



What's Happening

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# How current teachers in the Republic of Palau performed on a practice teacher certification examination

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## Summary

Teacher effectiveness has been a longstanding concern throughout the Regional Educational Laboratory Pacific Region, including in the Republic of Palau. To address this concern, Palau passed legislation requiring that all teachers complete a teacher preparation program at Palau Community College (or another institution of higher education) and take the Educational Testing Service Praxis I Pre-Professional Skills Test® (PPST). The Praxis I PPST is commonly used in the United States to help determine whether teaching candidates should be certified to teach. This study examines how teachers in Palau performed on a practice version of the Praxis I PPST and explores the relationships between test performance and selected teacher demographic and professional characteristics. The study used a retired Praxis I test last administered by the Educational Testing Service in 2008.

Study data came from teacher performance scores on the reading, writing, and math subtests of the Praxis I PPST practice test and from a teacher demographic survey. The Praxis I PPST practice test was administered by the Ministry of Education in June 2013. A total of 214 of Palau's 233 teachers (92 percent) completed all three subtests. The study's findings include:

- Palau teachers received an average score of 43 percent in reading, 35 percent in writing, and 29 percent in math.
- Average scores ranged from 27 percent to 47 percent across content categories, with teachers scoring lowest on data analysis and probability on the math subtest and highest on literal comprehension on the reading subtest.
- Scores varied by teachers' demographic and professional characteristics, with higher reported English proficiency, higher levels of education, fewer than seven years of experience, and teaching upper elementary or high school grades generally being associated with higher scores.

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## **Why this study?**

In spring 2006 the Republic of Palau developed its Master Plan for Educational Improvement for 2006–16. Of the plan’s six priority areas, one focused on the Professional Personnel and Certification System (Republic of Palau Ministry of Education, 2006) and included action steps to administer the Educational Testing Service Praxis I Pre-Professional Skills Test® (PPST) to all teachers, substitute teachers, counselors, school administrators, and other personnel as required by Palau’s Educational Assessment Act of 2002. The PPST is the current version of the National Teacher’s Examination cited in the 2002 Palau legislation.

The master plan noted that funding had been requested from the Palau National Congress to support administration of the assessment; however, as of 2008/09 Palau did not require testing for initial teacher certification or licensure (U.S. Department of Education, 2011). Thus, the Palau Research Alliance was interested in this study to inform Palau’s decision regarding the appropriateness of implementing the Praxis I PPST as part of its teacher certification system.

All 50 states, the District of Columbia, and seven affiliated jurisdictions,<sup>1</sup> including Palau, have established teacher certification requirements. While some of the requirements vary across these jurisdictions, as of 2013 a majority of states, as well as Guam, the Commonwealth of the Northern Mariana Islands, and American Samoa, have implemented testing programs and have established minimum passing scores for teacher applicants on one or both of the Praxis I or Praxis II tests (box 1).<sup>2</sup> However, Palau has not yet specified criteria for passing the Praxis I or established a timeline for implementing the testing program.

To further the development and implementation of the Palau Professional Personnel and Certification System, the Palau Research Alliance asked Regional Educational Laboratory (REL) Pacific to help explore the policy and practice implications of including the Praxis I PPST in the teacher certification process. Specifically, REL Pacific was asked to determine the appropriateness of Praxis I PPST for use in Palau given the characteristics of the Palau teaching workforce and Palau teachers’ readiness for and likely success rate on the Praxis I PPST. Despite limited research support of a positive relationship between certification requirements (such as passing the Praxis I PPST) and teacher effectiveness (Angrist & Guryan, 2007; Goldhaber, 2007), the research alliance believed it is important to understand how Palau teachers perform on the test before they officially adopt it or search for alternatives to better assess and predict teacher effectiveness.

Teachers’ performance on the practice test was also expected to indicate teachers’ readiness and predict their success on the actual Praxis I PPST tests if administered as part of Palau certification requirements in future years. Data on teacher performance will inform policymakers and researchers of the likely impact of establishing a passing score for the teacher certification. Teacher performance in specific subtests can inform teacher professional development efforts, and teachers themselves may benefit from better understanding professional expectations through their results on the practice Praxis I PPST. The study’s findings will help Palau decide whether to fully implement the Praxis I PPST as part of its teacher certification process. The study may also inform other REL Pacific Region school systems with similar teacher demographics of the use of certification examinations that are designed for English speakers.<sup>3</sup>

***This study aims to determine the appropriateness of the Educational Testing Service Praxis I Pre-Professional Skills Test® (PPST) for use in Palau given the characteristics of the Palau teaching workforce and Palau teachers’ readiness for and likely success rate on the PPST***

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## Box 1. The Praxis teacher test series

The Praxis Series® of tests, written and administered by the Educational Testing Service, measures teacher candidate knowledge and skills. A majority of U.S. states and jurisdictions use these tests to assess teacher candidate performance before, during, and after teacher education (U.S. Department of Education, 2013). The series includes three sets of tests: one on core academic skills, used primarily for candidates entering teacher preparation programs, and two sets of Pre-Professional Skills Tests (PPST), used primarily for candidates completing teacher preparation programs. The Praxis I PPST measures basic skills in reading, writing, and math and is often used by colleges to qualify candidates for admission to teacher education programs and by states as a prerequisite for teacher licensure. It was the Praxis Series used in this study. The Praxis II PPST measures content knowledge in many different subject areas and teaching skills needed for beginning practitioners; it was not used in this study.

