Analysis of Essential Programs and Services Components:
Salary Matrices

Report to

Maine Department of Education

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Essential Programs and Services Funding Model Component Review:

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Overview

The Essential Programs and Services (EPS) funding formula is designed to estimate the minimum amount of money a school district needs to have in order to provide the programs and services to enable all students have an equitable opportunity to achieve the Maine Learning Results standards. The model for determining this "total allocation" amount includes recommended staff-to-student ratios, per-pupil amounts for supplies and equipment, specialized services (e.g., professional development, student assessment, technology, instructional leadership support, co-curricular and extra-curricular student learning), and district services (e.g., transportation, facilities management). The total amount is largely driven by district enrollment, which is adjusted circumstances that have been determined to increase costs, such as specialized populations including students with limited English proficiency, economically disadvantaged students (defined as students eligible for free or reduced price lunch) and students with special needs, as well as small school size and remote location. The EPS formula also adjusts personnel costs for differences in staff experience and education and regional differences in the cost of living.

Personnel costs are the largest component of school district expenditures. According to a recent analysis by the National Center of Education Statistics (NCES), salaries and benefits paid to school personnel make up 80% of all school spending (NCES, 2017).[1] Maine is no different, with nearly 75% of Maine districts' expenditures going to staff salaries and benefits (MEPRI, 2018).

Personnel costs for individual districts tend to vary depending on the profile of their staff. The EPS model adjusts a district's allocation for the educational attainment of its teachers and other educational specialists and for those with more years of professional experience. Paying higher salaries for more education and experience may help districts

[1] https://nces.ed.gov/pubs2017/2017144.pdf

attract and retain staff.[2] Similarly, because districts generally pay higher salaries to administrators of larger schools, EPS adjusts for this also.

The EPS formula adjusts personnel costs for differences in staff and school profiles using a salary matrix. A salary matrix is a table that provides a measure of the salary differences for each category of staff based on experience and/or education, job classification or school size. The matrix is used to adjust a district's EPS allocation according to the mix of education and experience levels or other cost factors such as school size or job classification of its staff. Salary matrices are developed for school-based essential staff positions including teachers, educational and media technicians, counselors and librarians, Administrative assistants, nurses, and school administrators. The teacher salary matrix produces a larger allocation for districts employing a greater number of teachers with higher levels of education and experience and the administrator matrix produces a larger allocation for districts employing more principals managing larger schools. A description of the calculations using the salary matrix is included in Appendix A.

By statute, the EPS salary matrices are reviewed every three years. The data used to update the staff salary matrices comes from the 2016-2017 staff data file obtained from the Maine Department of Education. Districts utilize the state's NEO system to maintain a record of all employees engaged in an SAU's regular operations, including teaching, sports, health care, transportation, maintenance, and administration.[3] Salary matrices are used in EPS for the school personnel cost allocation only. Allocations for other costs, such as system administration, transportation, and operation and maintenance of facilities are addressed within other components of EPS. The data include an individual record for each position held by a staff member. Unique position codes and staff and school IDs enable the identification of individual staff across positions and schools. The staff record also includes information on each staff member's education and years of experience in Maine as well as FTE and salary for each position held.

In Part I of this report we provide a detailed explanation of how the salary matrices are calculated, based on how it has been done previously, and the results of the 2016-17

[2] https://cepa.stanford.edu/content/can-district-level-teacher-salary-incentive-policy-improve-teacher-recruitment-and-retention

[3] http://www.maine.gov/doe/data/staff/index.html

update. Previous salary matrices are included for comparison. In Part II we present an analysis of staff education and experience profiles across districts by district size, poverty level and rurality in order to investigate whether salary matrices allocate funds in ways that support or undermine the equity goals of the EPS funding model.

PART I

Teacher salary matrix

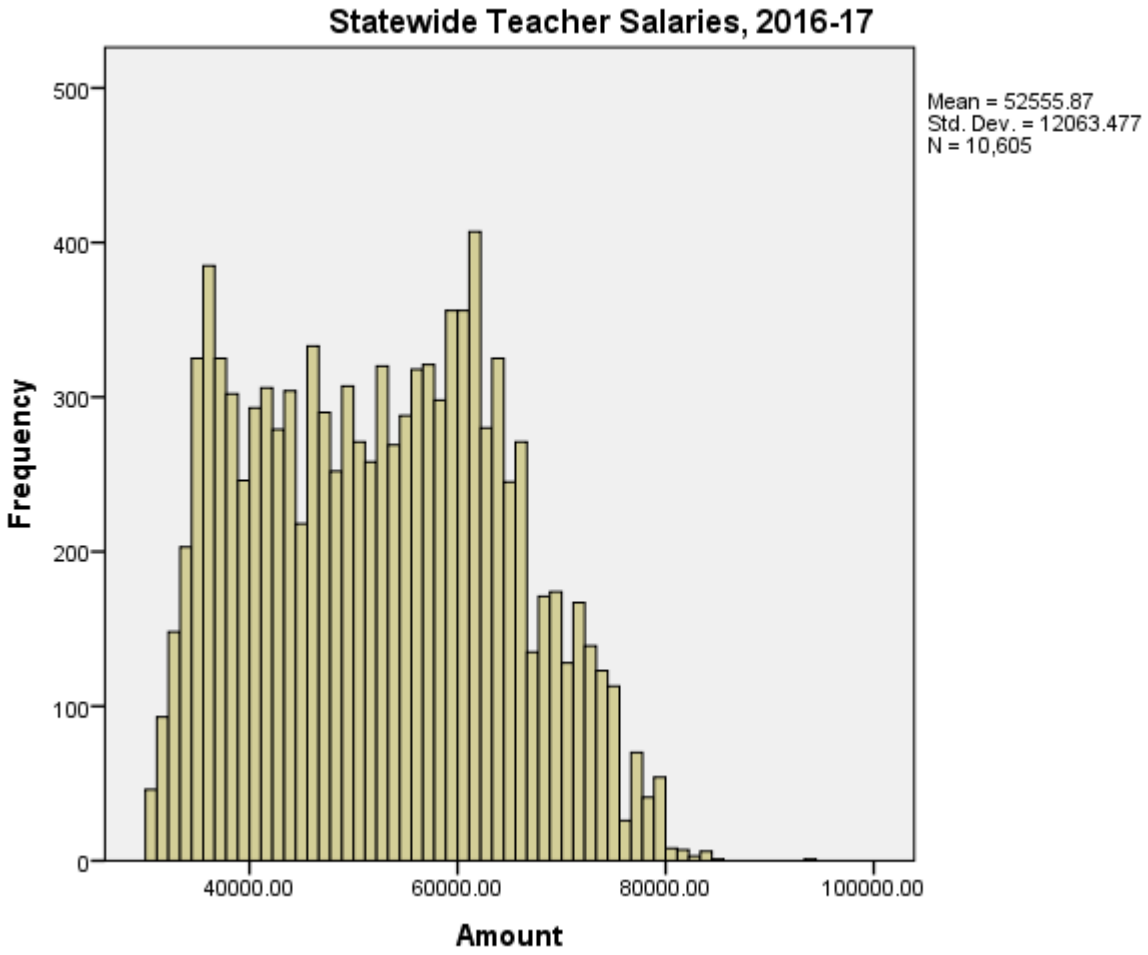
Teacher salaries are the largest single expenditure in any school. In fiscal year 2016, teacher salaries comprised 32.3% of district operating expenditures, and 40.5% for employee compensation when both salary and benefits are included (MEPRI, 2018). The teacher salary matrix is used in estimating how much money a particular school district needs to hire the number of teachers necessary to ensure that all students are provided an equitable opportunity to achieve the Learning Results standards. The matrix adjusts a district's EPS allocation according to the mix of education and experience levels of its teachers.

The salary matrix for teachers was generated using only fulltime public school teacher positions. Private schools as well as state-operated schools, CTE/Vocational Technical schools and public charters were excluded. Following the lead of previous reviews, only regular classroom teachers, ELL teachers, and Literary Specialists are included in the salary matrix sample. Special education and Gifted and Talented teachers were not included. Note: in earlier matrices, Title I and Gifted and Talented teachers were included because the data did not reliably identify these teachers; the data now include a specific position code for Title I teachers (88) and Gifted and Talented teachers (112). Because they are funded through federal programs, Title I teachers and those teaching military science were also excluded. Teachers whose highest educational degree was listed as "Other" (n=52) were also excluded from the matrix calculation as were teachers whose reported salaries were less than $30,000, the minimum teacher salary by law (n=32).

The Staff data used in updating the matrix are position level data. About 10% of the teachers have more than one position in the staff data. For example, a teacher who teaches Mathematics and Life and Physical Sciences within the same school or across two different schools may have two records. We include in the salary matrix data only those teachers with one full-time position (FTE=1.0). They may also have non-teaching positions in addition to their classroom role, such as Department Head or coach. Only the teaching positions are included in the salary matrix sample. Seven teachers with exceptionally high "outlier" salaries – three times the standard deviation above the mean salary ($106,902) – were also excluded from the data used to calculate the salary matrix.

The final data used for the salary matrix computation included 10,605 fulltime public school teachers with an average salary of $52,556 (minimum $30,000 and maximum $93,521).

Figure 1.



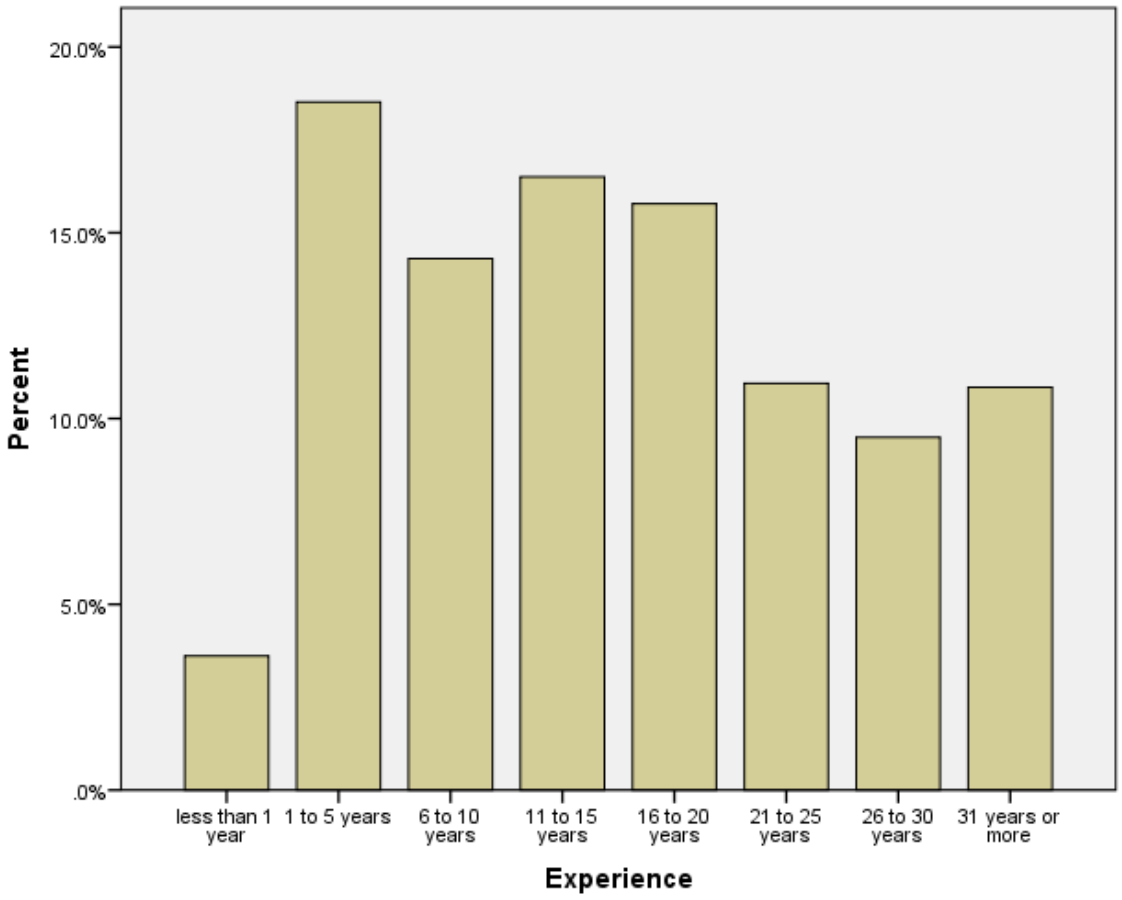
Both education and experience are used to calculate the teacher salary matrix. Regression analysis shows that years of experience is strongly correlated to salary, explaining nearly 60% of the variation in teacher salary. Level of education explains about 21% of salary variance. Together education level and experience level explain 68% of the variation in salary.

Highest educational degree was broken into 5 categories: Bachelor's degree, Bachelor's degree plus 15 or 30 hours of additional training, Master's degree or Master's degree plus 15 hours of additional training, Master's degree plus 30 hours of additional training or an Advanced Degree, and Doctorate. Eight categories were computed based on

the "years of experience" data field: less than 1 year, 1 to 5 years, 6 to 10 years, 11 to 15 years, 16 to 20 years, 21 to 25 years, 26 to 30 years, and 31 or more years.

Overall across the state, the average number of years of experience in 2016-17 was 15.6, with a minimum of 0 years and a maximum of 54. The bar graph below displays the percentage of teachers within each experience category. About 4% of Maine's teachers were in their first year of teaching, and an additional 18% had 1 to 5 years of experience, for a total of 22.3% who were relatively new teachers. Thirty-one percent have more than 20 years of experience and almost 11% of teachers have been working as teachers for 31 years or more.

