teachers were sent to Japanese schools and 9 to supplementary Japanese schools.

outcomes using a DID framework. First, Equation (1) is estimated using ordinary least squares (OLS) as follows:

$$\Delta Y_i = \beta_0 + \beta_1 D_i + \boldsymbol{X_i'\delta} + \varepsilon_i, \quad (1)$$

where ΔY_i denotes the difference in self-awareness of teacher ability related to curriculum management, administrative operation of the school, or cross-cultural understanding in 2011 and 2021;[8] D_i denotes a dummy variable that takes 1 if the teacher has been sent to overseas educational institutions; $\boldsymbol{X_i}$ denotes a control-variable vector that includes years of experience and its square, gender, and school size in 2021, the experience of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011; and ε_i is an error term. The coefficient of interest is β_1, which captures the difference in the growth of outcomes with or without experience of detachment to overseas educational institutions. By controlling for teacher attributes, we address biases arising from the differences in the attributes of dispatched and non-dispatched teachers.

4.2 Propensity Score Matching Estimation

Our DID design is unbiased if the parallel trends assumption holds. Nevertheless, the endogeneity problem of the treatment variable may arise since dispatched teachers were selected from applicants. For instance, if teachers with higher qualifications tend to be chosen and are more likely to improve their skills than less-qualified teachers, we may overestimate the impact of sending teachers abroad.[9]

To address this endogeneity problem, we apply a propensity score matching framework.

[8] To compare the effect size among outcomes, we standardized the outcome variables so that the mean is 0 and the standard deviation is 1.

[9] Because our survey only includes outcomes at two-points, we cannot graphically confirm whether the parallel trend assumption was supported before the intervention.

This approach creates a propensity score, which is the probability of being assigned to treatment based on observed covariates, and matches those with similar propensity scores in treatment and control groups. We can compare dispatched and non-dispatched teachers who were more similar ten years ago using the matched sample. To estimate the propensity score, we use the outcomes in 2011 and control variables in Equation (1), except for school size after dispatch, as covariates.

However, we also need to consider problems related to propensity score matching. King and Nielsen (2019) highlight the possibility of increased covariate imbalance and biases while applying propensity score matching. The authors find the one-to-one matching sampling without replacement using the nearest-neighbor method to be particularly problematic. Therefore, we use one-to-one matching with replacement using the nearest-neighbor method and check for covariate balancing after propensity score estimation. After estimating the propensity scores, we estimate Equation (1) using a sample matched by propensity score.

5. Results

5.1 Difference-in-Differences Estimation Results

Table 3 presents the impact of sending teachers abroad on their self-assessments of curriculum management skills. Columns (1), (3), (5), and (7) show the results of Equation (1) and indicate that being sent abroad significantly enhances teachers' self-assessment of curriculum management skills. The coefficients of the treatment variables are 0.172–0.232 (with standard errors of 0.045–0.047). One concern is that if they have experienced alternative domestic teaching or work that may lead to their growth instead of being sent abroad, we may underestimate the impact of sending teachers abroad. Columns (2), (4), (6), and (8) present similar results controlling for alternative experiences,[10] implying that the estimates are robust

[10] Alternative experiences include the following domestic experiences: (i) teaching students with disabilities,

to alternative experiences.

Table 4 shows whether the experience of being sent abroad enhances their self-assessment of school administration skills. As in Table 3, the odd-number columns present the results of Equation (1), while the even-number columns present the results conditioned on alternative experiences. In columns (5) and (6), the coefficients are 0.116 and 0.113 and are statistically significant, respectively; however, the effect size is small compared to curriculum management. Conversely, columns (11) and (12) have substantial and significant coefficients, indicating that dispatched teachers recognize that at least the administrative class needs to be able to perform each item related to school management competence.

Table 5 reports the impact of sending teachers abroad on their self-assessment of cross-cultural understanding. Similar to Table 4, odd-numbered columns show the base model results, and even-numbered columns consider alternative experiences in the base model. The coefficients are 0.374–0.595 (with standard errors of 0.046–0.048) and are more prominent than those in Tables 3 and 4. Thus, sending abroad makes teachers feel more confident about cross-cultural understanding.