The practice version of the Praxis I PPST used in this study can be found in *The Praxis Series Official Guide, 2nd Edition* (Educational Testing Service, 2010). It is the full-length test that was last used in actual test administrations in June/July 2008 and then retired by Educational Testing Service. The practice test includes correct answers, scoring instructions, and score conversion tables to help test takers get an idea of how they might score on the actual test. It includes three subtests:

- **Reading:** 40 multiple-choice questions (19 on literal comprehension and 21 on critical and inferential comprehension) to be answered within 60 minutes.
- **Writing:** 38 multiple-choice questions (11 on grammatical relationships, 15 on structural relationships, and 12 on word choice and mechanics) and one essay question, each portion to be answered within 30 minutes. The essay portion of the original test was not administered in this study.
- **Math:** 40 multiple-choice questions (13 on number and operations, 8 on algebra, 9 on geometry and measurement, and 10 on data analysis and probability) to be answered within 60 minutes.

**Source:** Educational Testing Service, 2010; U.S. Department of Education, 2013.

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## What the study examined

To provide information that can guide the implementation of the legislative mandate that all Palau teachers take the Praxis I PPST test as a certification requirement and pass the test at a specific level of competency, this study provides the results of a practice version of the test administered to teachers employed by the Palau Ministry of Education. The study addresses three research questions:

1. How do Palau teachers score on the practice Praxis I PPST subtests for reading, writing, and math and in their respective content categories?
2. How does teacher performance on the practice Praxis I PPST subtests for reading, writing, and math vary by teacher demographic and professional characteristics?
3. How does teacher performance in the content categories for reading, writing, and math on the practice Praxis I PPST subtests vary by teacher demographic and professional characteristics?

The data and methodology for this study are briefly described in box 2 and discussed in detail in appendix A.

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## Box 2. Data sources and methods

**Data sources.** The data for the study came from a demographic survey of teachers and the raw scores from the practice Educational Testing Service Praxis I Pre-Professional Skills Tests (PPST) in reading, writing, and math. The survey data include select teacher demographic and professional characteristics: nationality, gender, primary language spoken at home, English proficiency, highest level of education, teacher preparation program attended, years of teaching experience, and grade level taught.

To encourage participation, the Ministry of Education sent teachers a letter inviting them to participate, describing the purpose and benefits of the study and of the Praxis I PPST and assuring the confidentiality of the results.

All three subtests of the practice Praxis I PPST are written in English, and the only allowable accommodation for speakers of English as a second language is additional time. Of the 214 teachers who took the test, 39 (18 percent) requested accommodation as a speaker of English as a second language.

The practice test was administered in June 2013 over two days at the Palau High School, with Ministry of Education staff as proctors. Individuals were divided into groups of no more than 20. Before taking the tests, all teachers completed the demographic survey. All Educational Testing Service guidelines were followed in the administration of the three subtests. None of the teachers had previous experience with the practice Praxis I PPST. (See appendix A for detailed information on data collection and test administration.)

**Methodology and analysis.** The test scores and survey data were analyzed using descriptive statistics for the reading, writing, and math subtests, along with cross-tabulations of test performance by teacher characteristics, specifically teachers' reported English proficiency, level of education, years of teaching experience, and grade level taught. Statistical testing (one-way analysis of variance) was conducted only for teachers' education level, because it included subgroups of sufficient size to provide meaningful information. (See appendix A for more detailed information on the analyses.) Scores were reported for the content categories for each subtest.

Findings from the literature about the relationship between teaching experience and student performance were used to identify the three levels of teaching experience used in the analysis: fewer than three years, three or more but fewer than seven years, and seven or more years. The impact of teaching experience on student performance varies with content categories and education contexts. But the literature suggests that the impact of experience is greatest during the first few years of teaching, followed by only slight student performance gains in the next few years and no appreciable gains with additional years of experience (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008; Clotfelter, Ladd, & Vigdor, 2007; Hanushek & Rivkin, 2006; Kane, Rockoff, & Staiger, 2006; Sass, 2007).

Teachers' raw and average scores, percentage of questions answered correctly for each subtest, and average number of questions answered correctly for each content category were determined by reference to answer keys provided by the Educational Testing Service.

**Source:** Educational Testing Service, 2010, 2013.

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## What the study found

The results of the study provided information on the performance of Palau teachers on the practice version of the Praxis I PPST in reading, writing, and math and their respective content categories and on the relationships between their performance and selected teacher demographic and professional characteristics.

### Teachers scored higher in reading than in writing and math

Overall, teachers scored relatively low on all aspects of the practice version of the Praxis I PPST. However, they had a higher average percentage of questions correctly answered in reading (43.0 percent) than in writing (35.2 percent) and math (29.3 percent; table 1). On the reading subtest teachers scored highest in the content category of literal comprehension (47.4 percent) and lowest on critical and inferential comprehension (39.0 percent). Performance in this content category was the highest among all content categories across subtests. On the writing subtest teachers scored highest in the content category of structural relationships (36.9 percent) and lowest on grammatical relationships (32.7 percent). On the math subtest teachers scored lower in all the content categories than in any of the reading and writing subtest content categories; the highest scores were in number and operations (32.1 percent), and the lowest were in data analysis and probability (27.1 percent).

**Teachers had a higher average percentage of questions correctly answered in reading (43 percent) than in writing (35 percent) and math (29 percent)**

### Teacher scores on the subtests differed depending on the primary language spoken at home, reported English proficiency, level of education, years of teaching experience, and grade level taught

This section reports the average percentage of correct responses by teacher demographic and professional characteristics. Because of the small sample size for most characteristics, statistical significance was estimated only for teachers' education level.

### Teachers with higher reported English proficiency scored higher on the Praxis I PPST.

Teachers who reported higher English proficiency scored higher on all three subtests

**Table 1. Average number and percentage of questions answered correctly by Palau teachers on the Praxis I PPST, by subtest and content category, 2013**

Subtest or content category	Number of questions	Average number of correct answers	Average percentage answered correctly
Reading	40	17.2	43.0 (17.7)
Literal comprehension	19	9.0	47.4 (19.7)
Critical and inferential comprehension	21	8.2	39.0 (18.9)
Writing	38	13.4	35.2 (14.7)
Grammatical relationships	11	3.6	32.7 (21.8)
Structural relationships	15	5.5	36.9 (18.8)
Word choice and mechanics	12	4.2	35.4 (15.3)
Math	40	11.7	29.3 (13.2)
Number and operations	13	4.2	32.1 (15.8)
Algebra	8	2.4	29.4 (18.1)
Geometry and measurement	9	2.5	27.5 (17.7)
Data analysis and probability	10	2.7	27.1 (18.1)

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Numbers in parentheses are standard deviations.