Figure 2. Maine Teacher Experience Profile



In terms of education level, 56% of teachers across Maine hold a Bachelor's degree and about 43% have a Master's degree or an advanced certificate in education. Only 0.5% of teachers in Maine have a doctorate, as seen below in Figure 3.

Figure 3. Maine Teacher Education Level Profile

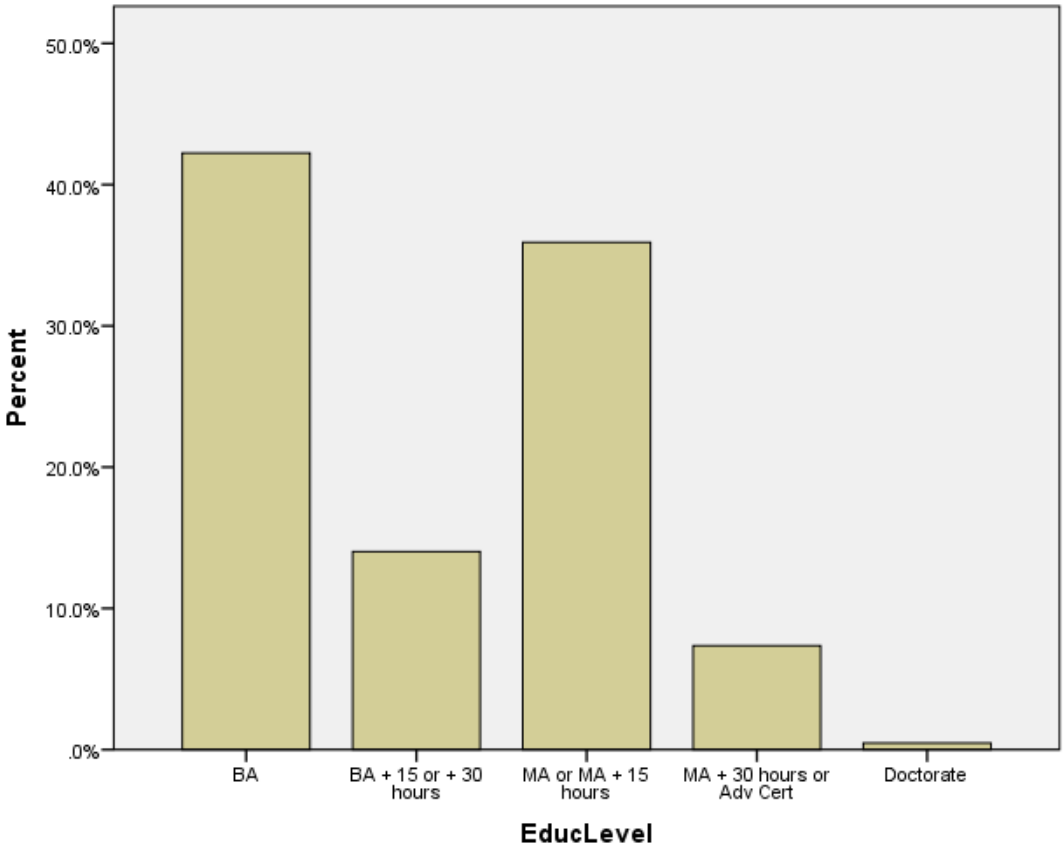


Table 1 displays the number of teachers in each of the 40 education-experience categories.

Table 1: Number of Teachers in each Education-Experience Category						
	Education category					
Experience Category	BA only	BA +15 or +30 hours	MA or MA + 15 hours	MA + 30 hrs or C.A.S.	Doctorate	Total
0	286	28	67	6	2	389
1-5	1,325	175	437	30	7	1,974
6-10	716	161	583	50	9	1,519
11-15	597	264	746	127	12	1,746
16-20	534	239	732	157	9	1,671
21-25	338	190	490	135	6	1,159
26-30	311	186	400	104	1	1,002
31 plus	364	233	372	172	4	1,145
Total	4,471	1,476	3,827	781	50	10,605

Table 2 displays the actual average, minimum and maximum salary for teachers in each of the 40 education-experience categories.

Table 2: Actual average (minimum and maximum) salary for teachers by Education and Experience

	Education category					
Experience Category	BA only	BA + 15 hours or + 30 hours	MA or MA + 15 hours	MA + 30 hours or advance cert	Doctorate	Overall
0	$35,395 (30,000-68,239)	$38,175 (31,000-62,156)	$45,486 (30,500-93,521)	$49,768 (39,183-65,356)	$40,268 (34,888-43,648)	$37,580 (30,000-93,521)
1-5	$37,178 (30,000-68,692)	$40,131 (31,500-71,083)	$42,966 (30,600-70,275)	$49,926 (39,194-76,129)	$43,509 (37,028-47,155)	$38,937 (30,000-76,129)
6-10	$42,399 (31,109-71,722)	$44,906 (33,907-63,502)	$47,946 (30,600-72,871)	$51,886 (35,800-74,796)	$53,327 (40,550-81,298)	$45,171 (30,600-81,298)
11-15	$48,161 (32,671-72430)	$53,207 (33,568-79,398)	$53,486 (34,650-75,070)	$59,793 (40,267-79,165)	$60,826 (52,075-81,298)	$52,132 (32,671-81,298)
16-20	$53,756 (34,876-76,473)	$56,779 (37,410-75,314)	$59,046 (40,267-79,783)	$64,720 (45,816-79,783)	$63,184 (54,599-76,403)	$57,589 (34,876-79,783)
21-25	$58,254 (35,656-79,168)	$59,655 (37,166-84,986)	$64,373 (33,114-80,168)	$69,207 (41,415-82,096)	$64,780 (57,709-76,403)	$62,380 (33,114-84,986)
26-30	$60,642 (42,506-79,168)	$61,259 (46,306-75,295)	$65,357 (42,598-82,675)	$68,049 (46,304-79,705)	$70,970 (NA)	$63,418 (46,304-79,705)
31 plus	$61,459 (46,530-79,168)	$62,825 (41,162-79,168)	$66,723 (39,811-81,904)	$70,015 (44,340-84,408)	$73,170 (67,072-79,177)	$64,773 (39,811-84,408)
Overall	$46,549 (30,000-79,168)	$54,408 (31,000-84,986)	$56,286 (30,500-93,521)	$64,799 (35,800-84,408)	$58,319 (34,888-81,298)	$52,556 (30,000-93,521)

Actual average salaries will differ from those generated by the matrix (See Table 4). The matrix is calculated using mathematical smoothing techniques which hold salary increments for experience constant and equal to the salary increments for Bachelor's-only teachers across all levels of education. Note for example that there are only 50 teachers with doctorates in the salary matrix sample and, as can be seen in Table 2, they sometimes

earn on average less than teachers with the same amount of experience but less education. Therefore, we combined the top two education levels and recommend using the same indices for teachers with doctorates and Master's degrees plus 30 hours. The actual matrix is thus adjusted in order to avoid rewarding less education or inexperience due to irregularities in the data.

The resulting teacher salary matrix (Table 3) is a 4x8 table of indices which provide a measure of the average salary differences from the base salary – the mean salary for beginner teachers (i.e., those with less than one year of experience) with a Bachelor's degree - for each of the 32 other education-experience categories. In 2016-17, the statewide average for Bachelor's-only teachers with less than one year of experience was $35,395. For these teachers the matrix value is 1.00. Each of the other matrix values represents the average difference in salary for teachers with higher levels of education and/or experience. For example, the 1.35 for teachers with Master's degrees and 6 to 10 years of experience means that these teachers on average earn roughly 35% more ($47,783) than beginning teachers with only a Bachelor's degree. Index values increase at every higher level of experience within each education level, and the rate of increase is approximately the same across education levels. Table 4 translates these indices into salary allocation amounts.

Table 3: Teacher Salary Matrix 2016-17				
Base Salary: $35,400	Education level category			
Experience Category	BA only	BA +15 or +30	MA or MA +15	MA + 30, CAS, or Doc
0 years	1.00	1.07	1.16	1.28
1-5 years	1.05	1.12	1.21	1.33
6-10 years	1.20	1.27	1.35	1.48
11 - 15 years	1.36	1.43	1.52	1.64
16 - 20 years	1.52	1.59	1.67	1.80
21 - 25 years	1.65	1.72	1.80	1.93
26 - 30 years	1.71	1.79	1.87	2.00
31+ years	1.74	1.81	1.89	2.02

Table 4: Teacher Salary Allocations 2016-17				
Base Salary: $35,395	Education level category			
Experience Category	BA only	BA +15 or +30	MA or MA +15	MA + 30, CAS, or Doc
0 years	$35,395	$37,873	$41,058	$45,306
1-5 years	$37,165	$39,642	$42,828	$47,075
6-10 years	$42,474	$44,952	$47,783	$52,385
11 - 15 years	$48,137	$50,615	$53,800	$58,048
16 - 20 years	$53,800	$56,278	$59,110	$63,711
21 - 25 years	$58,402	$60,879	$63,711	$68,312
26 - 30 years	$60,525	$63,357	$66,189	$70,790
31+ years	$61,587	$64,065	$66,897	$71,498

To verify that the salary matrix is accurate as adjusted, the statewide salary total was recalculated using the matrix (i.e. the sum of the base salary of $35,395 times the matrix value multiplied by the number of teachers in each category). When compared to the actual statewide total of teacher salaries, the difference was $0.73. Appendix B displays the actual average salaries and the amounts allocated by the teacher salary matrix for each of the education-experience categories when the top two education categories are combined.

Comparison of Teacher Matrix to Previous Years

For comparison purposes, Tables 5 and 6 provide the salary matrices generated in two prior MEPRI reviews, The range of indices in the 2009-10 salary matrix (1.00 to 2.06) narrowed in the 2012-13 matrix (1.00 to 2.01). The range of indices in the 2016-17 matrix (1.00 to 2.02) is about the same as the previous 2012-13 matrix. The indices relative to the base salary are lower for almost all of the education-experience categories compared to the 2012-13 matrix except for teachers with higher levels of education. For teachers with only a Bachelor's degree, index values are lower at all levels of experience compared to 2012-13 while for those with Master's degrees plus 30 hours of additional training (or an Advanced Certificate) index values are higher or the same over all levels of experience.

Table 5: Salary Matrix for Teachers (2009-10 data) Base salary = $30,911; Range 1.00 to 2.06[4]					
	Education category				
Experience Category	BA only	BA + 15 or + 30 hours	MA or MA + 15 hours	MA + 30 or adv cert	Doctorate
0	1.00	1.06	1.17	1.27	1.31
1-5	1.07	1.13	1.23	1.33	1.38
6-10	1.21	1.28	1.38	1.48	1.52
11-15	1.37	1.43	1.54	1.64	1.68
16-20	1.53	1.59	1.70	1.80	1.84
21-25	1.66	1.72	1.83	1.93	1.97
26-30	1.72	1.78	1.88	1.98	2.02
31 plus	1.75	1.81	1.92	2.01	2.06

Table 6: Salary Matrix for Teachers (2012-13 data) Base salary = $32,617; Range 1.00 to 2.01[5]					
	Education category				
Experience Category	BA only	BA + 15 hours or + 30 hours	MA or MA + 15 hours	MA + 30 hours or advance cert	Doctorate
0	1.00	1.04	1.16	1.24	1.25
1-5	1.07	1.11	1.23	1.31	1.32
6-10	1.22	1.27	1.38	1.47	1.47
11-15	1.39	1.44	1.55	1.63	1.64
16-20	1.56	1.60	1.72	1.80	1.81
21-25	1.68	1.73	1.84	1.93	1.93
26-30	1.74	1.79	1.90	1.98	1.99
31 plus	1.76	1.80	1.92	2.00	2.01

Guidance Counselors and Librarians

The teacher salary matrix, based on experience and education, is used as the matrix for guidance staff and librarians. Specifically, the same set of indices, generated using teacher salaries, is used to calculate EPS salary allocations adjusted for education and experience profile for school social workers, guidance counselors, directors of guidance, and librarians/media specialists.

This is primarily because there are not enough fulltime school social workers, guidance counselors, directors of guidance, and librarians/media specialist positions with

[4] https://usm.maine.edu/sites/default/files/cepare/2009-10_Review_of_Salary_Matrices_Components_in_the_Essential_Programs_and_Services_Funding_Model.pdf

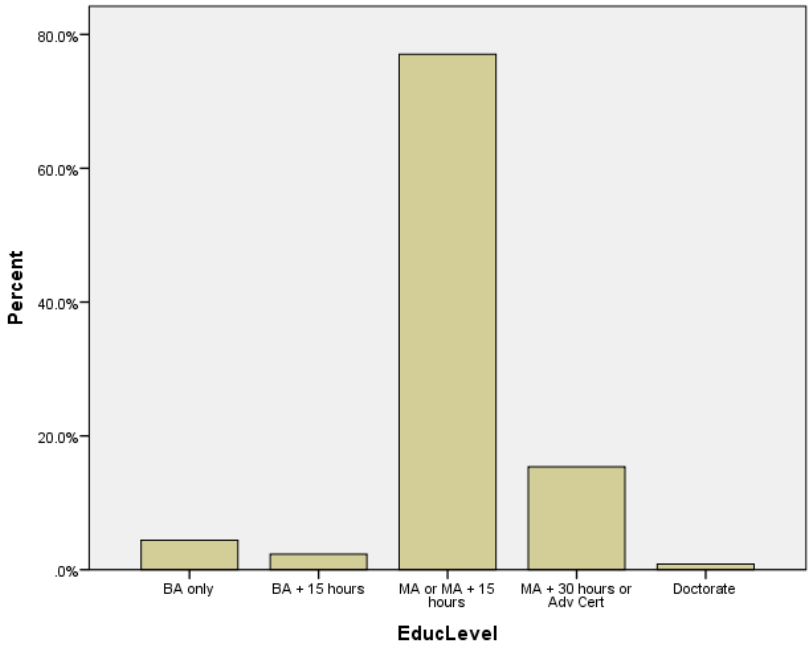
[5] https://usm.maine.edu/sites/default/files/cepare/EPSCmmssnRprtF_1_9_2015Web.pdf

which to generate a stable matrix with the same experience and education categories (See Table 11 below). Also, staff in these professional positions were generally on the same contract as teachers at the time the EPS formula was developed.

