IES Institute of Education Sciences

APPENDIXES
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Regional Educational Laboratory Pacific
At McREL International

Teacher Certification, Retention, and Recruitment in Palau: Understanding Graduation Patterns of Teacher Education Students at Palau Community College

Appendix A. About the study

Appendix B. Methods

See https://ies.ed.gov/ncee/rel/Products/Region/pacific/Publication/108210 for the study infographic.

A. About the study

Introduction

These appendixes provide the technical details, methods, and results for the accompanying infographic. The importance of the study, including guiding research questions, is addressed in appendix A, while the study's research approach and detailed results are provided in appendix B.

Why this study

The Republic of Palau is experiencing an urgent need to increase the rate at which its teachers are certified due to the Olbiil era Kelulau (Palau National Congress) passing a new law mandating minimal teacher certification by December 2023. To support the Ministry of Education's (MOE) effort to meet this deadline and ensure that current teachers remain certified and eligible to teach, this study prioritizes understanding the various teacher education programs at Palau Community College (PCC) to identify differences in time to completion by types of students and groups of students who may need additional support.

Palau's context

In 2018, a new law (RPPL 10-32) passed, requiring all teachers to have an associate's degree by December 2023 (within five years of the legislation's passing) to be eligible to teach (Island Times Palau, 2019). Per the law, classroom teachers who did not meet this requirement by the deadline would no longer be allowed to practice teaching. However, as of 2024, a temporary waiver has been put in place, since the teacher certification process outlined in the law is still being developed. In 2012, 40 percent of teachers in Palau did not have an associate's degree (Australia Department of Foreign Affairs and Trade, 2012). Teachers held high school diplomas and, in some cases, some college credits (Island Times Palau, 2019). By 2020, Palau had increased the percentage of teachers qualified with an associate's degree to 51 percent (Palau Bureau of Budget and Planning, 2020), but concerns remained

regarding the number of classroom teachers who would be certified within the stipulated time to continue teaching in the classroom.

A series of factors continued to create challenging conditions for staffing Palau's schools with qualified, certified teachers (Cross, 2016). Prior to its independence in 1994, Palau's school content/curriculum was mainly determined and taught by foreigners (Luka, 2018), including American teachers contracted to teach in Palau (Pacific Worlds, n.d.). Locals who taught in schools during that same time, did not have much, if any, formal education beyond high school (Luka, 2018). As Palau transitioned to self-government and American teachers were no longer employed at the same rate, Palau schools employed more staff with no formal teacher training. Since independence, preparing more local Palauan teachers has been a priority for the country. The Palau MOE supplements the cost of education for a select group of teachers who are pursuing their degrees while maintaining their teaching positions (referred to as MOE-sponsored cohorts). However, despite these efforts, having only one teacher preparation program in the country, operated by the country's only post-secondary institution [Palau Community College (PCC)], limits opportunities for teacher certification, especially for teachers living and teaching in remote areas of Palau.

Research questions

This study examines the following research questions using existing data from the 2019/20, 2020/21, 2021/22, and 2022/23 academic years:

1. What are the educational pathways to earning an associate's degree in education at PCC, and what are the characteristics of those individuals pursuing these pathways?
    a. For each of the identified pathways, what are the demographic characteristics of *graduates* who started enrollment during the 2019/20, 2020/21, and 2021/22 academic years?
    b. For each of the identified pathways, what are the demographic characteristics of *teacher-education students* who started enrollment during the 2019/20, 2020/21, and 2021/22 academic years?
2. What is the number of enrolled teacher-education students seeking associate's degrees for each pathway?
3. On average, how long do students in each pathway take to complete their associate's degrees?
4. What number and percentage of teacher-education students seeking associate's degrees graduate from each pathway within the expected two-year timeframe?

B. Methods and Results

Data sources

The data used in this study were provided by Palau Community College (PCC) and Palau's Ministry of Education (MOE). PCC shared de-identified student-level data for all students who either enrolled in a teacher-education associate's degree program or were members of one of the MOE-sponsored cohorts between summer 2019 and spring 2022.[1] Data for these students were provided from summer 2019 through summer 2023.[2] The data included some students who had previously enrolled in college but were new to the teacher education program or the MOE-sponsored cohorts. The number of prior credits completed by students with previous college experience was not available to the study team, partly because some students first enrolled in college several decades past and partly because some students attended college outside the country.