5.2 Propensity Score Matching Estimation Results

Here, we present the estimation results using propensity score matching because the presence of an international assignment may depend on teachers' skills, characteristics, and experiences. To generate a propensity score, we estimate a logistic regression model with a dummy variable that equals 1 if teachers have been sent abroad as the dependent variable. The covariates must satisfy the condition that they are associated with both treatment status and outcome, only

(ii) teaching students who have problems with Japanese language skills, (iii) working at schools or teaching subjects not covered by the teaching license, (iv) working at schools with academic problems due to poverty, (v) working at schools conducting special curriculum research, (vi) working at rural schools, and (vii) working at schools with combined classes.

outcome, or are measured before treatment and associated only with treatment status.[11] We use years of experience and its square, gender, experience staying abroad before becoming a teacher, an opportunity to contact non-Japanese students in 2011, and standardized outcomes in 2011 as covariates.

Figure 1 shows the balance of the covariates before and after propensity score matching. White and black points represent the standardized mean difference of the covariates before and after propensity score matching, respectively. The solid line indicates where the mean difference is 0.1; in conventional criteria, having black points to the left of this line is desirable. Almost all variables are below 0.1 after correction, which implies a desirable matching correction.

Table 6 presents the impact of sending teachers abroad on curriculum management using propensity score matching. The coefficients are 0.235–0.289, which are close to the results of the DID analysis in Table 3. Table 7 presents the estimates on the administrative operation of the school. All columns have positive and significant coefficients, unlike those in Table 4. Table 4 may not have revealed clear evidence because the control group was somewhat older and had more teachers at the managerial level. However, comparing more similar teachers in Table 7 does reveal a significant treatment effect. Table 8 reports the estimated results for cross-cultural understanding. The coefficients are 0.471–0.720, which are somewhat greater than those in Table 5. Although the DID and propensity score matching results for school administration skills differ, the results using propensity score matching and DID analysis for curriculum management and cross-cultural understanding are roughly the same. This suggests that the differences in characteristics between dispatched and non-dispatched teachers do not cause serious bias.[12]

[11] The discussion of the covariate selection follows Bai and Clark (2019). Note that our dependent variable after propensity score matching is the difference in outcomes in 2011 and 2021.

[12] Although these results estimate the average treatment effect on the treated (ATT), we also estimated the different estimands, average treatment effect (ATE) and average treatment effect on the untreated (ATU), by inverse probability weighting; the results are almost the same as ATT.

However, the matching estimator is based on the conditional independence assumption. If unobserved variables simultaneously affect the probability of being dispatched and the outcome, a "hidden bias" may arise. To confirm the robustness of the above results to hidden bias, we report the Rosenbaum (2002) bounds as a sensitivity analysis in Table 9. The odds ratio Γ indicates that one subject in a matched pair is Γ times more likely to be assigned to the treatment group than another because of differences in unobserved covariates. If $\Gamma = 1$, matched subjects have an equal probability of treatment, and the sensitivity analysis reports a single *p*-value testing the null hypothesis of no treatment effect. Conversely, for $\Gamma > 1$, an interval of possible *p*-values is reported. We confirm the critical level of Γ at which the upper bound of the *p*-value exceeds 0.1 to verify the sensitivity of our estimates to unobserved covariates.

Table 9 shows that the sensitivity of the above results to unobserved covariates varies across the outcomes. For curriculum management, the critical levels of Γ are between 1.2–1.3 and 1.4–1.5, which implies that it would require a hidden bias of Γ between 1.2–1.3 and 1.4–1.5 to overturn the conclusion of a positive treatment effect. In the case of administrative management of the school, Γ values between 1.2–1.3 and 1.5–1.6 are required. Finally, a value of $\Gamma > 2$ is required for cross-cultural understanding, indicating that the matching estimator is the most robust to a hidden bias for this outcome.