After selecting only FTE=1.0 positions with an education level of bachelor's degree or higher and excluding the 11 positions with outlier reported salaries (less than $7,100 or above $400,000), there were 819 school social workers, guidance counselors, directors of guidance, and librarians/media specialists positions. The average reported salary was $56,463, with a range of $23,809 to $92,817. Statewide, the average salary paid to these positions was $3,907 more than the average salary paid to teachers ($52,556) (Table 2).

This is likely because the education level among counselors and librarians/media specialists is generally higher than among teachers. Due primarily to credentialing requirements, over 93% of social workers, guidance counselors, directors of guidance, and librarians/media specialists have Master's degrees or higher compared to only 43.5% of teachers. School social workers and guidance counselors may also be given credit in salary negotiations for previous work experience outside education.

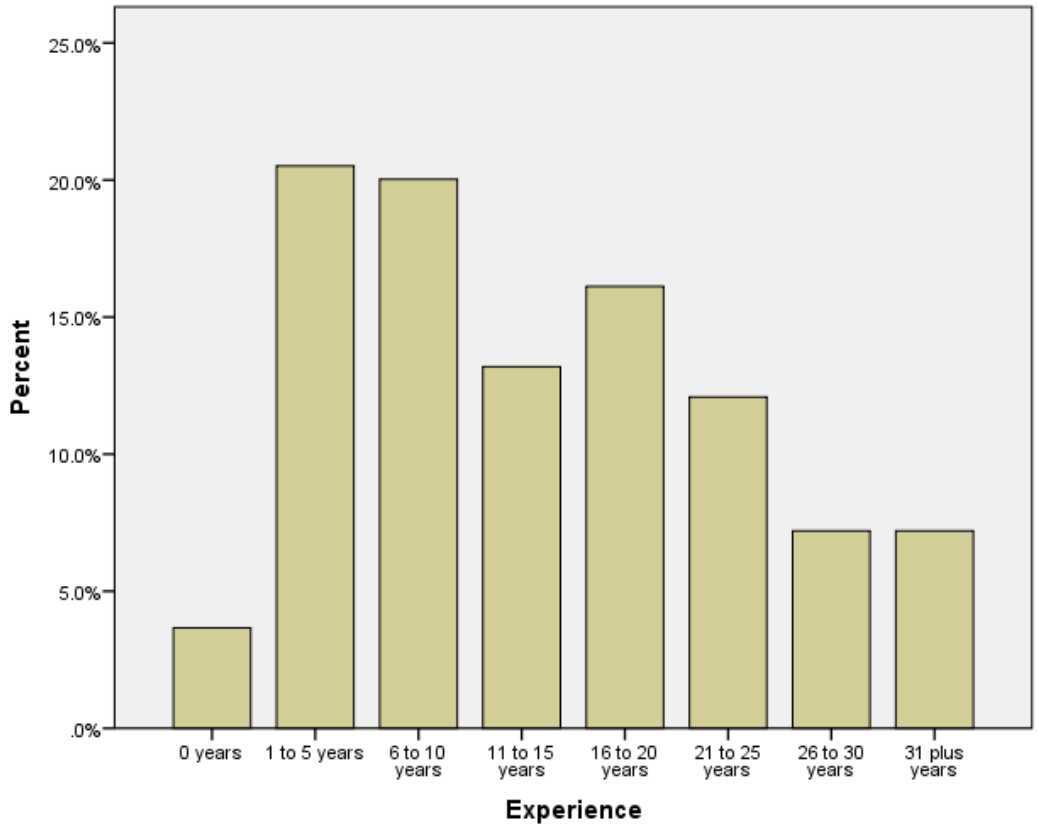
Figure 4. Education Levels of Guidance and Librarian Staff



While counselors and librarians/media specialists are more likely to have a master's degree, the distribution of experience levels is generally similar to that of teachers. About

4% of Maine's counselors and librarians/media specialists are in their first year (same as the % of teachers) and 24.2% have 5 years or less (compared to 22.3% of teachers). Almost 27% of counselors and librarians/media specialists have more than 20 years of experience' (compared to 31% of teachers) and 7.2% have 31 years or more (compared to almost 11% of teachers).

Figure 5. Experience Levels of Guidance and Librarian Staff



Because there is relatively less variation among counselors and librarians, especially in terms of education, education and experience have somewhat less power in predicting salary amounts compared to teachers. Regression analysis indicates that experience explains about 48% of the variation in salary and education level explains about 13%.

Table 7 displays the number of social workers, guidance counselors, directors of guidance, and librarians/media specialists in each of the 40 education-experience categories.

Table 7: Number of school social workers, guidance counselors, librarians/media specialists in each category						
	Education category					
Experience Category	BA only	BA +15 hours or + 30 hours	MA or MA +15 hours	MA +30 hours or C.A.S	Doctorate	Total
0	6	1	23	0	0	30
1-5	11	7	140	9	1	168
6-10	10	1	138	15	0	164
11-15	1	2	83	21	1	108
16-20	6	6	95	24	1	132
21-25	0	1	71	24	3	99
26-30	1	1	44	13	0	59
31 plus	1	0	37	20	1	59
Total	36	19	631	126	7	819

Table 8 displays the actual average, minimum and maximum salary for social workers, guidance counselors, directors of guidance, and librarians/media specialists in each of the 40 education-experience categories.

Table 8: Actual average salary for guidance staff and librarians, and the *amount allocated* by the teacher salary matrix, by education-experience category

Years of Experience Category		Education category					
		BA only	BA +15 or +30	MA or MA +15	MA +30 or C.A.S.	Doctorate	Overall
0 Years							
	Actual	$36,902	$36,250	$44,979	-	-	$43,072
	Allocated	*$35,395*	*$37,873*	*$41,058*	*$45,306*	*$45,306*	
1-5 Years							
	Actual	$42,595	$45,042	$46,104	$52,869	$73,366	$46,354
	Allocated	*$37,165*	*$39,642*	*$42,828*	*$47,075*	*$47,075*	
6-10 Years							
	Actual	$45,350	$54,778	$49,996	$56,676	-	$50,353
	Allocated	*$42,474*	*$44,952*	*$47,783*	*$52,385*	*$52,385*	
11-15 Years							
	Actual	$49,100	$62,283	$55,937	$66,095	$70,713	$58,103
	Allocated	*$48,137*	*$50,615*	*$53,800*	*$58,402*	*$58,402*	
16-20 Years							
	Actual	$55,564	$56,987	$60,032	$64,678	$67,418	$60,592
	Allocated	*$53,800*	*$56,278*	*$59,110*	*$63,711*	*$63,711*	
21-25 Years							
	Actual	-	$66,691	$65,691	$65,703	$77,256	$66,055
	Allocated	*$58,402*	*$60,879*	*$63,711*	*$68,312*	*$68,312*	
26-30 Years							
	Actual	$57,899	$57,469	$66,431	$69,679	-	$66,850
	Allocated	*$60,525*	*$63,357*	*$66,189*	*$70,790*	*$70,790*	
31 or more Years							
	Actual	$62,048	-	$69,019	$72,487	$83,627	$70,324
	Allocated	*$61,587*	*$64,065*	*$66,897*	*$71,498*	*$71,498*	
Overall Actual		$45,719	$52,472	$55,270	$65,069	$75,270	$56,463

Compared to the salary allocations generated by using the teacher matrix, actual average salaries are almost across the board higher, except for the 26-30 years of experience band where actual salaries are lower or about the same. This raises a question about whether these categories of staff should continue to be funded using the teacher salary matrix. Employment conditions for these staff may have changed since the

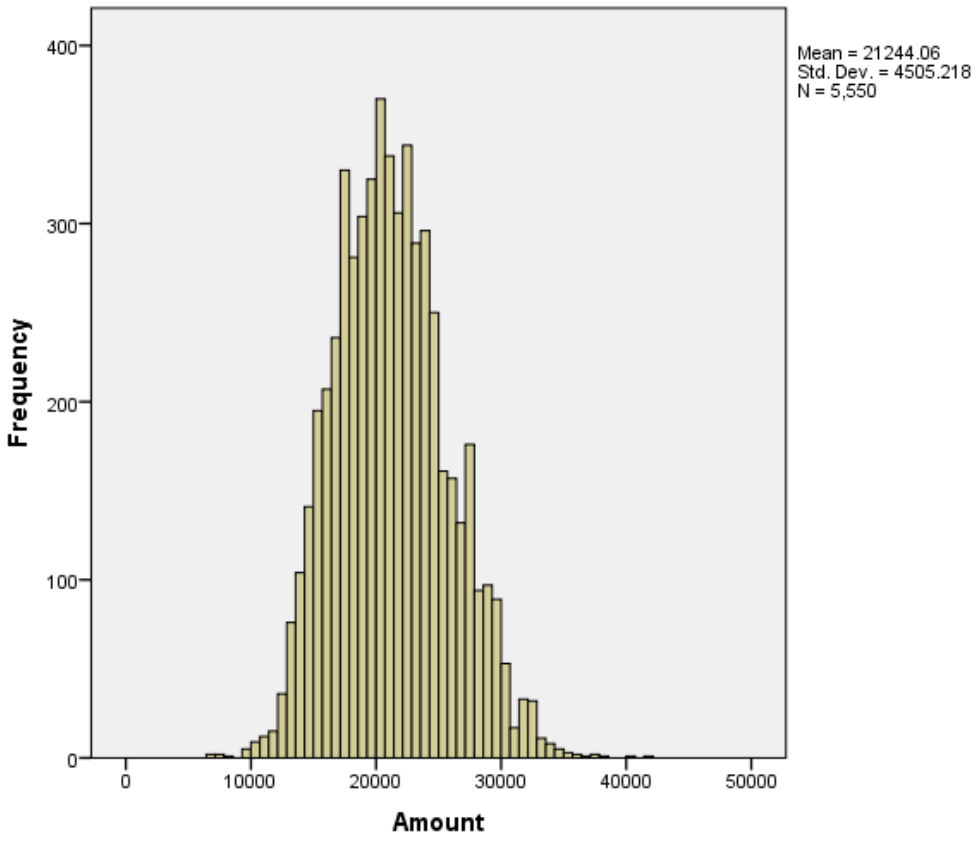
implementation of the EPS formula, and assumptions of similar contractual treatment may no longer hold true. However, Table 7 illustrates that the small number of staff in some matrix categories would make it problematic to construct a robust matrix, and there would likely need to be fewer categories if a separate matrix were created. Appendix C includes an expanded version of Table 8 that includes minimum and maximum salaries in each of the education-experience categories.

Educational Technicians and Library/Media Technicians

The data used to update the educational and library/media technician salary matrix also come from staff data file obtained from Maine DOE for the school year 2016-17. Following the approach used in previous matrix calculations, fulltime technicians whose salaries were less than $6,908 (inflated from 2010 $6,250) were also excluded from the matrix calculations (n=14).

This left 5,565 technicians with an average salary of $21,508 (minimum of $6,977 and a maximum of $226,796) and a standard deviation of $7,515. After excluding 14 high-salary outliers that were more than three standard deviations above the mean (i.e. greater than $44,053), the sample used to calculate the salary matrix for education and media technicians includes 5,550 technicians with an average salary of $21,244 (minimum $6,977 and maximum $41,933).

Figure 6. Educational Technician and Library / Media Technician Salaries



The salary matrix developed for educational technicians and library/media technicians uses experience and job classification rather than experience and education, because technician pay is typically based on job classification rather than a particular employee's education level. The different job classifications require different levels of education and certification, however, and thus are related to education level. Six job classifications (Educational Technician I, II and III and Library/Media technician I, II, and III) and 5 experience categories (less than one year, 1 to 5 years, 6 to 10 years, 11 to 15 years and 16 or more years) are used, creating a 5x6 matrix with 30 experience-position indices.

About 9% of education and media technicians are brand new, with less than one of year experience. Another 34% are relatively new with 1 to 5 years of experience. Nearly 25% have 16 or more years of experience.

Figure 7. Educational Technician and Library / Media Technician Experience

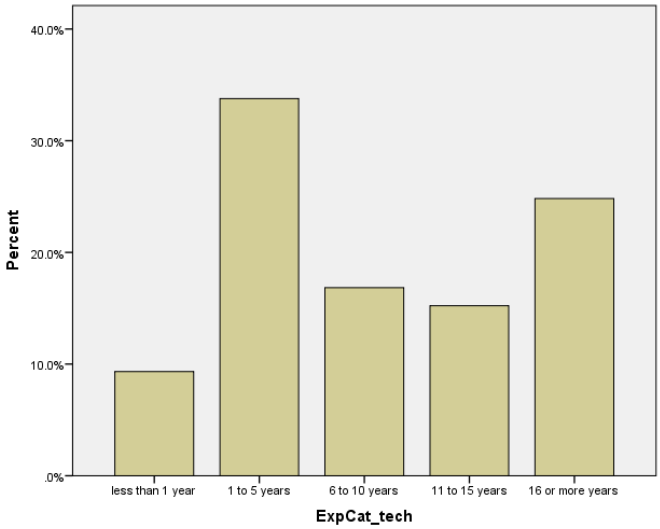


Table 9 displays the actual average, minimum and maximum salary for technicians in each of the 30 job type-experience categories.