PCC provided the following raw data for the study:

- **Student-level enrollment, graduation date, demographics, and course enrollments,** which included the date of first enrollment in a teacher education program, whether the student had prior college credits, organizational affiliation (MOE, Head Start, or regular [unaffiliated] student), academic major, anticipated graduation date, self-reported gender and ethnicity/nationality, and a list of courses the student enrolled in each term.
- **Course descriptions by term,** which included a list of each education course by term, number of students enrolled, days of the week and times that the course was offered, maximum enrollment capacity for the course, and the course's modality (in person, virtual, or hybrid).

Data processing and determination of the analytic sample

The study team received data for 109 teacher education students who started enrollment (or re-enrolled) at PCC between summer 2019 and spring 2022. The data included all students who enrolled or re-enrolled (after a break in enrollment). All 109 teacher education students were included in the study and comprised the analytic sample.

The following variables were used in the study to answer the research questions:

- **Starting term:** This variable was the first term that the student enrolled or re-enrolled at PCC in a teacher education program or an MOE-sponsored cohort.[3] The values for this variable ranged from summer 2019 through spring 2022. They were also coded numerically for the Kaplan-Meier curves (see the Analytic Methods sub-section on page B-10 for an explanation of Kaplan-Meier methodology) with summer 2019 having a value of 0, fall 2019 a value of 1, spring 2020 a value of 2, and so forth. The numeric values ranged from 0–8.
- **Ending term:** This variable was either the term in which the student graduated, the term the student dropped out of the program, or the last term of observation, which was summer 2023. The

[1] In order to be a member of the MOE-sponsored cohorts, the students had to be currently employed teachers of the MOE.
[2] An academic year at PCC includes three terms: summer, fall, and spring.
[3] A few students were marked as being in an MOE-sponsored cohort but were enrolled in a non-education major. Those students were still included since they were marked as current MOE teachers and sponsored by the MOE.

ending terms were coded numerically for the Kaplan-Meier curves, starting with a value of 1 for summer 2019. The numeric values ranged from 1–12.

- **Graduation status:** This variable was coded as a binary value where 1 indicated that the student graduated with an associate's degree between fall 2019 and summer 2023 and 0 if the student did not graduate.
- **Graduation on-time status:** This variable was coded as a binary value where 1 indicated the student graduated with an associate's degree between fall 2019 and summer 2023 and within two academic years (6 terms) of starting enrollment; this was coded as 0 if the student did not graduate in that timeframe.
- **Prior college experience status:** This variable was coded as a binary value where 1 indicated the student had some prior college experience before enrolling in their current program and 0 when the student did not.[4]
- **Event status:** This variable indicated the type of event that occurred for use in the Kaplan-Meier (Kaplan & Meier, 1958) curves. The variable had four possible values:
    - **0:** The student had no prior college experience but did not graduate within the study observation period. This indicated that the student's true start time was known, but their true end time was unknown and thus right censored.[5]
    - **1:** The student had no prior college experience and graduated within the study observation period. This indicated that the student's start and end times were known, and values were not censored.
    - **2:** The student had prior college experience and graduated within the study observation period. For students with prior college experience, it is not known when students originally started college, therefore, these students' start time was coded as the date they re-enrolled in the program. Thus, students' estimated average time to graduation should be interpreted as a lower bound of total time they were enrolled in college.
    - **3:** The student had prior college experience but did not graduate within the study observation period. Like other students with prior college experience, their start time was coded as the date of re-enrollment, but their end time was unknown. Therefore, the student was right censored, and their estimated average time to graduation is a lower bound of the total time they were enrolled in college.
- **Student's major:** The associate's degree major that the student declared. The original values included elementary education, secondary education, special education, early childhood education, liberal arts, and office administration. Secondary and special education were combined

[4] The number of prior completed credits was not available for students in the study. Instead, the available data only reflected whether the student had previously enrolled in a postsecondary institution.
[5] Censoring is conducted in cases where there are incomplete observations of the time to an event that is being studied, such as not knowing the true end time. There is one type of censoring for this study: right.

in the analyses, as were liberal arts and office administration, since the sample size of each group by itself was less than five students.[6] No students changed majors during the study period.