**Source:** Authors' calculations based on 2013 Praxis I PPST performance data.

(table 2). Similarly, the relatively few teachers who reported speaking English at home scored higher than teachers who did not speak English at home.

*Level of education was associated with a higher average number of correct responses.* Teachers' education level was consistently associated with a higher average number of correct responses on the subtests; these associations were statistically significant on the reading, writing, and math subtests (table 3). Teachers with a college degree (bachelor's or associate) answered more questions correctly on the writing subtest, on average, than did teachers with high school diplomas. In reading, teachers with a bachelor's degree answered more questions correctly than did teachers with a high school diploma. Teachers with a high school diploma and teachers with an associate degree did not differ significantly in average number of questions answered correctly in reading. In math, teachers with a bachelor's degree answered more questions correctly, on average, than did teachers with a high school diploma and teachers with an associate degree.

*Teachers with fewer than seven years of teaching experience answered slightly more questions correctly on the reading, writing, and math subtests than did teachers with seven or more years of experience.* Teachers with fewer than seven years of teaching experience in or outside Palau scored slightly higher on the reading, writing, and math subtests than did teachers with seven or more years of experience (table 4). Teachers with fewer than three years of experience scored higher on the math subtest, on average, than did teachers with three or more years of experience and teachers with fewer than seven years of experience, but the two groups had similar percentages of correct responses on the reading and writing subtests.<sup>4</sup>

**Table 2. Average percentage of questions answered correctly by Palau teachers on the Praxis I PPST reading, writing, and math subtests, by primary language spoken at home and English proficiency, 2013**

Characteristic	Number of teachers	Average percentage of questions answered correctly		
		Reading (n = 40)	Writing (n = 38)	Math (n = 40)
Overall	214	43.0 (17.7)	35.2 (14.7)	29.3 (13.2)
Primary language spoken at home				
Includes English	28	46.2 (19.0)	38.3 (15.8)	31.1 (16.8)
Does not include English	186	42.5 (17.5)	34.7 (14.6)	29.0 (12.6)
English proficiency				
I speak English "very well"	25	53.5 (21.3)	42.4 (17.5)	32.4 (17.4)
I speak English "well"	157	43.3 (17.0)	35.5 (13.7)	29.6 (12.8)
I speak English "not well"	23	31.2 (13.5)	28.6 (16.6)	24.9 (10.2)
No response	9	38.1 (8.1)	26.6 (7.6)	26.4 (13.2)

*Teachers who reported higher English proficiency scored higher on all three subtests*

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Numbers in parentheses are standard deviations.

**Source:** Authors' calculations based on participants' responses on the 2013 demographic survey and on 2013 Praxis I PPST performance data.

**Table 3. Average number and percentage of questions answered correctly by Palau teachers on the Praxis I PPST reading, writing, and math subtests, by highest education level, 2013**

Subtest and education level	Number of teachers	Average number of correct answers	Average percentage answered correctly
Reading (40 questions)			
High school diploma <sup>a</sup>	80	15.0	37.5 (15.0)
Associate degree <sup>a,b</sup>	82	17.5	43.8 (18.1)
Bachelor's degree and above <sup>b</sup>	52	20.1	50.3 (18.3)
Writing (38 questions)			
High school diploma <sup>a</sup>	80	11.5	30.3 (12.3)
Associate degree <sup>b</sup>	82	13.7	36.1 (15.1)
Bachelor's degree and above <sup>b</sup>	52	15.7	41.3 (15.2)
Math (40 questions)			
High school diploma <sup>a</sup>	80	11.1	27.8 (12.8)
Associate degree <sup>a</sup>	82	11.2	28.0 (10.0)
Bachelor's degree and above <sup>b</sup>	52	13.4	33.5 (17.1)

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Numbers in parentheses are standard deviations. Groups that share the same superscript are not significantly different from one another at  $p < .05$ . Groups that have no superscript in common are significantly different from one another at  $p < .05$ .

**Source:** Authors' calculations based on participants' responses on the 2013 demographic survey and on 2013 Praxis I PPST performance data.

**Table 4. Average percentage of questions answered correctly by Palau teachers on the Praxis I PPST reading, writing, and math subtests, by years of teaching experience, 2013**

Characteristic	Number of teachers	Average percentage of questions answered correctly		
		Reading (n = 40)	Writing (n = 38)	Math (n = 40)
Overall	214	43.0 (17.7)	35.2 (14.7)	29.3 (13.2)
Teaching experience				
Fewer than 3 years	21	43.9 (19.3)	37.8 (17.8)	32.6 (20.1)
3 years or more and fewer than 7 years	45	44.8 (18.1)	38.2 (13.4)	30.1 (9.1)
7 years or more	148	42.3 (17.4)	33.9 (14.6)	28.6 (13.1)

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Numbers in parentheses are standard deviations.

**Source:** Authors' calculations based on participants' responses on the 2013 demographic survey and on 2013 Praxis I PPST performance data.

**Teachers at the upper elementary and high school levels scored higher than teachers at the lower elementary level.** High school teachers scored higher on all three subtests than did elementary school (grades 1–8) teachers (table 5). But when performance data were disaggregated by lower (grades 1–3) and upper elementary (grades 4–8) school teachers, upper elementary school teachers answered nearly the same number of questions correctly as did high school teachers on all subtests. The average score of upper elementary and high school teachers was higher than that of the lower elementary school teachers.