Table 9: Actual average (minimum and maximum) salary for technicians by experience and job classification

Years of Experience	Educ Tech I	Educ Tech II	Educ Tech III	Media Tech I	Media Tech II	Media Tech III
< 1	$14,148 (7,372-23,214)	$16,416 (6,977-29,871)	$19,777 (11,100-35,496)	-	$17,843 (NA)	$18,752 (13,989-24,716)
1-5	$15,888 (7,002-25,334)	$18,652 (10,849-31,539)	$20,815 (8,329-38,000)	$15,665 (10,490-20,754)	$21,620 (13,396-33,765)	$21,209 (14,412-33,120)
6-10	$17,867 (12,125-33,630)	$20,786 (12,449-37,766)	$22,753 (12,308-37,627)	$18,457 (NA)	$20,171 (15,295-23,372)	$25,389 (17,042-33,855)
11-15	$18,095 (12,417-27,917)	$21,784 (12,656-31,583)	$24,429 (13,570-35,932)	$17,436 (17,090-17,781)	$22,758 (20,333-25,794)	$24,988 (18,640-29,324)
16 or more	$20,242 (12,627-34,882)	$23,064 (13,554-33,949)	$25,347 (13,361-41,933)	$19,205 (11,915-23,946)	$26,608 (20,537-36,414)	$26,617 (15,180-40,031)
Overall	$17,772 (7,002-34,882)	$20,602 (6,977-37,766)	$22,490 (8,329-41,933)	$18,326 (10,490-23,946)	$23,662 (13,396-36,414)	$24,159 (13,989-40,031)

In the past, the salary for beginner Ed Tech II's was used as the base because beginner Ed Tech II's were more common than beginner Ed Tech I's and using a larger sample for the base creates a more robust matrix. Following the lead of earlier reports, the matrix for educational or media technicians uses the statewide average salary paid to Ed Tech II's with zero experience as the base salary ($16,416) and holds increments paid to additional years of experience equal to those of Ed Tech II's. As can be seen from Tables 10 and 11, the number of Ed Tech I's is increasing. In 2009-10 there were only 21 beginner Ed Tech I's while in 2016-17 there are 68, a number that is likely sufficient for generating an adequate distribution and thus a reliable base salary.

Another thing to note from Tables 10 and 11 is that the number of library/media technicians is declining. In some cases, the raw average salaries are actually lower for media technicians of a higher experience level because there are so few staff. The same mathematical smoothing process used for teachers was also used for educational technicians to correct for this.

Table 10: Number of Technicians in each Salary Matrix experience band (2009-10 data)

	Position					
Years of Experience	Educ Tech I	Educ Tech II	Educ Tech III	Media Tech I	Media Tech II	Media Tech III
0 years	21	43	49	0	5	0
1-5	157	248	443	16	15	24
6-10	173	242	294	15	19	20
11-15	111	169	189	10	19	36
16 plus	137	313	344	15	36	70
Total	599	1,015	1,319	56	94	150

Table 11: Number of Technicians in each Salary Matrix experience band (2016-17 data)

	Position					
Years of Experience	Educ Tech I	Educ Tech II	Educ Tech III	Media Tech I	Media Tech II	Media Tech III
0 years	68	116	323	0	1	10
1-5	296	420	1,098	4	14	43
6-10	139	247	522	1	3	23
11-15	155	216	445	2	9	18
16 plus	281	408	601	14	18	56
Total	939	1407	2989	21	45	150

The resulting salary matrix for technician positions is depicted in Table 12.

Table 12: Salary Matrix for Educational and Library/Media Technicians, 2016-17						
Base Salary: $16,416	Position Type					
Experience Category	Educ Tech I	Educ Tech II	Educ Tech III	Media Tech I	Media Tech II	Media Tech III
0 years	0.82	1.00	1.14	0.78	1.15	1.20
1-5 years	0.96	1.14	1.28	0.91	1.29	1.34
6-10 years	1.09	1.27	1.41	1.04	1.42	1.47
11-15 years	1.15	1.33	1.48	1.11	1.49	1.53
16 + years	1.23	1.40	1.55	1.18	1.56	1.61

The difference between the actual total statewide salaries paid to technicians in 2016-17 and the total calculated using the matrix was $0.34.

Table 13 displays the actual average salaries paid and the matrix allocated salaries for each category.

Table 13: Actual average salary and matrix allocated salary for technicians by experience and job classification							
Years of Experience		Position					
		Ed Tech I	Ed Tech II	Ed Tech III	Media I	Media II	Media III
0 years							
	Allocated→	$13,461	$16,416	$18,714	$12,804	$18,878	$19,699
	Actual →	$14,148	$16,416	$19,777	-	17,843	$18,752
1-5 years							
	Allocated→	$15,759	$18,714	$21,012	$14,939	$21,177	$21,997
	Actual →	$15,888	$18,652	$20,815	$15,665	$21,620	$21,209
6-10 years							
	Allocated→	$17,893	$20,848	$23,147	$17,073	$23,311	$24,131
	Actual →	$17,867	$20,786	$22,753	$18,457	$20,171	$25,389
11-15 years							
	Allocated→	$18,878	$21,833	$24,296	$18,222	$24,450	$25,117
	Actual →	$18,095	$21,784	$24,429	17,436	$22,758	$24,988
16 + years							
	Allocated→	$20,192	$22,982	$25,445	$19,371	$25,609	$26,430
	Actual →	$20,242	$23,064	$25,347	$19,205	$26,608	$26,617

Technician salary matrices from previous years:

The matrix ranges narrowed between 2009-10 and 2012-13 but then widened significantly in 2016-17. By 2016-17 allocations relative to the base for starting salaries for level I technicians is lower but the rate of increase after the first year tends to be higher. The 2016-17 allocations relative to the base salary for Ed and Media Tech I's are lower at all levels of experience (except for Ed Tech's with 16 or more years of experience where the allocation is the same), compared to what they were in 2009-10.

Table 14: Salary Matrix for Technicians (2009-10 data)						
	Position (Base salary = $14,618)					
Experience	Ed Tech I	Ed Tech II	Ed Tech III	Media I	Media II	Media III
0 years	0.87	1.00	1.16	0.86	1.09	1.23
1-5	1.00	1.13	1.28	0.99	1.22	1.36
6-10	1.10	1.23	1.38	1.09	1.32	1.45
11-15	1.20	1.33	1.49	1.19	1.43	1.56
16 plus	1.23	1.36	1.51	1.22	1.45	1.58

Table 15: Salary Matrix for Technicians (2012-13 data)						
	Position (Base salary = $16,077)					
Experience	Ed Tech I	Ed Tech II	Ed Tech III	Media I	Media II	Media III
0 years	0.84	1.00	1.13	0.90	1.02	1.16
1-5	0.88	1.04	1.18	0.94	1.06	1.21
6-10	0.95	1.12	1.25	1.02	1.14	1.28
11-15	1.04	1.21	1.34	1.11	1.22	1.37
16 plus	1.06	1.22	1.35	1.12	1.24	1.38

In fact, allocations for both Ed and Media technicians at level I do not keep pace with the rate of inflation between 2009-10 and 2016-17 until the highest level of experience (16 or more years). For example, a beginner Ed Tech I position was allocated $12,718 in 2009-10 (0.87*$14,618) and $13,505 (0.84*$16,077) in 2012-13, just keeping pace with inflation ($12,718 was worth about $13,627 in 2012). But in 2016-17, a beginner Ed Tech I position was allocated $13,461 (0.82*$16,416), significantly below $14,090, the inflated value of $13,505.

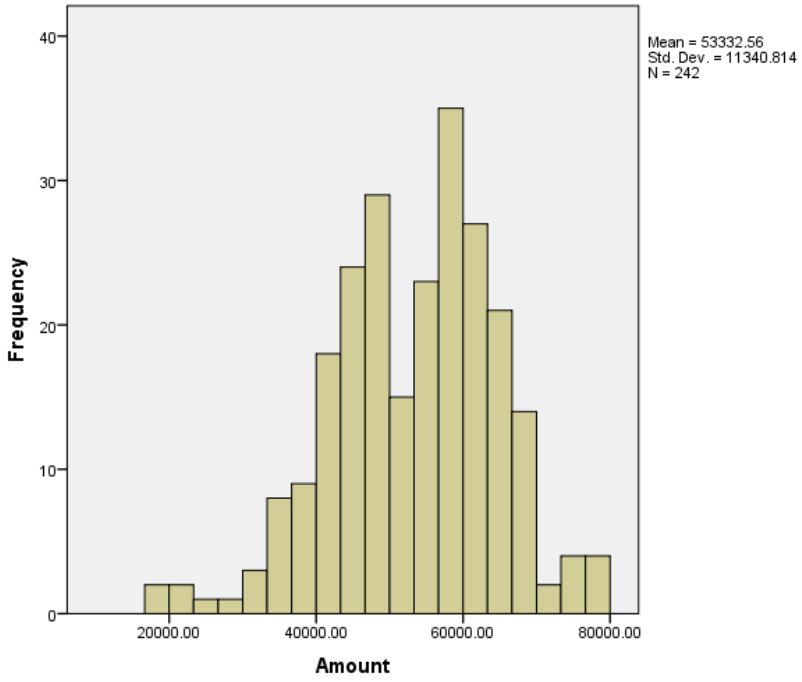
Likewise, a beginner Media Tech I position in 2009-10 was allocated a full-time salary of $12,571 (0.86*$14,618) and in 2016-17 is allocated $12,804 (0.78*$16,416); to keep pace with inflation, the allocation would have had to increase to about $14,053. That

said, assuming a full-time technician works about 6 hours per day, 175 days a year, the $13,461 allocated for a starting Ed Tech I works out to be about $12.80 per hour, above Maine's $10.00 per hour minimum wage.

Nurses/Health Staff

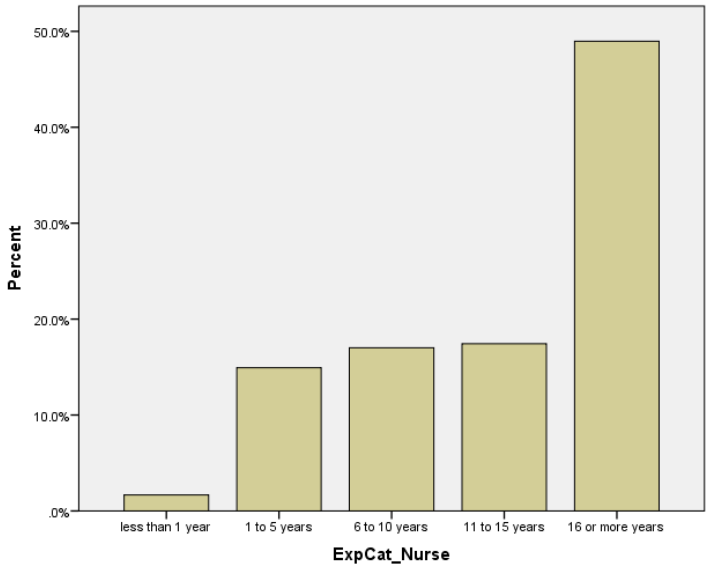
Part-time nurses (FTE<1.0) and full-time nurses with reported salaries equal to $100 (n=3) were excluded, leaving 242 nurses with an average salary of $53,333 (minimum of $17,162 and a maximum of $77,795) and a standard deviation of $11,341. There were no nurses with exceptionally high outlier salaries (more than 3 times the standard deviation above the mean.)

Figure 8. Health Staff Salaries



Experience is the only factor used in calculating the nurse matrix because the education levels of nurses does not vary enough to permit calculation of a reliable matrix using both education and experience. The majority of nurses (74%) have bachelor's degrees while only 12.8% have Master's degrees. Years of experience is moderately correlated with salary, explaining about 35% of the variation in salaries. The experience categories the same as for technicians: less than one year, 1 to 5 years, 6 to 10 years, 11 to 15 years and 16 or more years.

Figure 9. Health Staff Experience Levels



Almost half (49%) of school nurses in Maine have 16 or more years of experience. Less than 2% (1.7%) are beginner nurses in their first year. Because there are so few beginner nurses (n=4), the base salary used to calculate the salary matrix for nurses is the statewide average salary for all nurses rather than the average salary paid to beginner staff.

Table 16: Actual average (minimum and maximum) salaries, number of nurses by experience level, and updated Matrix Values

	Number of nurses	Salary average (min-max)	Matrix Index Value
Less than 1 year	4	$41,526 (36,600-48,423)	0.78
1-5 years	37	$44,061 (17,162-64,030)	0.83
6-10 years	41	$46,523 (35,032-63,131)	0.87
11-15 years	42	$52,995 (19,373-77,795)	0.99
16 or more years	118	$59,126 (20,911-77,537)	1.11
Overall	242	$53,333 (17,162-77,795)	--

The difference between the actual statewide total salaries paid to nurses in 2016-17 and the total calculated using the matrix generated when using overall statewide mean salary for all nurses ($53,333) as the base is $5.81.