- **Organizational affiliation:** This variable indicates the student's organizational affiliation as indicated by PCC. The values included MOE teacher, Palau Community Action Agency (PCAA; Head Start), and regular (unaffiliated) student. Students coded as MOE teacher were jointly employed as MOE teachers while enrolled at PCC and were members of MOE-sponsored cohorts. PCAA students were currently employed by PCAA as Head Start teachers but did not have a cohort structure, like the MOE teachers, and may not have received funding from PCAA. Regular students were students who did not have a current identified affiliation but may have been employed by a private school. The data received from PCC did not indicate that any students changed affiliation during the study period.
- **Student's gender:** This was the reported gender by PCC. Values included male or female.
- **Student's ethnicity/nationality:** This was the reported ethnicity or nationality by PCC. Values included Palau, Yap (a state within the Federated States of Micronesia), Republic of the Marshall Islands (RMI), or Commonwealth of the Northern Mariana Islands (CNMI).

Missing data

There was very little missing data in the study. Only 2 students (1.8 percent) had missing values for gender and ethnicity/nationality. All other variables had complete data. Those two students with missing data were not excluded from the analyses.

Based on the nature of the time-to-graduation data, some individuals had implicitly missing data, known as censored data. For example, some students did not graduate within the study's time period but may graduate later. The study's Kaplan-Meier approach helps account for this censored data by estimating the percentage of students who would have graduated at different points in time.

Sample

The analytic study's sample included 109 associate's degree-seeking students enrolled at PCC during academic years 2019/20–2021/22. An overview of the characteristics of students in the sample—including organizational affiliation, ethnicity/nationality, gender, graduation status, major, event status, and starting term—is provided in table B1. A majority of the sample were MOE teachers (63 percent), ethnically identified as Palauan (94 percent), female (79 percent), had not graduated from their respective programs (65 percent), and elementary education majors (63 percent). Most students (88 percent) also enrolled part-time for at least one term during the study's observation period.

[6] Due to small group sizes, secondary and special education were grouped together since they were both education majors. Likewise, liberal arts and office administration were grouped together since they were non-education majors.

Table B1. Overview of study sample

Category	n	Percentage
Organizational affiliation		
Ministry of Education teachers	69	63%
PCAA (Head Start) students	26	24%
Regular students	14	13%
Ethnicity/nationality		
CNMI	[a]	[a]
Palau	103	[a]
Republic of the Marshall Islands	[a]	[a]
Yap	[a]	[a]
Missing	2	2%
Gender		
Female	86	79%
Male	21	19%
Missing	2	2%
Graduation status		
Did not graduate	71	65%
Graduated	38	35%
Major		
Early childhood education	29	27%
Elementary education	69	63%
Non-education	5	5%
Secondary/Special education	6	6%
Event status		
Right censored, prior college experience	24	22%
Not censored, prior college experience	31	28%
Right censored, no prior college experience	47	43%
Not censored, no prior college experience	7	6%
Starting term		
Summer 2019	42	39%
Fall 2019	25	23%
Spring 2020	4	4%
Summer 2020	9	8%
Fall 2020	14	13%
Spring 2021	[a]	[a]
Summer 2021	11	10%
Fall 2021	0	0%
Spring 2022	[a]	[a]
Enrollment status		
Full-time only	7	6%
Part-time only	64	59%
Full-time and part-time	32	29%
Missing	6	6%

[a] Categories with three or fewer values were suppressed for privacy and due to small sample size.

Note: The total number in the sample is 109. Total percentages may not total 100 percent due to rounding. For additional information about the event status definitions, see the definitions in the Data processing and determination of the analytic sample section above.

Source: Authors' analyses of data from Palau Community College from Fall 2019–Summer 2023.

Sample by prior college experience

Many students had completed some college prior to enrolling in the program, particularly those who were: enrolled in the summer of 2019, affiliated with the MOE, and/or majored in elementary education. These data are presented in more detail in table B2.

Table B2. Sample disaggregated by prior college experience

Category	Prior college experience (No)	Prior college experience (Yes)
Organizational affiliation		
Ministry of Education teachers	27	42
PCAA (Head Start) students	15	11
Regular students	7	7
Ethnicity/nationality		
CNMI	[a]	[a]
Palau	46	57
Republic of the Marshall Islands	0	[a]
Yap	[a]	[a]
Gender		
Female	35	51
Male	13	8
Graduation status		
Did not graduate	47	24
Graduated	7	31
Major		
Early childhood education	17	12
Elementary education	27	42
Non-education	[a]	[a]
Secondary/Special education	[a]	4
Starting term		
Summer 2019	[a]	39
Fall 2019	13	12
Spring 2020	[a]	[a]
Summer 2020	6	[a]
Fall 2020	13	[a]
Spring 2021	[a]	0
Summer 2021	8	[a]
Fall 2021	0	0
Spring 2022	[a]	0

[a] Categories with three or fewer values were suppressed for privacy and due to small sample size.
Note: Variables may have different n-sizes because of missing data.
Source: Authors' analyses of data from Palau Community College from Fall 2019-Summer 2023.