**High school teachers scored higher than did elementary school (grades 1–8) teachers on all three subtests**

**Teachers’ performance in the reading, writing, and math subtest content categories varied by demographic and professional characteristics**

This section reports teachers’ performance on the reading, writing, and math subtests by content category.

**Reading.** Teacher performance in the reading content categories differed depending on primary language spoken at home, English proficiency, highest level of education attained, teaching experience, and grade level taught (table 6).

**Demographics.** Teachers who reported speaking any English at home scored higher in the literal comprehension and critical and inferential comprehension content categories than did teachers who reported not speaking English at home. Teachers who reported speaking English “very well” scored higher in both content categories than did teachers who reported speaking English “well” or “not well.”

**Education background.** In both reading content categories, the average percentage of questions answered correctly was highest for teachers with a bachelor’s degree and above. This is consistent with the finding for the average number of questions answered correctly on the overall reading subtest.

**Table 5. Average percentage of questions answered correctly by Palau teachers on the Praxis I PPST reading, writing, and math subtests, by grade level taught, 2013**

Characteristic	Number of teachers	Average percentage of questions answered correctly		
		Reading (n = 40)	Writing (n = 38)	Math (n = 40)
Overall	214	43.0 (17.7)	35.2 (14.7)	29.3 (13.2)
<b>Grade level taught</b>				
Other/no response <sup>a</sup>	5	b	b	b
Elementary (grades 1–8)	164	42.2 (16.7)	34.5 (14.2)	28.8 (11.5)
Lower elementary (grades 1–3)	71	36.7 (11.5)	29.9 (12.1)	26.3 (8.3)
Upper elementary (grades 4–8)	93	46.5 (18.7)	38.0 (14.8)	31.4 (12.9)
High school (grades 9–12)	45	46.1 (21.4)	38.0 (17.0)	31.8 (18.5)

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Numbers in parentheses are standard deviations.

**a.** Includes both prekindergarten teachers and nonrespondents.

**b.** Too few cases to report.

**Source:** Authors’ calculations based on participants’ responses on the 2013 demographic survey and on 2013 Praxis I PPST performance data.

**Table 6. Average percentage of questions answered correctly by Palau teachers on the Praxis I PPST reading subtest, by content category and teacher demographic and professional characteristics, 2013**

Characteristic	Number of teachers	Average percentage of questions answered correctly	
		Literal comprehension (n = 19)	Critical and inferential comprehension (n = 21)
Overall	214	47.4 (19.7)	39.0 (18.9)
<b>Primary language spoken at home</b>			
Includes English	28	52.3 (19.6)	40.7 (22.0)
Does not include English	186	46.7 (19.7)	38.7 (18.5)
<b>English proficiency</b>			
I speak English “very well”	25	60.2 (21.9)	47.4 (23.4)
I speak English “well”	157	47.3 (19.3)	39.7 (18.3)
I speak English “not well”	23	35.5 (15.4)	27.3 (15.4)
No response	9	44.4 (10.2)	32.3 (7.4)
<b>Highest level of education attained</b>			
High school diploma	80	42.0 (18.2)	33.5 (15.7)
Associate degree	82	49.2 (19.6)	38.7 (19.6)
Bachelor’s degree and above	52	52.9 (20.4)	47.8 (19.4)
<b>Teaching experience</b>			
Fewer than 3 years	21	46.9 (23.9)	41.3 (18.5)
3 years or more but fewer than 7 years	45	48.5 (19.9)	41.5 (19.4)
7 years or more	148	47.1 (19.1)	37.9 (18.9)
<b>Grade level taught</b>			
Other/no response <sup>a</sup>	5	<sup>b</sup>	<sup>b</sup>
Elementary (grades 1–8)	164	46.7 (19.3)	38.2 (17.7)
Lower elementary (grades 1–3)	71	41.4 (15.2)	32.4 (12.5)
Upper elementary (grades 4–8)	93	50.7 (21.1)	42.7 (19.8)
High school (grades 9–12)	45	50.9 (21.7)	41.7 (23.5)

*Teachers with seven years or more of teaching experience scored lower in critical and inferential comprehension than did less experienced teachers. There was little difference across the three experience categories in the average percentage of questions answered correctly in literal comprehension*

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Numbers in parentheses are standard deviations.

**a.** Includes both prekindergarten teachers and nonrespondents.

**b.** Too few cases to report.

**Source:** Authors’ calculations based on participants’ responses on the 2013 demographic survey and on 2013 Praxis I PPST performance data.

*Teaching experience and grade level taught.* Teachers with seven years or more of teaching experience scored lower in critical and inferential comprehension than did less experienced teachers. There was little difference across the three experience categories in the average percentage of questions answered correctly in literal comprehension.

High school teachers scored higher in both reading content categories than did elementary school teachers. However, when performance data were disaggregated into lower (grades 1–3) and upper (grades 4–8) elementary levels, upper elementary and high school teachers performed at the same level in both reading content categories.

**Writing.** Teachers’ performance in the writing content categories differed depending on the primary language spoken at home, English proficiency, level of education, years of teaching experience, and grade level taught (table 7).