5.3 Heterogeneous Effect by Years of Experience

We have shown that sending teachers abroad enhances their confidence, particularly cross-cultural understanding and curriculum management skills. However, we also need to understand the heterogeneous impact of this intervention on teacher quality based on past experiences.

For this, we estimate Equation (1) by dividing our sample into three groups according to years of experience: The first subsample has less than 10 years of experience as of 2011 (i.e.,

less than 20 years of experience as of 2021); their results are reported in Panel A of Tables 10 through 12. The second subsample includes teachers with 10–19 years of experience as of 2011; the results are presented in Panel B of Tables 10 through 12. The final subsample comprises teachers with 20 or more years of experience as of 2011, and we report the estimates in Panel C of Tables 10 through 12.

Table 10 presents the heterogeneous impact of sending teachers abroad on curriculum management by years of experience. The coefficients in Panel A are 0.297–0.354 and statistically significant. In Panel B, the estimates are somewhat smaller than those in Panel A, but the coefficients are significant, except in column (2). Conversely, Panel C reports statistically insignificant coefficients close to zero.

Table 11 shows the heterogeneous effect on school administrative operating skills by years of experience. In Panels A and B, the results for teachers with fewer years of experience are similar to those presented in Table 4. Interestingly, the coefficients in Panel C are 0.132–0.249 and statistically significant, except for column (4). Thus, sending teachers with more experience improves their school-administrative operating skills.

Finally, Table 12 reports the heterogeneous impact of this intervention on cross-cultural understanding by years of experience. All coefficients in Panels A to C are positive and significant. The size of the estimates does not vary much with years of experience. Thus, sending teachers abroad enhances their cross-cultural understanding, regardless of their years of experience.

6. Discussion and Concluding Remarks

This study investigated how sending teachers to overseas educational institutions affects their quality and abilities. Our main findings are summarized as follows. First, on average, dispatched teachers report self-assessed improvements in curriculum management skills of

approximately 0.2 standard deviations and cross-cultural understanding of 0.4–0.6 standard deviations compared to non-dispatched counterparts over a decade. Second, less experienced teachers are more likely to improve self-assessed curriculum management skills, while more experienced teachers become more confident in their school administration skills. These results may be due to differences in teachers' roles at overseas educational institutions. Finally, the intervention makes teachers feel more confident about their cross-cultural understanding, regardless of their years of experience.

With globalization, the importance of cross-cultural understanding is increasing in classrooms; therefore, our findings suggest that sending teachers abroad is an effective way to enhance these skills. Moreover, even sending them later in their careers can still improve teacher quality and ability, although the types of abilities improved vary.

This study has some limitations. First, since we could not access student data, we could not adopt the value-added approach; this is a common approach for measuring teacher quality. Rather, we depended on teachers' self-assessed outcomes. Second, because we retrospectively surveyed teacher outcomes as of 2011, these outcomes may contain measurement errors or recall biases. Third, if unobservables, such as motivation, influence both whether teachers are sent abroad and teacher outcomes, our estimation results may be biased, despite controlling for observed confounding factors, such as foreign experiences. Finally, we could not empirically reveal the mechanisms for how and why sending teachers abroad affects teacher outcomes. Further studies are required to address these limitations.

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Figure 1: Absolute standardized mean differences before and after propensity score matching