Analytic methods and results

This sub-section describes the analytic methods used to answer the research questions.

Research Question 1: What are the educational pathways to earning an associate's degree in education at PCC, and what are the characteristics of those individuals pursuing these pathways?

Research question 1 methods

To answer research question 1, the study team reviewed the available data received from PCC and looked for possible patterns that could be identified as pathways for earning an associate's degree in education at PCC. The study team considered the students' majors, organizational affiliation, and course-taking patterns as potential pathways. To identify patterns, the study team calculated counts of students who took similar courses, as well as by reported organizational affiliation and major. After reviewing the data, the study team consulted with PCC and MOE and decided to use the student's major and organizational affiliation as two types of pathways to examine, since (1) the course-taking patterns were mostly dictated by the student's major and organizational affiliation and had large enough sample sizes, and (2) these findings would have the highest probability of having practical implications for both PCC and the MOE.

Research question 1 results

There were two sets of education pathways identified: the student's organizational affiliation and the student's major.[7] The organizational affiliation pathways had three options: Palau Community Action Agency Head Start (PCAA; Head Start), Palau MOE current teachers, and regular students. The major pathways included four identified majors: early childhood education, elementary education, secondary education/special education (grouped together because of small sample size), and non-education.

Research question 1a methods

To answer research question 1a, for each major and organizational affiliation, the research team calculated counts and percentage of students who graduated during the study's observation period.

Research question 1a results

Table B3 provides demographic characteristics of individuals who enrolled from the 2019/20–2021/22 academic years and who graduated with an associate's degree. Vast majorities of graduates were MOE teachers (70 percent), ethnically identified as Palauan (95 percent), female (87 percent), and elementary education majors (71 percent).

Due to sample size and associated confidentiality concerns, results were not further disaggregated by gender, ethnicity/nationality, or pathway (organizational affiliation or major).

[7] In the accompanying infographic, the term, "pathway," is intentionally not used to keep the results clear and to avoid unnecessary confusion about the term and its multiple potential meanings. The term, pathway, is retained in this document to maintain the original research question text.

Table B3. Demographic characteristics of graduates

Category	n	Percentage
Organizational affiliation		
Ministry of Education teachers	27	70%
PCAA (Head Start) students	6	16%
Regular students	5	13%
Ethnicity/nationality		
Palau	36	95%
Republic of the Marshall Islands	1	3%
Yap	1	3%
Gender		
Female	33	87%
Male	5	13%
Major		
Early childhood education	7	18%
Elementary education	27	71%
Non-education	0	0%
Secondary/Special education	4	11%
Starting term		
Summer 2019	22	58%
Fall 2019	12	32%
Spring 2020	2	5%
Summer 2021	2	5%

Note: Categories with three or fewer values were not suppressed because this is directory information.
Source: Authors' analyses of data from Palau Community College from Fall 2019–Summer 2023.

Research question 1b methods

To answer research question 1b, the research team calculated counts and percentages of the students by major, organizational affiliation, gender, ethnicity/nationality, prior college experience, and graduation status for the entire sample. Given the sample size, it was not possible to disaggregate the results further by major and organizational affiliation jointly to maintain student confidentiality.

Research question 1b results

Table B4 provides demographic characteristics of all teacher-education students who started enrollment during the 2019/20, 2020/21, and 2021/22 academic years by organizational affiliation. Across all three organizational affiliations, most students identified as Palauan. For MOE teachers and regular students, the majority were elementary education majors, while all PCAA students were early childhood education majors.