Nurses salary matrices from previous years:

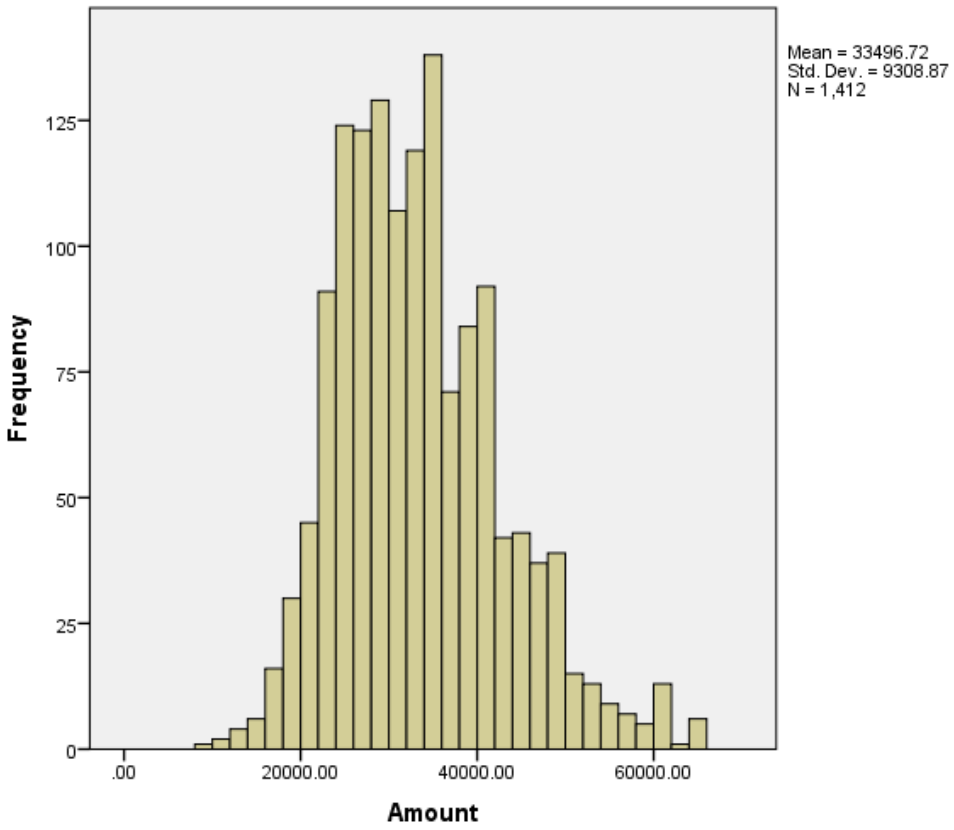
The range of indices widens somewhat in 2016-17 due to the drop in index value for the four beginning nurses. In fact, the indices for all levels of experience are lower, except for the highest level of experience (16 years or more), which remains the same. The average salary has increased relatively steadily over the time.

Table 17: Salary Matrix Trends for Nurses			
	2009-10	2012-13	2016-17
Base Salary:	*$46,873*	*$49,307*	*$53,483*
0 years	0.84	0.85	0.78
1-5 years	0.88	0.93	0.83
6-10 years	0.98	0.94	0.87
11-15 years	0.97	1.06	0.99
16 or more years	1.12	1.11	1.11

Administrative Assistant/Secretary

The salary matrix for administrative assistant staff used 2016-17 staff data for FTE=1 administrative assistant/secretary positions. Following the approach used in previous matrix calculations, fulltime administrative assistant staff with recorded salaries less than $6,987 (inflated from 2009-10 $6,250) were excluded from the matrix calculations (n=4). This left 1,415 administrative assistant staff with an average salary of $33,688 (minimum $8,794 to $229,047) and a standard deviation of $10,749. According to the rule of thumb (3 times the standard deviation above the mean = $65,935) there are three staff with exceptionally high recorded salaries ($229,483, $76,483, and $66,200); they were excluded from the sample used to generate the salary matrix. The final sample used for the salary matrix computation included 1,412 administrative assistants with an average salary of $33,497 (minimum of $8,794 and a maximum of $65,659).

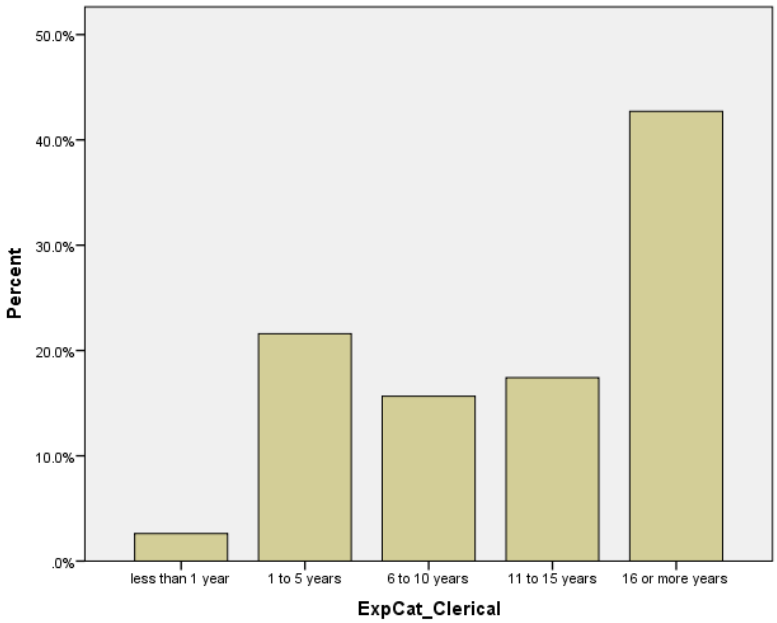
Figure 10. Administrative Assistant Salaries, FY2017



Most administrative assistants (85%) have "Other" recorded as their highest degree. This includes high school diplomas and Associate degrees. Fourteen percent have a Bachelor's degree and 1% have a Master's degree.

Experience is the only factor used in calculating the salary matrix for administrative assistant staff. While years of experience is weakly correlated with salary, explaining only 10% of the variation in average salaries, education has no statistically significant relationship to salary amounts (p=0.682). The experience categories are the same as for technicians and nurses: less than one year, 1 to 5 years, 6 to 10 years, 11 to 15 years and 16 or more years.

Figure 11. Administrative Assistant Experience Levels, FY2017



The experience profile of administrative assistants is similar to that of nurses with less than 3% being in their first year and almost 43% having 16 or more years of experience.

Table 18 displays the number of administrative assistants in each experience category and the average and range of salaries paid at each level. The average salary paid to beginner administrative assistants is typically used as the base salary. Note, however, that the number of beginning administrative assistants is has declined from 53 in 2009-10 to 37 in 2016-17; if this number continues to decline, future salary matrices should use statewide average salary for all administrative assistants rather than the average salary paid to beginning staff.

Table 18: Actual salaries for administrative assistants by experience level, 2016-17 (Base Salary: $25,821)			
Experience	Number of staff	Average salary (Minimum-Maximum)	Matrix Index Value
0 years	37	$25,821 (10,592-51,418)	1.00
1-5 years	305	$29,903 (8,794-65,545)	1.16
6-10 years	221	$31,393 (15,082-60,528)	1.22
11-15 years	246	$33,796 (12,766-60,341)	1.31
16 or more years	603	$36,435 (10,138-65,659)	1.41
Overall	1,412	$33,497 (8,794-65,659)	--

The difference between the actual total statewide salaries paid to administrative assistants and secretaries in 2016 and the total calculated using the matrix is $0.03.

Table 19: Actual average salary vs allocated salaries for administrative assistants by experience level, 2016-17		
Experience	Actual average salary	Allocated salary
0 years	$25,821	$25,821
1-5 years	$29,903	$29,953
6-10 years	$31,393	$31,502
11-15 years	$33,796	$33,826
16 or more years	$36,435	$36,408

The range of salaries is expanding. The base salary (i.e. the mean salary for beginner administrative assistants) barely increased since 2013, while salaries for more experienced staff have seen more typical increases. For example, between 2012-13 and 2016-17, the salary paid to experienced staff with 16 or more years of experience was 1.30 times that of beginning hires, and by 2016-17 the proportion increased to 1.41.

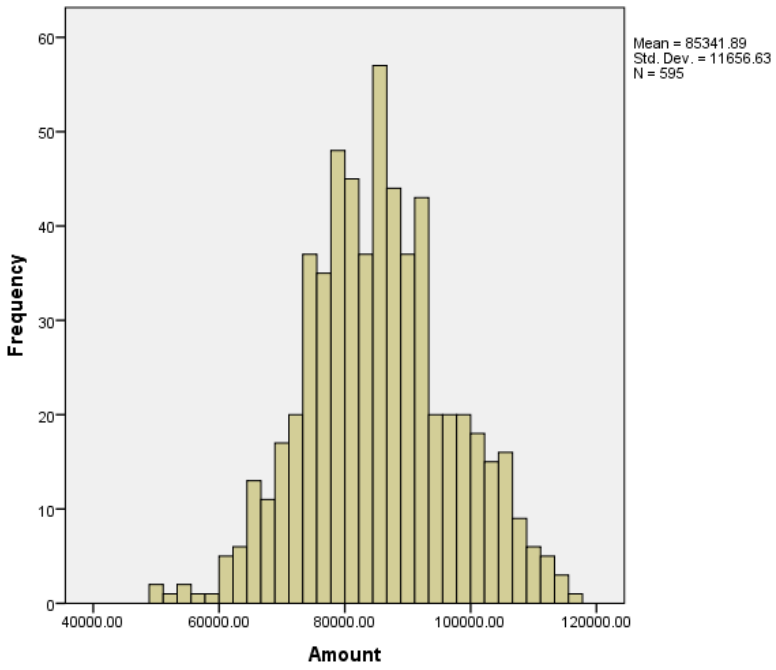
Table 20: Salary Matrix for Administrative Assistants			
Experience	2009-10	2012-13	**2016-17**
Base Salary	*$24,342*	*$25,577*	***$25,821***
0 years	1.00	1.00	**1.00**
1-5 years	1.04	1.08	**1.16**
6-10 years	1.14	1.18	**1.22**
11-15 years	1.17	1.27	**1.31**
16 or more years	1.28	1.30	**1.41**

School Administrators

The salary matrix for school administrators used 2016-17 staff data for assistant principals and principals. Part-time administrators (FTE<1.0) and those teaching private schools and public charters, magnets and CTE/vocational schools were excluded. Full-time administrators with reported salaries less than $30,000 (n=1) were also excluded from the matrix calculations because that is the cut-off used for the teacher salary matrix.

The final sample used for the salary matrix computation included 595 administrators, 68% of whom are principals and 32% assistant principals, with an average salary of $85,432 and a minimum of $48,984 and a maximum of $116,708. There are no high-salary outliers (defined as 3 times the standard deviation of $11,657 above the mean, or $120,043).

Figure 12. School Administrator Salaries



The vast majority of school administrators (84%) have a Master's degree or advanced certificate. About 12% percent have a Bachelor's degree, and 3.5% have a doctorate. Because there is very little variation in education level, it explains only 1.8% of the variation in salary level.

The average number of years of experience is 10. About 45% of school administrators are relatively new (5 years or less); and about 26% have 16 or more years of experience. Years of experience explains only about 6.5% of the variation in salaries.

Figure 13. School Administrator Experience

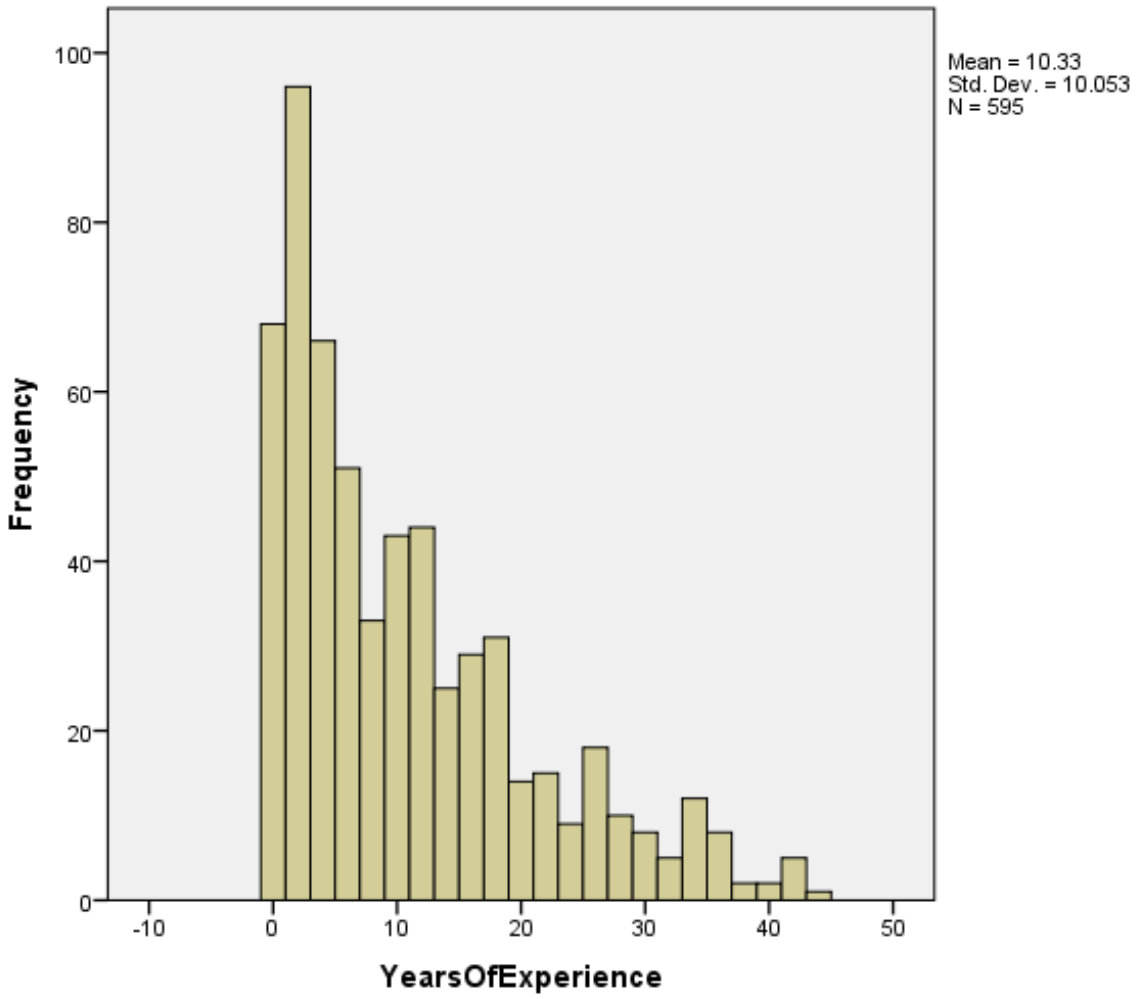


Figure 13 is noteworthy for its atypical shape compared to other staff types. A disproportionate number of administrators are in their first five years of experience as an administrator.