**Table 7. Average percentage of questions answered correctly by Palau teachers on the Praxis I PPST writing subtest, by content category and teacher demographic and professional characteristics, 2013**

Characteristics	Number of teachers	Average percentage of questions answered correctly		
		Grammatical relationships (n = 11)	Structural relationships (n = 15)	Word choice and mechanics (n = 12)
Overall	214	32.7 (21.8)	36.9 (18.8)	35.4 (15.3)
<b>Primary language spoken at home</b>				
Includes English	28	39.3 (23.1)	40.0 (20.9)	35.1 (12.9)
Does not include English	186	31.7 (21.5)	36.4 (18.5)	35.4 (15.7)
<b>English proficiency</b>				
I speak English "very well"	25	40.4 (24.6)	45.1 (22.2)	41.0 (15.6)
I speak English "well"	157	33.5 (20.5)	37.4 (17.8)	35.0 (15.2)
I speak English "not well"	23	21.7 (25.4)	29.9 (20.0)	33.3 (16.5)
No response	9	25.3 (16.2)	23.7 (10.1)	31.5 (12.3)
<b>Highest level of education attained</b>				
High school diploma	80	25.8 (16.8)	31.3 (16.1)	32.8 (15.7)
Associate degree	82	33.6 (22.9)	38.6 (20.3)	35.3 (14.1)
Bachelor's degree and above	52	41.8 (23.6)	42.7 (18.4)	39.4 (16.0)
<b>Teaching experience</b>				
Fewer than 3 years	21	37.7 (24.6)	41.0 (19.8)	34.1 (15.8)
3 years or more but fewer than 7 years	45	33.7 (19.3)	39.3 (19.4)	40.9 (16.7)
7 years or more	148	31.6 (22.1)	35.6 (18.5)	33.8 (14.5)
<b>Grade level taught</b>				
Other/no response <sup>a</sup>	5	<sup>b</sup>	<sup>b</sup>	<sup>b</sup>
Elementary (grades 1–8)	164	30.8 (21.3)	36.4 (18.5)	35.5 (14.9)
Lower elementary (grades 1–3)	71	25.7 (19.8)	29.9 (15.5)	33.8 (14.6)
Upper elementary (grades 4–8)	93	34.6 (21.8)	41.4 (19.2)	36.7 (15.1)
High school (grades 9–12)	45	39.8 (22.8)	39.3 (20.7)	34.6 (17.0)

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Numbers in parentheses are standard deviations.

**a.** Includes both prekindergarten teachers and nonrespondents.

**b.** Too few cases to report.

**Source:** Authors' calculations based on participants' responses on the 2013 demographic survey and on 2013 Praxis I PPST performance data.

*Demographics.* Teachers who reported speaking English at home on average scored more than 7 percentage points higher in the grammatical relationships content category and nearly 4 percentage points higher in the structural relationships content category than did teachers who did not report speaking English at home. However, the average percentage of questions answered correctly in the word choice and mechanics content category was similar for teachers who reported speaking any English at home and teachers who did not. Teachers who reported speaking English “very well” on average scored about 7 percentage points higher in the grammatical and structural relationships content categories than did teachers who reported speaking English “well” and more than 15 percentage points higher than did teachers who reported speaking English “not well.” The performance gap in word choice and mechanics was smaller between teachers who reported speaking English “very well” and “well” (6 percentage points) and between teachers who reported speaking English “very well” and “not well” (nearly 8 percentage points).

*Education background.* In all three writing content categories the average percentage of questions answered correctly was higher for teachers with a bachelor’s degree and above than for teachers with an associate degree or high school diploma.

*Teaching experience and grade level taught.* The average percentage of questions answered correctly decreased as teaching experience increased in the grammatical relationships and structural relationships content categories. Teachers with three years or more but fewer than seven years of teaching experience scored higher in the word choice and mechanics content category than did teachers with fewer than three years of experience and teachers with seven or more years of experience. Teachers with seven or more years of experience had the lowest scores across the three experience categories in all content categories.

High school teachers on average scored 9 percentage points higher in the grammatical relationships content category than did all teachers at the elementary level (grades 1–8). High school teachers also scored slightly higher in the structural relationships content category than did all teachers at the elementary level, but scores were similar in the word choice and mechanics content category. However, when performance data were disaggregated into lower (grades 1–3) and upper (grades 4–8) elementary levels, upper elementary school teachers outperformed lower elementary school teachers in all content categories and high school teachers in two content categories.

**Math.** Teachers’ performance in the math content categories differed depending on the primary language spoken at home, English proficiency, highest level of education attained, teaching experience, and grade level taught (table 8).

*Demographics.* Across three of the four math content categories, teachers who reported speaking any English at home on average scored higher than teachers who did not. The only content category in which teachers who reported speaking any English at home scored similarly to teachers who did not was number and operations.

Teachers who reported speaking English “very well” on average scored higher in every math content category than did teachers who reported speaking English “well” and teachers who reported speaking English “not well.” The largest difference between teachers who reported speaking English “very well” and teachers who reported speaking English “well” was 4.1 percentage points (in the number and operations category).

**The average percentage of questions answered correctly decreased as teaching experience increased in the grammatical relationships and structural relationships content categories**

**Table 8. Average percentage of questions answered correctly by Palau teachers on the Praxis I PPST math subtest, by content category and teacher demographic and professional characteristics, 2013**