Table B4. Counts of demographic characteristics of teacher-education students by organizational affiliation

Category	MOE teachers	PCAA (Head Start)	Regular student
Ethnicity/nationality			
CNMI	[a]	0	0
Palau	68	22	13
Republic of the Marshall Islands	0	[a]	[a]
Yap	0	0	[a]
Gender			
Female	54	22	[a]
Male	15	[a]	[a]
Graduation status			
Did not graduate	42	20	[a]
Graduated	27	[a]	[a]
Major			
Early childhood education	0	26	[a]
Elementary education	60	0	9
Secondary/Special education	[a]	0	[a]
Non-education	[a]	0	0
Starting term			
Summer 2019	32	7	[a]
Fall 2019	17	[a]	[a]
Spring 2020	[a]	[a]	[a]
Summer 2020	9	0	0
Fall 2020	[a]	[a]	[a]
Spring 2021	[a]	0	[a]
Fall 2021	0	0	0
Spring 2022	0	[a]	0
Total			

[a] Categories with five or fewer values were suppressed, as well as some categories with more than five, when necessary, for privacy and due to small sample size.
Note: Missing values are not represented in this table. Sample sizes by variable may be different due to missing data. Overall n=109.
Source: Authors' analyses of data from Palau Community College from Fall 2019–Summer 2023.

Table B5 provides demographic characteristics of teacher-education students who enrolled during the 2019/20, 2020/21, and 2021/22 academic years by major. The four majors represented in the sample were early childhood education, elementary education, secondary education/special education, and non-education majors.

Table B5. Demographic characteristics of teacher-education students by major

Category	Early childhood education	Elementary education	Non-education	Secondary education/Special education
Ethnicity/nationality				
CNMI	0	[a]	0	0
Palau	25	68	[a]	[a]
Republic of the Marshall Islands	0	0	[a]	[a]
Yap	[a]	0	0	0
Gender				
Female	25	53	[a]	[a]
Male	[a]	16	[a]	[a]
Graduation status				
Did not graduate	22	42	[a]	[a]
Graduated	7	27	[a]	[a]
Organizational affiliation				
Ministry of Education teachers	0	60	[a]	[a]
PCAA (Head Start) students	26	0	0	0
Regular students	[a]	9	0	[a]
Starting term				
Summer 2019	9	33	0	0
Fall 2019	[a]	15	[a]	[a]
Spring 2020	[a]	[a]	0	0
Summer 2020	0	7	[a]	0
Fall 2020	[a]	8	0	[a]
Spring 2021	[a]	0	0	[a]
Fall 2021	0	0	0	0
Spring 2022	[a]	0	0	[a]

[a] Categories with five or fewer values were suppressed for privacy due to small sample size.
Note: Missing values were excluded. Sample sizes by variable may be different due to missing data. Overall n=109.
Source: Authors' analyses of data from Palau Community College from Fall 2019–Summer 2023.

Research Question 2: What is the number of enrolled teacher-education students for each pathway?

Research question 2 methods

To answer research question 2, the research team calculated counts and percentages of students in the sample by major and organizational affiliation.

Research question 2 results

For the first identified set of pathways (organizational affiliation), MOE teachers comprised most of the teacher-education student sample (63.3 percent), followed by PCAA (Head Start) students (23.9 percent), and regular students (12.8 percent). For the second set of pathways (major), elementary education majors comprised the majority (63.3 percent), followed by early childhood education (26.6 percent). Together, secondary/special education and non-education majors comprised approximately

10 percent of the student sample (5.5 percent and 4.6 percent, respectively). Table B6 provides counts and percentages of the number of students enrolled in each identified pathway.

Table B6. Count and percentage of students in each pathway

Category	n	Percentage
Organizational affiliation		
Ministry of Education teachers	69	63.3%
PCAA (Head Start) students	26	23.9%
Regular students	14	12.8%
Major		
Early childhood education	29	26.6%
Elementary education	69	63.3%
Non-education	[a]	4.6%
Secondary/Special education	6	5.5%

[a] Categories with five or fewer values were suppressed for privacy due to small sample size.
Note: Overall n=109.
Source: Authors' analyses of data from Palau Community College from Fall 2019-Summer 2023.

Research Question 3: On average, how long do students in each pathway take to complete their degrees?