The salary matrix for school administrators is calculated using position title (assistant principal or principal) and school size rather than education and experience. Regression analysis shows that position and school size are more predictive of salary amount than experience or education level. School size and position together explain about 34% of the variation in salary among school administrators. This is less than the 68% of variation in teacher salaries explained by education and experience, but nevertheless represents the best known predictors of school administrator salary.

There are 8 school size categories: 1 to 125, 126-175, 176-250, 251-350, 351-500, 501-700, 701-1,000, and 1,001 or more. The number of assistant principals and principals by school size and their salary averages and ranges are displayed below in Figure 14 and Table 21.

Figure 14. School Administrators by School Size

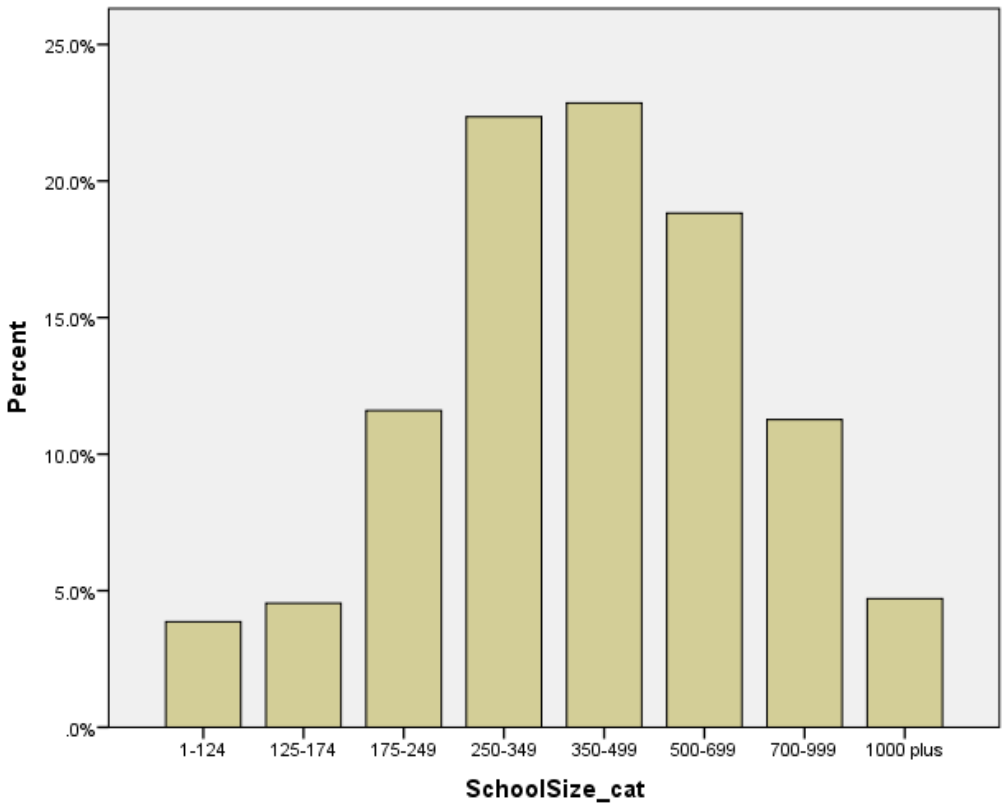


Table 21: Actual average (minimum and maximum) salaries and number of school administrators by school size				
School size (Enrollment)	Assistant Principals		Principals	
	N	Average salary (minimum-maximum)	N	Average salary (minimum-maximum)
1-124	0	-	23	$78,920.13 (57,297-88,776)
125-174	2	$68,895.00 (67,500-70,470)	25	$78,844.88 (65,000-91,234)
175-249	4	$75,279.50 (72,468-77,520)	65	$82,182.27 (49,438-108,333)
250-349	18	$69,336.56 (52,273-82,973)	115	$84,859.82 (62,554-108,457)
350-499	51	$77,775.91 (58,338-91,214)	85	$90,507.69 (65,556-111,037)
500-699	55	$80,730.65 (62,632-99,755)	57	$96,893.33 (55,182-116,708)
700-999	41	$83,616.63 (48,984-99,231)	26	$101,807.83 (84,460-114,610)
1000 or more	19	$85,207.79 (74,116-92,769)	9	$102,028.33 (86,984-107,100)
Overall	190	$79,690.13	405	$87,993.32

The matrix for school administrators uses the statewide average salary for all assistant principals and principals combined as the base salary.

Table 22. Salary Matrix for School Administrators, 2016-17
(Base Salary: $85,342)

	Principal	Asst. Principal
1 to 124	0.92	0.74
125 to 174	0.92	0.74
175 to 249	0.96	0.78
250 to 349	0.99	0.81
350 to 499	1.06	0.88
500 to 699	1.14	0.95
700 to 999	1.19	1.01
1,000 or More	1.20	1.02

The difference between the actual total statewide salaries paid to administrators in 2016 and the total calculated using the matrix is $0.01.

Table 23: Actual average salary vs allocated salaries for school administrators by school size				
School size	Assistant Principals		Principals	
	Allocated salary	Actual average salary	Allocated salary	Actual average salary
1-124	$63,153.08	-	$78,514.64	$78,920.13
125-174	$63,153.08	$68,895.00	$78,514.64	$78,844.88
175-249	$66,566.76	$75,279.50	$81,928.32	$82,182.27
250-349	$69,127.02	$69,336.56	$84,488.58	$84,859.82
350-499	$75,100.96	$77,775.91	$90,462.52	$90,507.69
500-699	$81,074.90	$80,730.65	$97,289.88	$96,893.33
700-999	$86,195.42	$83,616.63	$101,557.00	$101,807.83
1000 or more	$87,048.84	$85,207.79	$102,410.40	$102,028.33

Note that the allocations do not increase initially with school size and that the increase in allocation for administrators of schools with 1,000 or more students is very small (1%). This is because of the small numbers of small and larger schools and skewed salary distributions. The number of administrators has declined in recent years, perhaps due to school closings and consolidations. Table 24 below shows the number of assistant principals and principals at each school size level in 2009-10 and 2016-17.

Table 24: Number of school administrators by school size in 2009-10 and 2016-17				
School size	Assistant Principals		Principals	
	2009-10	2016-17	2009-10	2016-17
1-124	2	0	27	23
125-174	4	2	31	25
175-249	5	4	77	65
250-349	23	18	118	115
350-499	48	51	87	85
500-699	47	55	47	57
700-999	36	41	23	26
1000 or more	30	19	14	9
Overall	195	190	424	405

School administrator salary matrices from previous years:

The range of indices has narrowed slightly over time as the number of administrators at very small and very large schools has declined, with a range of 0.67 to 1.25 in 2009-10 and a range of 0.70 to 1.24 in 2016-17.

Table 25: Salary Matrix Trend for School Administrators						
School size category	Principals			Assistant Principals		
	2009-10	2012-13	2016-17	2009-10	2012-13	2016-17
1 to 125	0.85	0.88	0.92	0.67	0.70	0.74
126-175	0.93	0.92	0.92	0.74	0.73	0.74
176-250	0.97	0.96	0.96	0.78	0.78	0.78
251-350	1.01	1.01	0.99	0.83	0.83	0.81
351-500	1.06	1.05	1.06	0.88	0.87	0.88
501-700	1.14	1.11	1.14	0.95	0.93	0.95
701-1,000	1.20	1.18	1.19	1.02	0.99	1.01
1,001 plus	1.25	1.24	1.20	1.06	1.06	1.02

Given the decreased variation between the high and low ands of the school size bands, it may simplify the model to combine some of the size spans into fewer categories. However, this becomes a trade-off with sharper changes in allocation when schools near the edge of an enrollment band shift categories with small changes in enrollment.

PART II

In this section we compare teacher education and experience profiles across districts by district size, poverty level and rurality and investigate the impact of these differences on cost allocations. Because salary matrices for teachers are generated using current education and experience profiles, the salary matrix, in effect, compensates or equalizes districts that employ teachers with higher degrees and more experience. Districts employing more experienced (e.g., more years of teaching) and/or more highly educated (e.g., Master's degrees) teachers will be allocated more money than districts employing less experienced and educated staff to recognize the additional cost of paying such employees. If the education-experience profiles differ by SAU size, poverty level, or rurality, the allocations resulting from the salary matrices will reflect those patterns. For example, if rural districts systematically employ teachers with lower levels of education and less experience than suburban districts, the salary matrix will allocate less funding on the whole to rural districts than it does to suburban districts. Thus the purpose of these analyses is to

describe Maine's staffing patterns in order to inform policy discussions about the role and impact of the salary matrix component on funding allocations.

The data used to conduct the analysis come from the 2016-17 staff data files (staff education level and years of experience), NCES code rankings from the National Center for Education Statistics (SAU urban-to-rural category), and 2016-16 information from Maine DOE on student enrollment (SAU size category) and % of students eligible for FRPL (poverty level).[6] The sample includes the population of Maine public school districts and administrative units with data available on enrollment, %FRPL, and NCES locale, excluding those in unorganized territories and on tribal reservations as well as small island districts (N=175).

Poverty: Within this study, researchers categorized districts according to three levels of poverty: lower, average, and higher. Lower poverty districts had less than 31% or students eligible for FRPL, or one standard deviation below the mean percent eligible of 49.4%. The average rate of eligibility for FRPL among low poverty districts is 21.9% (range: 5% to 31%). Average poverty districts had 32% to 67% FRPL eligibility, or within one standard deviation from the mean, and had a mean eligibility rate of 50.2% (range: 32% to 67%). Higher poverty districts had 68% or more of their students eligible for FRPL, or greater than one standard deviation above the mean, with an mean of 75% eligibility (range 68% to 100%). . Of the 181 districts used in the analysis, 18% (31) are lower poverty, 68% (119) are average poverty, and 14% (25) are higher poverty districts.

Table 26. Districts by Poverty Level Category		
	N	%
Lower Poverty (0% to 31%)	31	17.7%
Average Poverty (32% to 67%)	119	68.0%
Higher Poverty (68% to 100%)	25	14.3%

[6] http://dw.education.maine.gov/DirectoryManager/WEB/Maine_Report/StudentNeedDTViewer.aspx

District size: We also categorized districts by size, with smaller districts defined as those with fewer than 300 attending students (n=68), medium sized districts as those with 300 to 1,200 attending students (n=49), and larger districts as those with 1,201 or more (n=58).

Table 27. Districts by Enrollment Size Category		
	N	%
Less than 300 students	68	38.9%
300 to 1,199 students	49	28.0%
1,200 or more students	58	33.1%

The average student enrollment count among small districts is 134 (with a range of 30 to 297), for medium sized districts is 658 (range of 304 to 1,180), and for large districts is 2,293 (range of 1,207 to 6,825).

Rurality: Districts were also categorized according to their NCES locale code, a measure of rurality produced by the National Center for Education Statistics, which includes three levels within each category of city, suburban, town, and rural.

Table 28. Districts by Locale Category		
	N	%
City	4	2.3%
Suburb	18	10.3%
Town	18	10.3%
Rural	135	77.1%

Maine is a heavily rural state with only 4 districts in the sample (2%) categorized as a city (small city inside an urbanized area with a population of 100,000 or less), 10% as suburban (small and midsize territories outside a principal city and inside an urbanized area with a population of less than 100,000 or less than 250,000, respectively), and 10% as a town (fringe, distant, and remote territories within 10 miles, or 10 to 35 miles more than 35 miles of an urbanized area, respectively). Nearly 77% of Maine districts are classified as rural (fringe, distant, and remote Census-defined areas, with 5 miles, or 5 to 25 miles or more than 25 miles from an urbanized area, respectively, as well as less than 2.5 miles, or 2.5 to 10 miles, or greater than 10 miles from an urban cluster).