Demographics/characteristics	Number of teachers	Average percentage of questions answered correctly			
		Number and operations (n = 13)	Algebra (n = 8)	Geometry and measurement (n = 9)	Data analysis and probability (n = 10)
Overall	214	32.1 (15.8)	29.4 (18.1)	27.5 (17.7)	27.1 (18.1)
<b>Primary language spoken at home</b>					
Includes English	28	31.6 (18.8)	36.6 (24.8)	28.6 (20.4)	28.2 (20.2)
Does not include English	186	32.1 (15.4)	28.4 (16.7)	27.4 (17.3)	26.9 (17.8)
<b>English proficiency</b>					
I speak English "very well"	25	36.3 (20.7)	31.0 (21.1)	30.2 (22.6)	30.4 (19.7)
I speak English "well"	157	32.2 (15.0)	29.9 (18.0)	28.0 (17.7)	27.4 (17.9)
I speak English "not well"	23	30.1 (16.1)	23.9 (12.5)	20.8 (9.7)	22.6 (16.6)
No response	9	23.1 (10.2)	31.9 (23.5)	28.4 (16.8)	24.4 (20.7)
<b>Highest level of education attained</b>					
High school diploma	80	31.9 (16.0)	28.0 (17.8)	24.9 (17.7)	24.6 (16.3)
Associate degree	82	29.3 (12.7)	29.4 (17.2)	27.1 (14.9)	26.3 (15.8)
Bachelor's degree and above	52	36.7 (18.9)	31.7 (20.0)	32.3 (20.9)	32.1 (22.9)
<b>Teaching experience</b>					
Fewer than 3 years	21	37.0 (20.6)	29.8 (25.8)	30.2 (22.2)	31.4 (23.7)
3 years or more but fewer than 7 years	45	33.5 (13.2)	30.8 (17.0)	26.2 (15.4)	28.4 (13.6)
7 years or more	148	30.9 (15.7)	29.0 (17.3)	27.6 (17.7)	26.1 (18.4)
<b>Grade level taught</b>					
Other/no response <sup>a</sup>	5	b	b	b	b
Elementary (grades 1–8)	164	32.2 (14.8)	28.5 (16.9)	26.5 (16.3)	26.6 (16.6)
Lower elementary (grades 1–3)	71	28.8 (14.1)	25.4 (14.5)	22.7 (12.5)	23.1 (13.6)
Upper elementary (grades 4–8)	93	34.8 (14.9)	30.9 (18.2)	29.4 (18.3)	29.3 (18.1)
High school (grades 9–12)	45	32.0 (19.7)	33.3 (22.3)	32.8 (21.7)	29.3 (23.4)

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Numbers in parentheses are standard deviations.

**a.** Includes both prekindergarten teachers and nonrespondents.

**b.** Too few cases to report.

**Source:** Authors' calculations based on participants' responses on the 2013 demographic survey and on 2013 Praxis I PPST performance data.

*Education background.* Teachers whose highest degree was a bachelor’s degree or above scored higher in all math content categories, though the difference in algebra was minimal. Scores were similar for teachers with a high school diploma and teachers with an associate degree in all content categories.

*Teaching experience and grade level taught.* Scores were similar across levels of teaching experience. Teachers with fewer than three years of teaching experience scored higher in number and operations, geometry and measurement, and data analysis and probability than did teachers with more teaching experience. Teachers with at least three years but fewer than seven years of experience scored slightly higher in algebra than did teachers from the other experience categories. The largest differences by experience category were in number and operations.

Across grade level taught, scores were similar for elementary and high school teachers in number and operations; high school teachers on average scored higher than elementary teachers in algebra, geometry and measurement, and data analysis and probability. However, when performance data were disaggregated into lower (grades 1–3) and upper (grades 4–8) elementary levels, upper elementary and high school teachers scored at nearly the same level in all math content categories.

### **Implications of the study**

In light of Palau’s legislation requiring teacher certification, the Palau Research Alliance and Ministry of Education were particularly interested in the use of the Praxis I PPST to fulfill these requirements because the test is specified in the legislation. The results of this study provide the Palau Ministry of Education and other regional stakeholders with information on the utility of the Praxis I PPST as a tool for certifying Palau K–12 teachers. As the Palau education leadership moves to identify and validate alternative testing options for certifying teachers, the findings regarding teacher performance from this study may help establish passing scores and a plan of incremental improvement, determine the appropriateness of Praxis I for Palau teachers who do not have a strong command of English, and establish preservice and in-service training requirements for teachers.

#### **Determining the appropriateness of Praxis I for Palau teachers and non-English speakers**

The use of the Praxis I PPST as a certification requirement in Palau may warrant further review in light of the study results, which indicate that Palau teachers answered 29–43 percent of test questions correctly. The fact that a majority of Palau teachers are not native English speakers and that there were substantial differences in subtest scores between teachers with different English proficiency suggest that accommodations may need to be made for Palau teachers taking the Praxis I PPST for certification purposes.

#### **Establishing preservice and in-service training requirements for teachers**

All 50 states and 9 affiliated entities<sup>5</sup> have certification requirements. However, the requirements vary. According to the U.S. Department of Education’s federal Title II reports (2012), all teachers in Hawaii, American Samoa, and the Commonwealth of the Northern Mariana Islands must hold at least a bachelor’s degree to become certified. In Guam teachers must hold at least a bachelor’s degree, except for some K–5, entry-level vocational,

***As the Palau education leadership moves to identify and validate alternative testing options for certifying teachers, the findings regarding teacher performance from this study may help establish passing scores and a plan of incremental improvement, determine the appropriateness of Praxis I for Palau teachers who do not have a strong command of English, and establish preservice and in-service training requirements for teachers***

and Chamorro language and culture instructors. The Federated States of Micronesia and the Republic of the Marshall Islands require at least an associate degree for several types of certification.

The results of this study can provide guidance to teacher preparation program development at Palau and other REL Pacific Region postsecondary institutions regarding curriculum and course content. These programs could be designed to strengthen teacher knowledge and skills, which could in turn improve teachers' performance on certification tests. The study results may also help the Palau Ministry of Education leadership tailor reading, writing, and math professional development programs to the specific needs of various subgroups of teachers to maximize annual improvement in the performance of the teacher workforce.

### **Limitations of the study**

One limitation of the study is the small number of teachers in Palau. This limited the number of categories of teacher demographic and professional characteristics that could be analyzed concurrently. Occasionally, it was necessary to aggregate or suppress the data for some of the teacher characteristics because of the small number of teachers in those categories (cell size of less than five).

A second study limitation involves the completeness and accuracy of the self-reported data, which include primary language spoken at home, highest education level attained, grade level taught, and years of teaching experience. Performance data on all three subtests suggest that teachers reporting lower English proficiency did not perform as well as those reporting higher English proficiency. It is possible that teachers reporting lower English proficiency may also have misunderstood some survey questions or elected not to respond to some questions. For example, a number of respondents selected more than one language when asked what primary language was spoken at home.