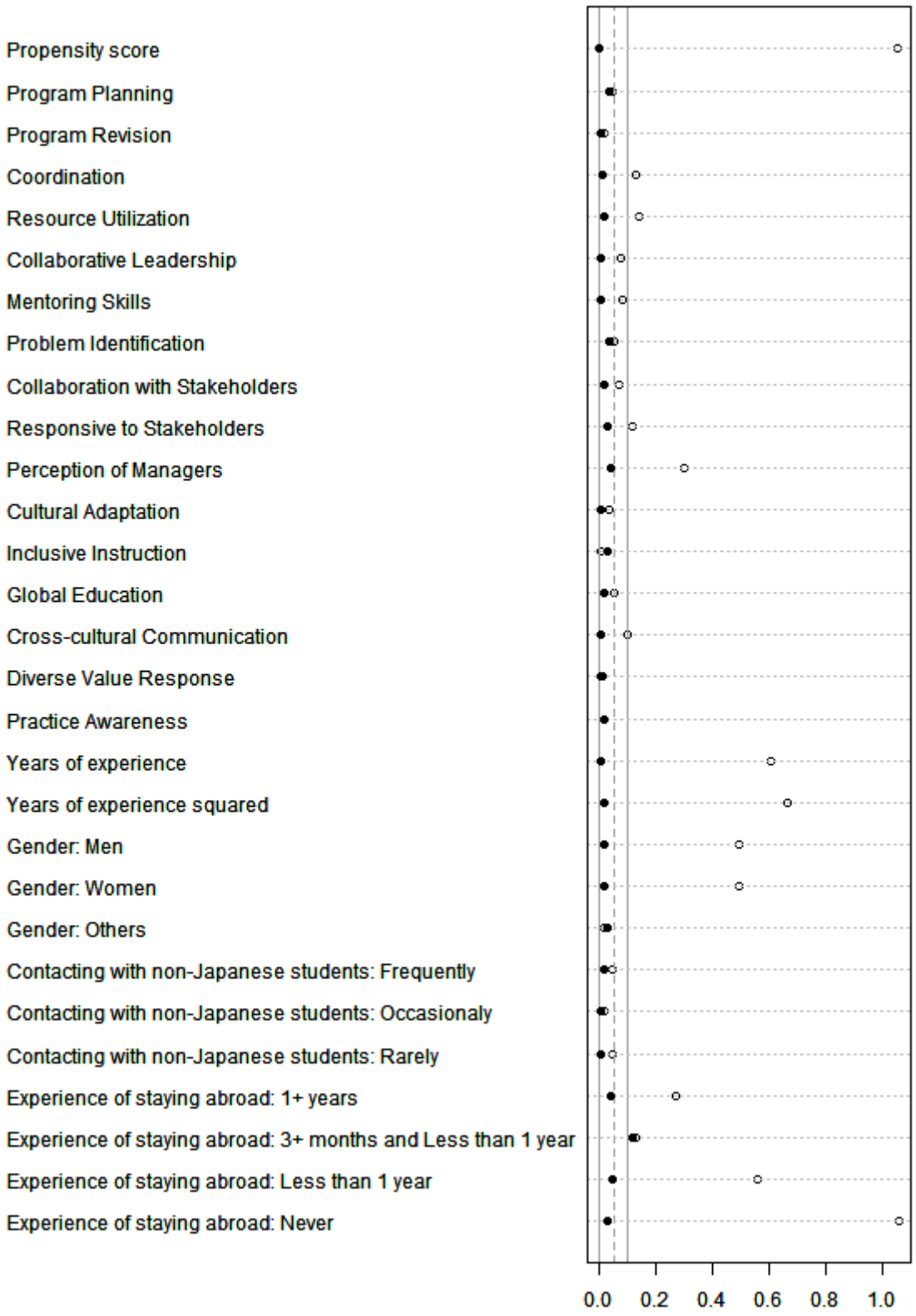

Table 1: Outcome questions

Classification	Label	Question (1: Not applicable, 10: Applicable)
Curriculum management	Program Planning	(1) I can plan programs with the qualities and abilities to be developed in mind, based on the reality of the students and community, and provide effective instruction.
	Program Revision	(2) I can re-evaluate the students' state and community's reality after instruction, and flexibly revise the programs and instruction methods.
	Coordination	(3) I am always aware of effective coordination with other subjects and school goals while preparing and discussing programs and curricular tables.
	Resource Utilization	(4) I believe that it is important to utilize school resources through school-wide discussion and community collaboration when planning, evaluating, and improving programs.
Administrative operation of the school	Collaborative Leadership	(1) I can play a key role in the division of school duties, and provide appropriate advice and support to other teachers.
	Mentoring Skills	(2) I can play a main role in the school organization, and provide appropriate mentoring and advice to other teachers for improving their instruction abilities and responsiveness.
	Problem Identification	(3) I can identify school problems, raise them to superiors and others, and propose countermeasures to resolve them.
	Collaboration with Stakeholders	(4) I can collaborate with parents, the community, and external institutions to improve educational activities.
	Responsive to Stakeholders	(5) I can respond smoothly and promptly to requests and complaints from parents and others, and resolve them.
	Perception of Managers	(6) I believe that managerial levels need to be able to do (1) through (5).
Cross-cultural understanding	Cultural Adaptation	(1) I can adapt instruction to the cultural diversity of the students.
	Inclusive Instruction	(2) I can instruct to raise awareness of cultural diversity among students and eliminate discrimination.
	Global Education	(3) I can introduce teaching and learning practices that incorporate global issues.
	Cross-cultural Communication	(4) I can communicate smoothly with parents and community members from different cultural backgrounds.
	Diverse Value Response	(5) I can respond to students and parents based on their diverse values and backgrounds, not just cultural backgrounds.