Research question 3 methods

To answer research question 3, the research team used Kaplan-Meier (KM) curves to determine the estimated average graduation time. KM curves are a non-parametric descriptive statistical method to describe the probability of an event occurring at a given time. To create the KM curves, the following survival function, $\hat{S}(t)$, was calculated for all students in the sample overall and separately by student major, organizational affiliation, and prior college experience status; this function estimates the probability of a student not graduating by time (academic terms), t:

$$\hat{S}(t) = \prod_{i:\, t_i \leq t} \left(1 - \frac{d_i}{n_i}\right)$$

where d_i is the number of teachers who have graduated at time t_i and n_i is the number of teachers known to have not graduated or who are censored (missing end point data) up to that time. Once the KM curves were generated, the estimated average graduation time (technically, the "restricted mean graduation time") was calculated by taking the area under each of the curves. This calculation, however, depended on the possible maximum time to graduation. The actual upper limit of the time it takes students to graduate may exceed the four-year (13-term) observation period of the study. Therefore, the research team restricted the upper limit to 15 terms (five academic years). PCC allows five academic years for students to graduate before their credits begin to expire and new degree requirements come into place. The following equation shows how the restricted mean graduation time (RMGT) was calculated:

$$RMGT(t_1, t_2) = \int_{t_1}^{t_2} \hat{S}(t)\, dt$$

Where:

- $RMGT(t_1, t_2)$ is the restricted mean graduation time to event from the shortest possible time, t_1, to the maximum possible end time t_2, where t_1 is 0 terms and t_2 is 15 terms.[8]
- $\hat{S}(t)$ is the estimated KM survival function.

To calculate the restricted mean graduation time, KM curves were first calculated for the time period observed by the study (from 0 to 13 terms). Then, the graduation probability at 13 terms was extended to the 15-term upper limit, conservatively assuming that no additional students graduated after 13 terms. The area under the extended curve was used to calculate the restricted mean graduation time. Using this upper limit of 15 terms enables a policy-relevant average graduation time to be calculated because PCC is interested in graduation times before students reach their five-year mark. These estimates are also lower bounds of overall time to graduation because some students might graduate after 15 terms, especially if their credits expire or degree requirements change.

The research team used KM curves to calculate the estimated average graduation time, instead of simply calculating the average number of terms, since the data contained students who were not observed to graduate within the study period (that is, they were right censored) [see table B1]. Right censoring of data occurs when the true end point is not known, but the starting point is. For this study, not all students included in the study graduated by the end of the observation period (summer 2023), so those observations would be right censored since their true time to graduation was not known. Using a simple average of the observed completion times would not accurately account for right-censored observations and would provide a biased and possibly overly optimistic estimate of the average completion time. In contrast, KM curves take into account data censoring and can provide a better estimate of the completion times.

The study team used the R statistical language package *survival* (Therneau, 2023) to calculate the KM curves, the restricted mean graduation times, and 95 percent confidence intervals for the restricted mean. Numeric values of the start and end terms, as well as the event status, all described earlier, were used to calculate the KM curves. P-values to assess differences in the KM curves between groups were calculated using logrank tests for interval-censored data using the R language package *interval* (Fay & Shaw, 2010).

Research question 3 results

Table B7 displays the restricted average time to graduation, with 95 percent confidence intervals. The results are shared using time units of academic terms, academic years, as well as the percentage relative to PCC's definition of on-time (two years) graduation time. The results are shared for the entire sample and disaggregated for both sets of pathways identified (organizational affiliation and major). These average times to graduation should be interpreted as lower bounds because some students may

[8] Time 0 is the same for all students, which was determined to be when they started their current associate's program. If a student had prior college experience, they were marked as being left censored at time 0. If the student only enrolled for one term, their start term was 0, and ending term was 1 to indicate that they had enrolled in 1. 0 was used as the starting point for consistency, and no student could graduate in 0 terms. But it is conventional for t_1 to start at 0 for the sake of calculating the RMGT.

have taken more than the 15-term upper limit. For instance, the findings show that overall, students took at least 7.7 terms (2.6 academic years), on average, to graduate.

Table B7. Estimated average time to graduation

Category	Average graduation time (terms)	95 percent confidence interval (terms)	Average graduation time (academic years)	Average graduation time (percentage of on-time [2 years] graduation time)	Percentage of students graduated
Overall					
Overall	7.73	6.71–8.76	2.58	129%	34.9%
Organizational affiliation					
Ministry of Education teachers	6.90	5.63–8.17	2.30	115%	39.1%
PCAA (Head Start) students	9.08	6.92–11.24	3.03	151%	23.1%
Regular students	8.40	5.09–11.71	2.80	140%	35.7%
Major[*]					
Early childhood education	9.30	7.09–11.50	3.10	155%	24.1%
Elementary education	6.96	5.71–8.22	2.32	116%	39.1%
Secondary/Special education	6.07	[a]	2.02	101%	66.7%
Non-education	11.5[b]	[a]	3.83	192%	0.0%