***The study results may also help the Palau Ministry of Education leadership tailor reading, writing, and math professional development programs to the specific needs of various subgroups of teachers to maximize annual improvement in the performance of the teacher workforce***

## Appendix A. Data sources and methodology

This appendix provides information about the sources of study data, the characteristics of the teachers who took the test, data collection methods, and data processing and analysis.

### Data sources

Two data sources were used to address the research questions: a demographic survey and the results from the practice Educational Testing Service Praxis I Pre-professional Skills Tests® (PPST) in reading, writing, and math.

**Demographic survey.** Palau teachers' demographic and professional characteristic data were collected at the time of testing through a written demographic survey. Data were collected on the following teacher demographic and professional characteristics:

- Nationality.
- Gender.
- Primary language spoken at home.
- Highest level of education attained.
- Teacher postsecondary institution, if applicable.
- Years of teaching experience in Palau.
- Total years of teaching experience (in Palau and outside of Palau).
- Prior Praxis I PPST experience (that is, whether the test was previously taken).
- Grade level taught (elementary or secondary).

**Praxis tests.** The results from the multiple-choice portions of the practice Praxis I PPST tests of reading, writing, and math were analyzed. The Praxis Series tests, developed by the Educational Testing Service, measure teacher candidate knowledge and skills. The series includes a set of tests of core academic skills, used primarily for candidates entering teacher preparation programs, and two sets of tests of pre-professional skills. The Praxis I PPST, used in this report, measures basic skills in reading, writing, and math and is often used to qualify candidates for licensure. The Praxis II PPST was designed to measure subject-specific content knowledge, along with specific teaching skills needed for beginning practitioners. The practice test comes from *The Praxis Series Official Guide, 2nd Edition*, (Educational Testing Service, 2010), which was retired in 2008.

The paper-based Praxis I PPST test used in this study includes three subtests: tests in reading and math, each with 40 multiple-choice items requiring 60 minutes, and a writing test with 38 multiple-choice items and one essay question, each allotted 30 minutes. The essay portion of the test was not administered in this study; thus, the total raw score is 40 for reading and math and 38 for writing.

Each subtest includes content categories in which scores are reported. Reading includes 19 questions on literal comprehension and 21 questions on critical and inferential comprehension. Writing includes 11 questions on grammatical relationships, 15 questions on structural relationships, and 12 questions on word choice and mechanics. Math includes 13 questions on number and operations, 8 questions on algebra, 9 questions on geometry and measurement, and 10 questions on data analysis and probability.

All three subtests of the practice version of the Praxis I PPST are written in English, and the only allowable accommodation for those with English as a second language is 50 percent additional time. Of the 214 teachers who took the test, 39 (18 percent) requested accommodation as a speaker of English as a second language.

Teachers' raw and average scores, average number of questions answered correctly for each subtest, and percentage answered correctly for each content category were determined by reference to answer keys provided by the Educational Testing Service.

### Characteristics of teachers who took the test

Of the 233 teachers in Palau, 214 (92 percent) participated. None of the teachers had previous experience with the practice version of the Praxis I PPST.

**Demographics.** The majority of the test takers were Palauan (86 percent), female (76 percent), and said they do not speak English at home (87 percent). When asked to rate their English proficiency, 73 percent reported speaking English “well,” and 12 percent reported speaking English “very well” (table A1).

**Education background.** Of the teachers in the study, 21 percent reported having a bachelor's degree and 4 percent a master's degree; 38 percent reported having a high school diploma as their highest degree, and 38 percent reported having an associate degree (see table A1).<sup>6</sup> In response to the question on the name and location of college or university attended, 50 percent identified Palau Community College, 35 percent indicated other colleges or universities, and 15 percent did not respond to the question or indicated that the question was not applicable.<sup>7</sup>

**Teaching experience and grade level taught.** Three questions on the demographic survey related to teaching experience and grade level taught: number of years teaching in Palau; total number of years teaching in Palau and in other places, if applicable; and grade level taught. Responses to the questions on years of teaching experience in Palau and total years of teaching experience were nearly identical; most teachers had spent all their teaching career in Palau. Some 16 percent of respondents reported fewer than three years of experience, 14 percent reported three or more but fewer than seven years of experience, and 70 percent reported seven years or more of experience. Some 77 percent of teachers reported teaching at the elementary school level (grades 1–8), and 21 percent reported teaching at the high school level (grades 9–12). Of the elementary school teachers, 43 percent taught grades 1–3, and 57 percent taught grades 4–8.

### Data collection methods

At least 30 days prior to the test administration date, the Palau Ministry of Education sent a personalized letter and consent form to teachers that included the following components: purpose of the study, contribution to the study, assurance that the test results would not impact employment or have any other negative consequences, and maintenance of confidentiality of test scores. The letter indicated the amount of time involved, dates for the administration of the tests, that participation was voluntary, and that administration would occur during noninstructional duty hours. Teachers were informed that it would be a “low-stakes” test and that the information obtained from the results would be used

**Table A1. Characteristics of Palau teachers who took the practice Praxis I PPST, 2013**

Characteristic	Number of teachers	Percentage of test takers
Total	214	100.0
<b>Nationality</b>		
Palauan	184	86.0
Filipino	7	3.3
Other Pacific Islanders	7	3.3
Other	3	1.4
No response	13	6.1
<b>Gender</b>		
Male	51	23.8
Female	163	76.2
<b>Primary language spoken at home<sup>a</sup></b>		
Includes English	28	13.1
Does not include English	186	86.9
<b>English proficiency</b>		
I speak English “very well”	25	11.7
I speak English “well”	157	73.4
I speak English “not well”	23	10.7
No response	9	4.2
<b>Highest level of education attained</b>		
High school diploma	80	37.4
Associate degree	82	38.3
Bachelor’s degree and above	52	24.3
<b>Name of college/university attended</b>		
Palau Community College (PCC)	107	50.0
Other	75	35.0
No response/not applicable	32	15.0
<b>Years of Palau teaching experience</b>		
Fewer than 3 years	25	11.7
3 years or more but fewer than 7 years	48	22.4
7 years or more	141	65.9
<b>Total years of teaching experience</b>		
Fewer than 3 years	21	9.8
3 years or more and fewer than 7 years	45	21.0
7 years or more	148	69.2
<b>Grade level taught</b>		
Elementary (grades 1–8)	164	76.6
Lower elementary (grades 1–3)	71	33.2
Upper elementary (grades 4–8)	93	43.5
High school (grades 9–12)	45	21.0
Other/no response <sup>b</sup>	5	2.3

PPST is the Educational Testing Service Pre-Professional Skills Test.