	Practice Awareness	(6) I am always aware of the need to put (1) through (5) into practice in classroom management.

Table 2: Summary statistics

	Dispatched teachers (N = 670)				Non-dispatched teachers (N = 2,919)			
	2011		2021		2011		2021	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Outcomes								
Program Planning	5.431	1.845	7.806	1.513	5.515	2.048	7.181	1.715
Program Revision	5.399	1.897	7.707	1.573	5.431	2.076	7.123	1.754
Coordination	5.227	2.028	7.872	1.653	5.484	2.154	7.361	1.756
Resource Utilization	5.419	2.108	8.091	1.687	5.719	2.202	7.610	1.822
Collaborative Leadership	5.134	2.026	8.130	1.459	4.987	2.213	7.433	1.717
Mentoring Skills	4.955	2.077	7.940	1.584	4.793	2.234	7.164	1.828
Problem Identification	4.894	2.134	7.843	1.678	4.791	2.261	7.080	1.891
Collaboration with Stakeholders	5.325	1.995	7.667	1.648	5.186	2.126	7.138	1.787
Responsive to Stakeholders	5.600	2.003	8.007	1.449	5.368	2.136	7.345	1.729
Perception of Managers	6.961	2.412	8.945	1.495	7.676	2.287	8.818	1.562
Cultural Adaptation	5.016	1.862	7.963	1.455	5.079	1.997	6.773	1.772
Inclusive Instruction	5.275	1.879	8.082	1.446	5.277	2.051	7.003	1.759
Global Education	4.997	1.916	7.585	1.681	4.902	2.092	6.545	1.910
Cross-cultural Communication	5.204	1.935	7.925	1.513	5.017	2.033	6.473	1.888
Diverse Value Response	5.487	1.930	8.284	1.381	5.465	2.075	7.252	1.729
Practice Awareness	5.604	2.055	8.399	1.509	5.634	2.189	7.399	1.821
Age			45.360	6.718			48.761	7.842
Years of experience			21.182	6.776			25.291	8.294
Gender								
Men			0.699	-			0.473	-
Women			0.299	-			0.525	-
Others			0.003	-			0.002	-
Educational stage								
Elementary school			0.636	-			0.647	-
Junior high school			0.363	-			0.353	-
Secondary school			0.001	-			0.000	-
School size								
Less than 100 students			0.106	-			0.159	-
100–199 students			0.142	-			0.151	-
200–399 students			0.304	-			0.304	-
400–599 students			0.215	-			0.234	-
600+ students			0.233	-			0.151	-
Contacting with non-Japanese students								
Frequently	0.103	-			0.090	-		
Occasionally	0.393	-			0.384	-		
Rarely	0.504	-			0.526	-		
Experience of staying abroad (before becoming a teacher)								
1+ years			0.101	-			0.020	-
3+ months and Less than 1 year			0.045	-			0.018	-
Less than 3 months			0.724	-			0.475	-
Never			0.130	-			0.486	-

Notes: See questions corresponding to labels in Table 1 for the specific questions for the outcome variable.