Staff Education and Experience by District Characteristics

From the 2016-17 staff files obtained from the Maine DOE data were extracted on "years of experience" and "highest educational degree" using the same categories as used in the salary matrices above. Highest educational degree was broken into 5 categories: Bachelor's degree, Bachelor's degree plus 15 or 30 hours of additional training, Master's degree or Master's degree plus 15 hours of additional training, Master's degree plus 30 hours of additional training or an Advanced Degree, and Doctorate. Based on "years of experience" information available in the staff data eight experience categories were computed: less than 1 year, 1 to 5 years, 6 to 10 years, 11 to 15 years, 16 to 20 years, 21 to 25 years, 26 to 30 years, and 31 or more years. This information was aggregated up to the SAU level and used to assess the % of professional staff (including teachers and school social workers, guidance counselors, directors of guidance, and librarians/media specialists) at each education and experience level across districts by size, poverty level, and urban-rural locale.

Profiles by Poverty Level

Finding #1: Higher poverty districts employ less experienced and less educated staff compared to other districts.

High poverty districts employ fewer staff with Master's degrees or more, compared to low poverty and average poverty districts. On average, the proportion of staff with only a Bachelor's degree among low poverty districts is 34.3% compared to 51.9% among high poverty districts. On average, the percentage of staff with a Master's degree or a Master's degree plus 15 hours of additional training is 41.3% among low poverty districts, 32.6% among average poverty districts and 26.8% among high poverty districts. The typical profile among low poverty districts contains 11.3% of staff with a Master's degree plus 30 additional hours of training (or an Advanced Certificate) compared to 4.9% among average poverty districts and 4.1% among high poverty districts.

Table 29. Percentage of staff at each education level by district poverty level						
	Other	BA only	BA plus 15 or 30 hours	MA or MA plus 15 hours	MA plus 30 hours (or advanced cert)	Doctorate
Low poverty	0.5%	34.3%	11.5%	41.3%	11.3%	1.0%
Average poverty	0.7%	48.2%	13.3%	32.6%	4.9%	0.4%
High poverty	2.0%	51.9%	15.2%	26.8%	4.0%	0.1%
Overall	0.8%	46.3%	13.2%	33.3%	5.9%	0.4%

Using Spearman's rank correlation (useful when normality assumption is violated, or variables are related in nonlinear ways) and regression analysis, we confirm that the percent of students eligible for FRPL is significantly correlated with education profile. Poverty level is positively correlated with %BA-only and negatively correlated with %MA or MA15, and %MA30/ Advanced Certificate. Poverty and %BA-15/30 are only weakly correlated. The results are similar using weighted and unweighted counts. The significance between %FRPL and %BA-only and %Masters or more remains statistically significant ($p<.05$) even after controlling for district size and rurality.

Experience profiles: Low poverty districts have fewer beginning career staff compared to higher poverty districts. On average, the percent of staff with 5 or fewer years of experience among lower poverty districts is 20% compared to 26.3% among average poverty districts and 33.2% among higher poverty districts. Lower poverty districts have higher percentages of mid-career staff: on average, 45.3% of staff at lower poverty districts have 11 to 25 years of experience compared to 39.3% among average poverty districts and 32.7% among higher poverty districts. Higher poverty districts, on the other hand, have on average slightly lower percentages of teachers with 26 years or more: 19.6% compared to 21.1% among lower poverty districts.

Table 30. Percentage of staff at each experience level by district poverty level								
Years →	**< 1**	**1-5**	**6-10**	**11-15**	**16-20**	**21-25**	**26-30**	**31+**
Low poverty	2.7%	17.3%	13.6%	16.8%	15.2%	13.4%	9.5%	11.6%
Average poverty	4.6%	21.7%	15.4%	14.0%	14.5%	10.9%	8.9%	10.0%
High poverty	5.8%	27.4%	13.4%	12.5%	12.5%	7.7%	10.5%	10.1%
Overall	4.4%	21.7%	14.8%	14.3%	14.3%	10.9%	9.3%	10.3%

Using correlation and regression analysis, we confirm that the %FRPL is significantly correlated with district staff experience profile. Poverty rate is positively correlated with % of staff with 5 years or less and negatively correlated with the % of staff with 6 to 25 years of experience, even after controlling for district size and rurality. The differences in percentage of staff with 26 years or more are small and not statistically significant.

Profiles by Size

Finding #2: Small districts employ staff with less education and less experience compared to large districts.

Education profiles: Small districts have fewer staff with Master's degrees or more compared to medium sized and large districts. On average, the % of teachers with a Bachelor's degree is 65.7% among small districts compared to 62.0% among medium sized districts and 50.1% among large districts. Nearly half (49.5%) of staff in the typical large districts have a Master's degree, a Master's degree with 15 or 30 hours of additional training, an Advanced Certificate or a Doctorate compared to only 32.9% for small districts and 37.4% for medium sized districts.

Table 31. Percentage of staff at each education level by district size						
	Other	BA only	BA plus 15 or 30 hours	MA or MA plus 15 hours	MA plus 30 hours (or adv. cert)	Doctorate
< 300	1.4%	52.3%	13.4%	27.5%	4.8%	0.5%
300-1,199	0.6%	48.5%	13.5%	33.7%	3.5%	0.1%
1,200 or more	0.3%	37.3%	12.8%	39.7%	9.3%	0.6%
Overall	0.8%	46.3%	13.2%	33.3%	5.9%	0.4%

Student enrollment is negatively correlated with the % of staff with Bachelor's degrees and positively correlated with the % with a Master's degree or more. These correlations remain statistically significant even after controlling for the district's poverty rate and location.

Experience profiles: Small districts tend to have more beginner staff (0 to 5 years) and fewer mid-career staff (6 to 25 years). On average, the % of staff with 5 years or less of experience among small districts is 31.3% compared to 25.1% among medium size districts and 21.1% among large districts. In the typical small district 50.2% of staff have 6 to 25 years compared to 54.1% in medium sized districts and 59.1% in large districts. The difference in the average percentage of staff with 26 years or more is small: on average 18.5% among small districts, 20.7% among medium sized districts and 19.8% among large districts.

Table 32. Percentage of staff at each experience level by district size								
Years →	< 1	1-5	6-10	11-15	16-20	21-25	26-30	31+
< 300	5.6%	25.7%	14.3%	12.2%	12.5%	11.2%	8.8%	9.7%
300-1,199	4.1%	21.0%	16.0%	13.4%	14.7%	10.0%	9.9%	10.9%
1,200 or more	3.4%	17.7%	14.3%	17.6%	16.0%	11.2%	9.3%	10.6%
Overall	4.4%	21.7%	14.8%	14.3%	14.3%	10.9%	9.3%	10.3%

Student enrollment is negatively correlated with the % of staff with 5 or fewer years of experience and positively correlated with the % with 6 to 25 years of experience. These correlations remain significant even after controlling for the district's poverty rate and location, although only marginally so for the % of beginner staff. The differences in percentage of staff with 26 years or more are small and not statistically significant.

Profiles by Rurality

Finding #3: Rural districts employ teachers and other professional staff with lower levels of education compared to other districts, and both urban and rural districts tend to have less experienced teachers but differences disappear once district size (enrollment) is taken into account. Rural districts, particularly small rural districts, are significantly more likely to have a staff profile with fewer Master degrees and less experience.

Education profiles: Rural districts tend to have staff with lower levels of education compared to city-based and suburban districts. On average, 62% of staff have Bachelor's degree in rural districts compared to 46% among urban districts and 50% among suburban districts. On average, the % of staff with Master's degrees or more in rural districts is 37.2% compared to 48.6% in suburban districts and 53.5% in urban districts.

Table 33. Percentage of staff at each education level by locale

	Other	BA only	BA plus 15 or 30 hours	MA or MA plus 15 hours	MA plus 30 hours (or advanced cert)	Doctorate
City	0.2%	32.3%	14.0%	42.5%	10.3%	0.7%
Suburb	1.5%	34.4%	15.5%	35.4%	12.7%	0.4%
Town	0.04%	39.2%	14.3%	40.1%	6.1%	0.2%
Rural	0.9%	49.2%	12.8%	31.8%	4.9%	0.5%
Overall	0.8%	46.3%	13.2%	33.3%	5.9%	0.4%

However, after controlling for district size, location is not in and of itself significantly correlated to differences in staff education profiles (even when comparing rural districts to all others), except for the % of highly educated teachers (MA plus 30 hours or Advanced Certificate or Doctorate), which remains statistically significant even after holding district size constant.

Experience profiles: Rural districts tend to have more beginner staff and fewer mid-career staff especially compared to city-based and suburban districts. Nearly 28% of staff in the average rural district have 5 or fewer years of experience compared to 21.9% of districts based in towns, 19.6% of suburban districts and 23.4% of urban districts. With an average of 62%, suburban districts have the highest average percentage of mid-career staff (6 to 25 years of experience). This is compared to 53.2% among rural districts, 54.3% among town-based districts, and 56.3% of city-based districts.

Table 34. Percentage of staff at each experience level by district locale

Years →	< 1	1-5	6-10	11-15	16-20	21-25	26-30	31+
City	4.1%	19.3%	15.3%	14.7%	15.0%	11.2%	9.6%	10.7%
Suburb	2.9%	16.7%	14.5%	18.4	16.0%	13.1%	9.1%	9.3%
Town	3.7%	18.1%	13.6%	15.3%	14.2%	11.3%	11.8%	12.0%
Rural	4.7%	23.0%	15.0%	13.6%	14.1%	10.5%	8.9%	10.2%
Overall	4.4%	21.7%	14.8%	14.3%	14.3%	10.9%	9.3%	10.3%

After controlling for district size, rural location is not in and of itself significantly correlated to experience profile (even when comparing rural districts to all others). Rural districts, particularly small rural districts, are significantly more likely to have a staff profile with less experience.

While the differences are not dramatic, high poverty districts and small rural districts tend to employ less experienced and less educated staff compared to other districts. Next we examine how these differences in staff profiles impact EPS allocations.

Staff education and experience profiles and EPS Allocations

Using our sample of 175 public school districts and administrative units and the 2016-17 teacher salary matrix generated in Part I, we calculate the per-student teacher salary allocation by district size, poverty level and location in order to visualize the impact of differences in teacher education-experience profile. We produce these figures for poverty level as follows:

- Step 1: Obtain the % of teachers in each experience-education category for low, average, and high poverty districts
- Step 2: Calculate EPS total teachers = actual enrollments * EPS recommended teacher ratios
- Step 3: Calculate EPS total allocation = % of teachers in each experience-education category * EPS # of teachers* salary matrix index * base salary ($35,395)
- Step 4: Calculate the per student teacher salary allocation = total EPS allocation / total student enrollment

The above is then repeated for district size and locale. Table 35 summarizes the results of these analyses.

Table 35. Per student **teacher** salary allocations by district poverty level, size, and locale*

	Number of teachers (districts)	Per-pupil teacher salary allocation
District Poverty Level		
Low poverty	N=2,217 (n=31)	$3,387
Average poverty	N= 7,291 (n=119)	$3,239
High poverty	N=1,208 (n=25)	$3,180
District Size		
Small	N=625 (n=68)	$3,133
Medium	N= 2,058 (n=49)	$3,178
Large	N=8,033 (n=58)	$3,288
District Locale		
City	N= 1,172 (n=4)	$3,165
Suburb	N=1,718 (n=18)	$3,294
Town	N= 1,588 (n=18)	$3,287
Rural	N=6,238 (n=135)	$3,139
Overall	N=10,761 (n=175)	$3,195

**Sample excludes very small districts with less than 20 students.*

Because higher poverty districts employ teachers with lower levels of education and less experience, the salary matrix allocates poorer districts less funding relative to other districts. Based on the 2016-17 salary matrix, high poverty districts receive $59 per student less than average poverty districts and $207 per student less than low poverty districts.

This effect may be mitigated by the Economically Disadvantaged component of the school funding formula, which currently provides an additional weight of 0.20 for FRPL-eligible students in each district. For example, in a district with a typical per-pupil base allocation of $6,000, districts would be allocated an additional $1,200 for each economically disadvantaged student.[7] Since higher poverty districts have more than 68% of students eligible for FRPL, the additional student weight more than offsets the lower allocation due to their patterns of staff experience and education level.

Small districts have fewer staff with Master's degrees compared to medium sized and large districts. Small districts also tend to have more beginner staff (0 to 5 years) and fewer mid-career staff (6 to 25 years). Based on the 2016-17 salary matrix, small districts receive $157 per student less than large districts and $45 per student less than medium-sized districts.

Almost all of the small districts (those with fewer than 300 students) are rural. When we examine only rural districts and look at the per pupil teacher salary allocations, small rural districts are allocated $147 less per student overall than large rural districts.

Table 36. Per-pupil **teacher** salary allocations among rural districts, by size

District Size	Number of teachers (districts)	Per-pupil teacher salary allocation
Small (<300)	N= 594 (n=65)	$3,087
Medium	N= 1,591 (n=39)	$3,175
Large (>1,200)	N= 4,053 (n=31)	$3,234

**Sample excludes very small districts with less than 20 students.*

[7] In 2016-17 the statewide average per-pupil allocation was $6,584 for elementary students and $7,078 for 9-12th grade students. http://www.maine.gov/education/data/eps/epsmenu.htm

The differences in education and experience profiles of guidance staff across districts by poverty level are minor, compared to differences in teacher profiles. There is only a $5 per student difference in guidance staff salary allocation between low and high poverty districts.

Table 37. Per-pupil **guidance staff** salary allocations by district poverty level*		
District Poverty level	Number of guidance staff (districts)	Per student salary allocations
Low poverty	N=152 (n=31)	$178
Average poverty	N= 456 (n=119)	$169
High poverty	N= 71 (n=25)	$173

*Sample: Guidance counselors, directors of guidance, social workers FTE=1 from 175 public schools (excludes very small districts, with less than 20 students).