[*]Differences in estimated average graduation time between majors are statistically significant (p = .045). The differences between organizational affiliations are not statistically significant (p = .261).
[a] Because of their sample size, researchers did not calculate confidence intervals.
[b] The time of 11.5 terms is the longest time that non-education students were observed in the study, since none of those students enrolled beyond 11.5 terms.
Note: The original unit of time used in the analysis was academic terms. Terms were converted to academic years by dividing by 3 and converted to percentage of normal graduation time by dividing by 6 and then converting to a percentage. All mean graduation time values represent a restricted mean time to graduation, which is a lower bound of the estimated graduation time because some students might take longer to graduate than the upper limit of 15 terms (five academic years). The percentage of students graduated includes all students who graduated during the study's observation period.
Source: Authors' analyses of data from Palau Community College from Fall 2019–Summer 2023.

Graduation rates and times vary by whether a student had any college experience prior to (re-)enrolling. Students with prior college experience had a graduation rate of 43.6 percent, while students without prior college experience had a graduation rate of 12.9 percent (table B2). The average time-to-graduation results disaggregated by whether the student had prior college experience are provided in table B8.

Table B8. Estimated average time to graduation for students by prior college experience

Category	Average graduation time (terms)		Average graduation time (academic years)		Average graduation time (percentage of normal graduation time)	
	Prior college experience		Prior college experience		Prior college experience	
	(Yes)	(No)	(Yes)	(No)	(Yes)	(No)
Overall						
Overall*	2.6 (1.9–3.3)	14.4 (13.7–15.1)	0.9	4.8	43%	240%
Organizational affiliation						
Ministry of Education teachers	2.2 (1.4–2.9)	13.9 (12.8–15.1)	0.7	4.6	73%	232%
PCAA (Head Start) students	1.5 (1.0–2.0)	15.0 ([a])	0.5	5.0	25%	250%
Regular students	3.0 (0.4–5.6)	15.0 ([a])	1.0	5.0	50%	250%
Major						
Early childhood education	1.5 (1.0–2.0)	15.0 ([a])	0.5	5.0	25%	250%
Elementary education	2.3 (1.5–3.2)	13.9 (12.8–15.1)	0.8	4.6	38%	232%
Secondary/ Special education	2.5 ([a])	15.0 ([a])	0.8	5.0	42%	250%
Non-education	7.5 ([a])	15.0 ([a])	2.5	5.0	125%	250%

*Differences in estimated average graduation time overall between students with and without prior college experience are statistically significant (p = .002).

Note: Values in parentheses indicate 95 percent confidence intervals. The original unit of time used in the analysis was academic terms. Terms were converted to academic years by dividing by 3 and converted to percentage of normal graduation time by dividing by 6 and then converting to a percentage. All mean graduation time values represent a restricted mean time to graduation, which is a lower bound of the estimated graduation time because some students might take longer to graduate than the upper limit of 15 terms (five academic years). Overall n=109.

[a] Confidence intervals were not able to be calculated for these groups because of their sample size.

Source: Authors' analyses of data from Palau Community College from Fall 2019–Summer 2023.

Research Question 4: What number and percentage of teacher-education students graduate from each pathway within the expected two-year timeframe?

Research question 4 methods

To answer research question 4, for each major and organizational affiliation, the research team calculated counts and percentages of students who graduated within two academic years (six terms) of enrollment during the study's observation period.

Research question 4 results

For the major pathways, 50 percent of secondary/special education students graduated within the two-year timeframe, followed by 34.8 percent of elementary education majors, 20.7 percent of early childhood education majors, and none of the students from non-education majors. For the

organizational affiliation pathways, 34.8 percent of MOE teachers graduated within the two-year timeframe, followed by 28.6 percent regular students, and 19.2 percent PCAA (Head Start) students. Table B9 provides the number and percentage of students who graduated from each pathway within two academic years (six terms).

Table B9. On-time (two years) graduation by organizational affiliation and major

Category	Did not graduate on-time	Graduated on-time	Percentage not on-time	Percentage on-time
Major				
Early childhood education	23	6	79.3%	20.7%
Elementary education	45	24	65.2%	34.8%
Non-education	5	0	100.0%	0.0%
Secondary/Special education	[a]	[a]	50.0%	50.0%
Organizational affiliation				
Ministry of Education teachers	45	24	65.2%	34.8%
PCAA (Head Start) students	21	[a]	80.8%	19.2%
Regular students	10	[a]	71.4%	28.6%
Overall	33	76	69.7%	30.3%

[a] Categories with five or fewer values were suppressed for privacy due to small sample size.
Note: Overall n=109.
Source: Authors' analyses of data from Palau Community College from Fall 2019–Summer 2023.