Table 3: Difference-in-differences estimation of sending teachers abroad on curriculum management

Outcome :	Program Planning		Program Revision		Coordination		Resource Utilization	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment	0.217***	0.216***	0.172***	0.175***	0.217***	0.216***	0.232***	0.231***
	(0.045)	(0.045)	(0.045)	(0.045)	(0.047)	(0.047)	(0.047)	(0.047)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Alternative experiences		✓		✓		✓		✓
Observations	3589	3589	3589	3589	3589	3589	3589	3589
Adjusted R2	0.117	0.117	0.110	0.109	0.115	0.116	0.086	0.087

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR *q*-values, calculated using *p*-values of eight hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. *** denotes significance at the 1% level.

Table 4: Difference-in-differences estimation of sending teachers abroad on the administrative operation of the school

Outcome :	Collaborative Leadership		Mentoring Skills		Problem Identification		Collaboration with Stakeholders		Responsive to Stakeholders		Perception of Managers	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	0.041	0.037	0.074*	0.068	0.116***	0.113**	0.004	0.005	0.030	0.028	0.306***	0.308***
	(0.042)	(0.043)	(0.043)	(0.043)	(0.044)	(0.045)	(0.045)	(0.045)	(0.044)	(0.044)	(0.051)	(0.052)
	[0.563]	[0.576]	[0.203]	[0.230]	[0.034]	[0.034]	[0.931]	[0.931]	[0.637]	[0.637]	[0.000]	[0.000]
Alternative experiences		✓		✓		✓		✓		✓		✓
Observations	3589	3589	3589	3589	3589	3589	3589	3589	3589	3589	3589	3589
Adjusted R2	0.197	0.198	0.199	0.201	0.174	0.174	0.140	0.139	0.163	0.163	0.072	0.073

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR *q*-values, calculated using *p*-values of 12 hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. ***, **, and * denote significance at the 1, 5, and 10% levels, respectively.

Table 5: Difference-in-differences estimation of sending teachers abroad on cross-cultural understanding

Outcome:	Cultural Adaptation		Inclusive Instruction		Global Education		Cross-cultural Communication		Diverse Value Response		Practice Awareness	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Treatment	0.542***	0.535***	0.459***	0.457***	0.374***	0.374***	0.595***	0.590***	0.413***	0.408***	0.382***	0.381***
	(0.046)	(0.046)	(0.046)	(0.046)	(0.048)	(0.048)	(0.047)	(0.048)	(0.046)	(0.046)	(0.046)	(0.047)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Alternative experiences		✓		✓		✓		✓		✓		✓
Observations	3589	3589	3589	3589	3589	3589	3589	3589	3589	3589	3589	3589
Adjusted R2	0.204	0.207	0.175	0.176	0.154	0.155	0.177	0.179	0.162	0.164	0.156	0.158

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR *q*-values, calculated using *p*-values of 12 hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. *** denotes significance at the 1% level.

Table 6: Propensity score matching estimation of sending teachers abroad on curriculum management

Outcome :	Program Planning	Program Revision	Coordination	Resource Utilization
	(1)	(2)	(3)	(4)
Treatment	0.289***	0.235***	0.240**	0.253***
	(0.068)	(0.070)	(0.093)	(0.098)
	[0.029]	[0.038]	[0.048]	[0.048]
Observations	1123	1123	1123	1123
Adjusted R2	0.091	0.091	0.071	0.056

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR *q*-values, calculated using *p*-values of four hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. *** and ** denote significance at the 1 and 5% levels, respectively.

Table 7: Propensity score matching estimation of sending teachers abroad on the administrative operation of the school

Outcome :	Collaborative Leadership	Mentoring Skills	Problem Identification	Collaboration with Stakeholders	Responsive to Stakeholders	Perception of Managers
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.297***	0.321***	0.348***	0.238***	0.312***	0.181***
	(0.087)	(0.090)	(0.086)	(0.074)	(0.090)	(0.064)
	[0.026]	[0.026]	[0.026]	[0.027]	[0.026]	[0.035]
Observations	1123	1123	1123	1123	1123	1123
Adjusted R2	0.139	0.147	0.122	0.077	0.098	0.037

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR *q*-values, calculated using *p*-values of six hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. *** denotes significance at the 1% level.