**Note:** Percentages may not sum to 100 because of rounding.

**a.** Based on a survey question regarding primary language spoken at home.

**b.** Includes prekindergarten teachers and nonrespondents.

**Source:** Authors’ calculations based on participants’ responses on the 2013 demographic survey.

to develop and provide appropriate professional development activities that may support them in the delivery of effective instruction.

The Palau Ministry of Education administered the test and the demographic survey at the same time. REL Pacific supported the Palau Ministry of Education in developing the demographic survey.

The Palau Ministry of Education administered the test in adherence to all Educational Testing Service guidelines. The paper-and-pencil tests were administered over two days. Of the 214 teachers, 39 (18 percent) requested test accommodation as a speaker of English as second language. The reading and writing subtests were administered on the first day, and the math subtest on the second day. Administration of the reading and writing subtests included a 15-minute break between administrations. Trained staff members from the ministry proctored the test rooms. Per Educational Testing Service guidelines, participants taking the reading and math subtests were given 60 minutes to complete each subtest, and participants taking the writing multiple-choice subtest were given 30 minutes to complete it. Those who requested second language accommodation received an additional 50 percent of testing time for the total test.

The Palau Ministry of Education administered the practice Praxis I PPST test following Educational Testing Service guidelines for allowable accommodations. Test takers with disabilities and health-related needs were required to meet the American with Disabilities Act Amendments Act disability requirement prior to requesting any accommodation. The following accommodations were allowable under Educational Testing Service guidelines for test takers with disabilities and health-related needs:

- Extended testing time.
- Additional rest breaks.
- Separate testing room.
- Writer or recorder of answers.
- Test reader.
- Sign language interpreter for spoken directions only.
- Perkins Braille.
- Braille slate and stylus.
- Printed copy of spoken directions.
- Oral interpreter.
- Audio test.

Before receiving any accommodations, the test takers completed Part I (Applicant Information), Part II (Accommodations Requested), and Part III (Certification of Eligibility: Accommodations History) of the Testing Accommodations Request Form and submitted the form to the Palau Ministry of Education. The Palau Ministry reviewed the form for completeness and approved it according to Educational Testing Service guidelines.

Test takers whose primary language spoken at home is not English completed and submitted to the Palau Ministry of Education a Certificate of Documentation form and the Eligibility Form for Test Takers Whose Primary Language Is Not English.

## Data processing and analysis

This study analyzed the practice version of the Praxis I PPST data for teachers in Palau using primarily descriptive methods. Significance testing was also employed when subgroups were of sufficient size to provide meaningful information; therefore, statistical significance was estimated only for teachers' education level. This included a one-way analysis of variance and post hoc tests to determine which of the groups differed from one another.

To assess how teachers performed on the Praxis I (research question 1), the study team examined the overall performance of Palau teachers on a practice version of the Praxis I PPST in the three subtests of reading, writing, and math.

The *Praxis Official Guide, Second Edition* (Educational Testing Service, 2010), categorizes test questions into content categories. To assess how teachers performed on subtest content categories (research question 2), the study team analyzed subtest performance data to describe the average number and percentage of questions answered correctly in each of the nine content categories associated with the three subtests.

To examine whether teachers' performance on the test and on content categories within each subtest varied by selected teacher demographic and professional characteristics (research question 3), the study team calculated score averages, percentages, and cross-tabulations to explore differences in test performance by teacher demographic and professional characteristics.

## Notes

1. Puerto Rico, the U.S. Virgin Islands, American Samoa, the Commonwealth of the Northern Mariana Islands, the Republic of Palau, the Federated States of Micronesia, and the Republic of the Marshall Islands.
2. While most U.S. states use a version of the Praxis tests developed by Educational Testing Service, some work with Pearson to develop assessments aligned to their state standards, use a combination of Educational Testing Service and Pearson assessments, or they work with other organizations to create assessments.
3. The official national languages of Palau are Palauan and English. Palauan is the language of instruction in grades K–3, Palauan and English are the languages of instruction in grades 4–5, and English is the language of instruction in grades 6–12 (Regional Educational Laboratory Pacific, 2014). For comparison, 96 percent of the teachers surveyed in this study reported speaking English as a second language, 82 percent reported speaking Palauan as a primary language, 14 percent indicated “other” as a primary language, and 87 percent of Palauan teachers said they do not speak English at home.
4. Chi-square analyses showed no significant difference based on years of experience by self-reported English proficiency. Further in-depth analyses of why newer teachers performed better than more experienced teachers is outside the scope of the current study.
5. Puerto Rico, the District of Columbia, the U.S. Virgin Islands, American Samoa, the Commonwealth of the Northern Mariana Islands, Guam, the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau.
6. Percentages do not sum to 100 because of rounding.
7. Although 85 percent of participants reported attending a postsecondary institution, just 62 percent reported receiving a degree. A portion of the 38 percent of those who received a high school diploma likely attended a postsecondary institution but did not receive a degree, which would account for the apparent discrepancy.

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