Limitations

This study has multiple limitations. First, this is not a causal study, and the study team did not seek to identify the pathways that are causally linked to graduation time. Rather, this is a purely descriptive study by design, and causal links between graduation times and pathways should not be inferred from these results. Second, the study team did not have consistent information about the number of prior credits completed by students before their (re-)enrollment in one of PCC's education programs. Having this information would have allowed the study to consider the student's prior progress toward a degree when calculating average graduation times, which may have led to more nuanced estimates. Third, there were limited opportunities to conduct subgroup analysis due to the small sample size and associated privacy concerns. Having a larger sample could have allowed for a more nuanced understanding of differences in graduation times for more groups of students. Future studies could address this limitation by including more cohorts of students; however, this study was timebound by the start of the teacher certification legal requirements during the 2019/20 academic year, so it was limited in the number of available cohorts. Fifth, the calculation for estimated average graduation time was capped at five academic years; consequently, results close to that value may be biased. Finally, the results are only for the cohorts that started enrollment during the 2019/20, 2020/21, and 2021/22 academic years, and may not be generalizable to other cohorts. Structural differences between cohorts may limit the generalization to future cohorts, especially if there are new policies, such as the one motivating this study, that affect teacher training patterns and PCC enrollment.

Reflection questions

To encourage dissemination and reflection of study results with the PCC campus community, the study team co-developed a series of reflection questions with PCC partners that are designed to foster a deeper examination of the study's results, potential implications, and areas for further investigation by PCC and MOE educators and policymakers, current students, and teachers considering enrollment at PCC. These reflection questions come from a place of collaborative thought partnership, rather than accountability. An abbreviated, approachable version of these questions is included in the infographic accompanying this study.

Reflection questions for educators and policymakers at PCC and the MOE

Thirty percent of the teacher education students in this study graduated on-time within two academic years. **What existing supports at PCC could help promote students' on-time graduation? In what ways could these supports be enhanced?**

The study found that certain student characteristics may be associated with shorter estimated average graduation times. **What assets do students bring to their college experience that may also support their success? How can faculty build on these assets to promote greater student success?**

Current MOE teachers (61 percent of whom had prior college experience) had the fastest average graduation time, while PCAA (Head Start) teachers (42 percent of whom had prior college experience) had the longest average graduation time. **Are there some other potential reasons for this difference? How might PCC faculty and staff use these findings to inform potential supports for PCAA (Head Start) teachers?**

Reflection questions for current students enrolled at PCC

PCC students may include current teachers seeking to meet the minimum degree requirement of an associate's degree in education (or equivalent) in the subject area they teach. **If you are pursuing a degree at PCC to meet this requirement, how much time will you need to graduate? If you are an unaffiliated student pursuing an education degree at PCC, what additional support might help you successfully complete your degree?**

Some majors had faster estimated average times to graduate than others. **How might choice of major make a difference in your experience?**

Research suggests that making connections with faculty and staff could help increase students' sense of belonging and support persistence.[9] **Have faculty or staff reached out to you with support or opportunities? Is there a way for you to make time to connect with your faculty about academics or professional goals? How can you use the flexibility of the college environment to make connections with your faculty?**

[9] Museus, S. D. (2013). The culturally engaging campus environments (CECE) model: A new theory of success among racially diverse college student populations. In *Higher Education: Handbook of Theory and Research: Volume 29* (pp. 189–227). Dordrecht: Springer Netherlands.

Reflection questions for teachers considering enrollment at PCC

Teachers in Palau are required to hold at least an associate's degree in education or in the subject area they teach. **If you are considering pursuing a degree at PCC to meet this requirement, how much time will you need to graduate?**

The study found that average graduation times differed when considering students' major and other characteristics, such as their prior experience as students at PCC. **How do you plan to select your intended major? Have you considered resources available for you (such as academic advisors) at PCC to support your planning and preparation?**

Students with prior college experience who then enrolled in a PCC teacher education program graduated, on average, more quickly than students without prior college experience. **If you are attending PCC for the first time, how prepared for the program do you feel? Are you able to connect with other first-time teacher education students to build a community of support?**

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