Table 8: Propensity score matching estimation of sending teachers abroad on cross-cultural understanding

Outcome :	Cultural Adaptation	Inclusive Instruction	Global Education	Cross-cultural Communication	Diverse Value Response	Practice Awareness
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.637***	0.592***	0.488***	0.720***	0.501***	0.471***
	(0.046)	(0.074)	(0.062)	(0.076)	(0.084)	(0.077)
	[0.000]	[0.001]	[0.001]	[0.001]	[0.002]	[0.002]
Observations	1123	1123	1123	1123	1123	1123
Adjusted R2	0.160	0.150	0.099	0.171	0.123	0.124

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR *q*-values, calculated using *p*-values of six hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. *** denotes significance at the 1% level.

Table 9: Sensitivity analysis

Panel A: Curriculum management

	Program Planning		Program Revision		Coordination		Resource Utilization	
Γ	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
1	0	0.000	0	0.000	0	0.000	0	0.000
1.1	0	0.000	0	0.000	0	0.004	0	0.001
1.2	0	0.001	0	0.007	0	0.036	0	0.008
1.3	0	0.008	0	0.048	0	0.162	0	0.053
1.4	0	0.045	0	0.182	0	0.409	0	0.194
1.5	0	0.158	0	0.417	0	0.682	0	0.434

Panel B: Administrative operation of the school

	Collaborative Leadership		Mentoring Skills		Problem Identification		Collaboration with Stakeholders		Responsive to Stakeholders		Perception of Managers	
Γ	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
1	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1.1	0	0.000	0	0.000	0	0.000	0	0.001	0	0.000	0	0.006
1.2	0	0.001	0	0.001	0	0.000	0	0.017	0	0.001	0	0.044
1.3	0	0.010	0	0.007	0	0.001	0	0.097	0	0.009	0	0.176
1.4	0	0.058	0	0.045	0	0.006	0	0.294	0	0.052	0	0.413
1.5	0	0.191	0	0.156	0	0.032	0	0.563	0	0.173	0	0.671
1.6	0	0.413	0	0.358	0	0.112	0	0.793	0	0.381	0	0.856

Panel C: Cross-cultural understanding

	Cultural Adaptation		Inclusive Instruction		Global Education		Cross-cultural Communication		Diverse Value Response		Practice Awareness	
Γ	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper
1	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1.1	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1.2	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1.3	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1.4	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1.5	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1.6	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
1.7	0	0.000	0	0.000	0	0.001	0	0.000	0	0.000	0	0.001
1.8	0	0.000	0	0.000	0	0.007	0	0.000	0	0.001	0	0.004
1.9	0	0.000	0	0.000	0	0.025	0	0.000	0	0.004	0	0.015
2	0	0.000	0	0.001	0	0.070	0	0.000	0	0.015	0	0.046

Notes: See questions corresponding to labels in Table 1 for the specific questions for the outcome variable.

Table 10: Heterogeneous effects of sending teachers abroad on curriculum management by years of experience

Outcome :	Program Planning	Program Revision	Coordination	Resource Utilization
	(1)	(2)	(3)	(4)
Panel A:Teachers with less than 10 years of experience				
Treatment	0.354***	0.324***	0.297***	0.327***
	(0.072)	(0.072)	(0.076)	(0.076)
	[0.000]	[0.000]	[0.000]	[0.000]
Observations	1223	1223	1223	1223
Adjusted R2	0.041	0.034	0.033	0.032
Panel B: Teachers with 10-19 years of experience				
Treatment	0.168**	0.058	0.189**	0.183**
	(0.072)	(0.074)	(0.078)	(0.078)
	[0.034]	[0.577]	[0.034]	[0.034]
Observations	1181	1181	1181	1181
Adjusted R2	0.009	0.004	0.017	0.011
Panel C: Teachers with 20 or more years of experience				
Treatment	-0.014	0.009	0.070	0.056
	(0.090)	(0.085)	(0.089)	(0.089)
	[0.913]	[0.913]	[0.577]	[0.635]
Observations	1185	1185	1185	1185
Adjusted R2	0.023	0.019	0.018	0.012

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR *q*-values, calculated using *p*-values of 12 hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. *** and ** denote significance at the 1 and 5% levels, respectively.

Table 11: Heterogeneous effects of sending teachers abroad on the administrative operation of the school by years of experience

Outcome:	Collaborative Leadership	Mentoring Skills	Problem Identification	Collaboration with	Responsive to Stakeholders	Perception of Managers
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A:Teachers with less than 10 years of experience						
Treatment	0.068	0.113	0.157**	0.054	0.054	0.341***
	(0.069)	(0.069)	(0.071)	(0.070)	(0.071)	(0.086)
	[0.452]	[0.202]	[0.068]	[0.532]	[0.532]	[0.001]
Observations	1223	1223	1223	1223	1223	1223
Adjusted R2	0.024	0.020	0.022	0.017	0.020	0.015
Panel B: Teachers with 10-19 years of experience						
Treatment	-0.029	-0.023	0.036	-0.101	-0.077	0.270***
	(0.068)	(0.071)	(0.074)	(0.075)	(0.075)	(0.082)
	[0.713]	[0.744]	[0.700]	[0.294]	[0.452]	[0.009]
Observations	1181	1181	1181	1181	1181	1181
Adjusted R2	0.016	0.022	0.017	0.007	0.014	0.037
Panel C: Teachers with 20 or more years of experience						
Treatment	0.186**	0.200**	0.190**	0.132	0.196**	0.249***
	(0.084)	(0.083)	(0.093)	(0.087)	(0.084)	(0.095)
	[0.068]	[0.068]	[0.094]	[0.236]	[0.068]	[0.056]
Observations	1185	1185	1185	1185	1185	1185
Adjusted R2	0.061	0.059	0.060	0.043	0.049	0.024

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR q-values, calculated using p-values of 18 hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. *** and ** denote significance at the 1 and 5% levels, respectively.

Table 12: Heterogeneous effects of sending teachers abroad on cross-cultural understanding by years of experience

Outcome :	Cultural Adaptation	Inclusive Instruction	Global Education	Cross-cultural Communication	Diverse Value Response	Practice Awareness
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A:Teachers with less than 10 years of experience						
Treatment	0.641***	0.555***	0.448***	0.692***	0.429***	0.397***
	(0.071)	(0.072)	(0.076)	(0.075)	(0.074)	(0.072)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	1223	1223	1223	1223	1223	1223
Adjusted R2	0.094	0.064	0.045	0.085	0.044	0.047
Panel B: Teachers with 10-19 years of experience						
Treatment	0.459***	0.363***	0.264***	0.528***	0.382***	0.343***
	(0.076)	(0.075)	(0.080)	(0.077)	(0.075)	(0.075)
	[0.000]	[0.000]	[0.001]	[0.000]	[0.000]	[0.000]
Observations	1181	1181	1181	1181	1181	1181
Adjusted R2	0.042	0.030	0.022	0.059	0.041	0.034
Panel C: Teachers with 20 or more years of experience						
Treatment	0.541***	0.460***	0.442***	0.527***	0.445***	0.442***
	(0.100)	(0.104)	(0.103)	(0.106)	(0.097)	(0.114)
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	1185	1185	1185	1185	1185	1185
Adjusted R2	0.079	0.052	0.048	0.072	0.046	0.045

Notes: In all columns, years of experience and its squared, gender, school size, experiences of going abroad before becoming a teacher, and opportunities to contact non-Japanese students as of 2011 are controlled. Robust standard errors are in parentheses. Benjamini and Hochberg's (1995) FDR *q*-values, calculated using *p*-values of 18 hypothetical tests in this table, are in brackets. See questions corresponding to labels in Table 1 for the specific questions for the outcome variable. *** denotes significance at the 1% level.