Conclusion: Staff in low poverty districts and larger, non-rural districts are more experienced and more likely to hold advanced degrees while teachers in high poverty districts and small rural districts are less experienced and less likely to hold advanced degrees (e.g., Master's degrees, Advanced Certificates, doctorates). Because salary matrices for teachers, social workers, counselors, and librarians/media specialists are generated using current education and experience profiles, the salary matrix provides more funding to lower poverty and larger, non-rural districts than to higher poverty and small, rural districts.

Discussion

This analysis for the salary matrix component reveals two categories of findings: those that inform updates to the EPS model indices, and those that illuminate the broader context of how the component translates into practice. The first category is relatively straightforward, and the second is more nuanced.

The results of the Part I calculations show that the salary matrix for 2017 are not markedly different from the existing formula. We recommend an update to the EPS matrix to the more current indices presented in these tables in the report:

- Teachers: Table 3 (p. 9)
- Educational Technicians: Table 12 (p. 20)
- Health Staff: Table 16 (p. 23)
- Administrative Assistants: Table 18 (p. 27)
- School Administrators: Table 22 (p. 31)

For guidance staff, we recommend additional analysis to evaluate whether a separate matrix with fewer categories would be technically feasible and result in a better fit to actual reported staff salaries.

The Part II analyses reveal stark contrasts in the staffing patterns among school districts of varying poverty levels, size, and rurality. Lower poverty, larger, and more urban districts have more experienced staff with more advanced degrees than higher poverty, small, and rural districts. These differences translate into different staff costs, since more experienced and more educated teachers command a higher salary. The salary matrix component fulfills its intended function of recognizing these differences and providing a funding level that is an appropriate estimate of a district's actual budgetary needs. However, the resulting allocation patterns highlight a distressing reality in Maine schools.

Existing research provides extensive evidence that a teacher's experience level impacts his or her students' learning (Clotfelter, Ladd, & Vigdor, 2007; Boyd et al., 2009; Buddin & Zamarro, 2009). The evidence around advanced degrees is more mixed; graduate study that is in a teacher's content area or focuses on pedagogical skills that are closely related to instructional needs have a positive impact on student learning, while Master's degrees that are not closely related to teachers' classroom instruction are less impactful

(Clotfelter, Ladd, & Vigdor, 2007). Thus the analysis in Part II provides empirical confirmation that Maine's staffing patterns are inequitable. Students in small, rural, and higher poverty schools should have the same access to highly-skilled teachers as those in the rest of the state if they are to achieve the expectations of the Maine Learning Results. We recommend further policy discussions around strategies to address the teacher quality gaps across Maine school districts. As districts are better able to attract and retain excellent teachers, the salary matrix component will ensure that they receive the appropriate funding level to reward the education and experience levels of their staff.

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Appendix A. How the Salary Matrix is Used in Calculating the Allocation for School Personnel Costs

The salary matrix is used to calculate the cost of the teachers for each district in the following way. First, a profile is created for each SAU detailing the education-experience mix (i.e., the percentage of teachers in each education-experience category) using the previous year's personnel file. An example SAU has 50 teachers, 5 with Bachelor's degrees and less than one year of experience, 20 with Bachelor's degrees and 6 to 10 years of experience, 20 with Bachelor's degrees and 26 to 30 years of experience, and 5 with Master's degrees plus 30 hours of additional certification and 11 to 15 years of experience. Using the 2016-17 matrix in the report (see Table 3): 10% of the total number of teachers are assigned an index of 1.0, 40% are assigned an index of 1.20, 40% are assigned 1.71, and 10% are assigned a 1.65.

Next the *EPS total number* of teachers is calculated based on actual student enrollments and the EPS recommended teacher-student ratios (student enrollment x EPS teacher-student ratio). For example, the EPS calculations may determine that based on the number of students the SAU needs 45 teachers to ensure all students are given the opportunity to achieve the Learning Results standards.

Finally, the *total EPS allocation for teachers* for each SAU is calculated by multiplying the percentage of actual teachers in each education-experience category by the EPS total number of teachers by the salary matrix index for each education-experience category by the base salary (which in 2016-17 was $35,384) and summing the results. For example, the total allocation for the SAU with the teacher profile described above would be: 10%*45*1.00*$35,384 (= $159,228) plus 40%*45*1.20*$35,384 (=$764,294) plus 40%*45*1.71*$35,384 (= $1,089,119) plus 10%*45*1.65*$35,384 (=$262,726) for a total of $2,275,367.

Appendix B: Actual average teacher salaries and matrix allocated salaries by education and experience

Table B1: Actual average teacher salaries and matrix allocated salaries by education-experience								
Edu→ Exp↓	BA only		BA + 15 hours or + 30 hours		MA or MA + 15 hours		MA + 30 hours or C.A.S. or Doctorate	
	Mean salary	Allocated salary	Mean salary	Allocated salary	Mean salary	Allocated salary	Mean salary	Allocated salary
0	$35,395	$35,395	$38,175	$37,873	$45,486	$41,058	$47,393	$45,306
1-5	$37,178	$37,165	$40,131	$39,642	$42,966	$42,828	$48,712	$47,075
6-10	$42,399	$42,474	$44,906	$44,952	$47,946	$47,783	$52,106	$52,385
11-15	$48,161	$48,137	$53,207	$50,615	$53,486	$53,800	$59,882	$58,048
16-20	$53,756	$53,800	$56,779	$56,278	$59,046	$59,110	$64,637	$63,711
21-25	$58,254	$58,402	$59,655	$60,879	$64,373	$63,711	$69,018	$68,312
26-30	$60,642	$60,525	$61,259	$63,357	$65,357	$66,189	$68,077	$70,790
31+	$61,459	$61,587	$62,825	$64,065	$66,723	$66,897	$70,086	$71,498

Appendix C: Actual Salary Details for Counselors and Librarians/media technicians

Table C1: Actual average and minimum and maximum salaries for guidance staff and librarians by education-experience category						
	Education category					
Experience Category	BA only	BA + 15 hours or + 30 hours	MA or MA + 15 hours	MA + 30 hours or advance cert	Doctorate	Overall
0	$36,902 (31,849-42,774)	$36,250 (NA)	$44,979 (25,181-66,973)	-	-	$43,072 (25,181-66,973)
1-5	$42,595 (34,420-56,137)	$45,042 (24,003-66,238)	$46,104 (30,466-71,400)	$52,869 (36,021-66,662)	$73,366 (NA)	$46,354 (24,003-73,366)
6-10	$45,350 (23,809-59,541)	$54,778 (NA)	$49,996 (37,993-83,205)	$56,676 (45,071-73,089)	-	$50,353 (23,809-83,205)
11-15	$49,100 (NA)	$62,283 (59,014-65,552)	$55,937 (29,175-77,820)	$66,095 (48,800-83,669)	$70,713 (NA)	$58,103 (29,175-83,669)
16-20	$55,564 (52,060-58,563)	$56,987 (41,775-74,967)	$60,032 (37,600-80,484)	$64,678 (46,794-82,514)	$67,418 (NA)	$60,592 (37,600-82,514)
21-25	-	$66,691 (NA)	$65,691 (42,484-82,073)	$65,703 (55,428-81,422)	$77,256 (69,400-92,817)	$66,055 (42,484-92,817)
26-30	$57,899 (NA)	$57,469 (NA)	$66,431 (45,100-80,530)	$69,679 (51,790-81,422)	-	$66,850 (45,100-81,422)
31 plus	$62,048 (NA)	-	$69,019 (58,050-87,829)	$72,487 (63,371-82,481)	$83,627 (NA)	$70,324 (58,050-87,829)
Overall	$45,719 (23,809-62,048)	$52,472 (24,003-74,967)	$55,270 (25,181-87,829)	$65,069 (36,021-83,669)	$75,270 (67,418-92,817)	$56,463 (23,809-92,817)

Appendix D. Simulated Matrix Using $40,000 Minimum Teacher Salary

Methodology: All teachers with FY2017 salaries less than $40,000 (between 30,000 and 39,999) were set to 40,000 and the salary matrix was recalculated. 19.5% (n=2,073) had a salary less than $40,000 in 2016-17. The final sample used for the salary matrix computation of the impact of the $40,000 minimum salary policy included the same teachers as were used to update the salary matrix in the full component review report. The top two education levels (Master's +30/Advanced Certificates and Doctorates) are also combined as in the full report due to the few (n=50) teachers with doctorates.

Analysis 1: Table D1 shows average salaries in each education and experience category if all those who earned below $40,000 in FY2017 were increased to $40,000.

Table D1: Average (minimum and maximum) salary for teachers by education and experience – after adjustment to $40,000 minimum

	Education category					
Experience Category	BA only	BA + 15 hours or + 30 hours	MA or MA + 15 hours	MA + 30 hours or C.A.S.	Doctorate	Overall
0 Years	$40,559 (40,000-68,239)	$41,512 (40,000-62,156)	$46,889 (40,000-93,521)	$49,904 (40,000-65,356)	$42,824 (40,000-43,648)	$41,874 (40,000-93,521)
1-5 Years	$40,795 (40,000-68,692)	$42,164 (40,000-71,083)	$43,838 (40,000-70,275)	$49,953 (40,000-76,129)	$43,933 (40,000-47,155)	$41,741 (40,000-76,129)
6-10 Years	$43,311 (40,000-71,722)	$45,358 (40,000-63,502)	$48,090 (40,000-72,871)	$52,133 (35,800-74,796)	$53,327 (40,550-81,298)	$45,712 (40,000-81,298)
11-15 Years	$48,324 (40,000-72,430)	$53,256 (40,000-79,398)	$53,506 (40,000-75,070)	$59,793 (40,267-79,165)	$60,826 (52,075-81,298)	$52,204 (40,000-81,298)
16-20 Years	$53,784 (40,000-76,473)	$56,790 (40,000-75,314)	$59,046 (40,267-79,783)	$64,720 (45,816-79,783)	$63,184 (54,599-76,403)	$57,597 (40,000-79,783)
21-25 Years	$58,270 (40,000-79,168)	$59,669 (40,000-84,986)	$64,396 (40,000-80,168)	$69,207 (41,415-82,096)	$64,780 (57,709-76,403)	$62,397 (40,000-84,986)
26-30 Years	$60,642 (42,506-79,168)	$61,259 (46,306-75,295)	$65,357 (42,598-82,675)	$68,049 (46,304-79,705)	$70,970 (NA)	$63,418 (46,304-79,705)
31+ Years	$61,459 (46,530-79,168)	$62,825 (41,162-79,168)	$66,723 (40,000-81,904)	$70,015 (44,340-84,408)	$73,170 (67,072-79,177)	$64,773 (40,000-84,408)
Overall	$48,123 (40,000-79,168)	$54,773 (40,000-84,986)	$56,439 (40,000-93,521)	$64,817 (40,000-84,408)	$58,480 (40,000-81,298)	$53,328 (40,000-93,521)

Analysis 2: What would the salary matrix look like using the salary scenario depicted in Table 1 with a base salary of $40,559?

Table D2. Simulated Salary Matrix with Minimum Salary Adjusted to $40,000				
Base Salary: ***$40,559***	BA only	BA +15 or +30	MA or MA +15	MA +30, CAS or Doc
0 years	1.00	1.06	1.12	1.24
1-5 years	1.01	1.06	1.13	1.25
6-10 years	1.07	1.12	1.19	1.31
11 - 15 years	1.19	1.25	1.31	1.43
16 - 20 years	1.33	1.38	1.45	1.57
21 - 25 years	1.44	1.49	1.56	1.68
26 - 30 years	1.50	1.55	1.62	1.74
31+ years	1.52	1.57	1.64	1.76

Analysis 3: What is the estimated increase in cost to raise all teachers to a minimum salary of $40,000?

Using the matrix scenario in Table D2 and applying the teacher counts from the sample used in the report analysis, the impact on the total FY2017 salary allocation would have been at least $8.2 M.

Table D3. Comparison of Allocations in Analysis Sample	
Simulated FY17 Salary Allocation, $40K Min	$565,542,329
FY17 Actual Teacher Allocation	$557,354,984
Difference	**$8,187,346**

However, this is a low estimate. The teacher salary allocations above include only the 10,605 individuals included in our analysis sample. Thus it is not a complete estimate for all teacher allocations in the EPS model.

In FY2017, there were 12,741 full-time teachers including all categories of teachers and all schools—20% more than in the sample described in Table D3. Of these, 20.1% had reported earnings less than $40,000. This is roughly comparable to the 19.5% in the analytic sample. Taking the overall proportion of all teachers to the analytic sample, we can generate another estimate of additional costs by adding 20% to reflect the additional teachers that would be affected by the salary increase. This yields an estimate of $9.8M. However, this estimate is a high estimate, because it includes an indeterminate number of special education and Title I teachers that are paid from federal funds and thus will not impact general funds.

A third method for estimating costs is to identify all full-time teachers earning less than $40,000 in the most recent year of salary data and calculate the additional amount of salary needed to raise each one to the new minimum. The sum of each salary gap in this scenario is $8.6 for classroom teachers, and $10.5M if special education, gifted and talented, ELL, and literacy specialist teachers are also included. This estimate involves error because

some of those teachers will have received cost-of-living increases in the intervening years; however, these savings may be counterbalanced by retiring veteran teachers (earning over $40,000) being replaced by beginning teachers (earning less than $40,000).

Taking the average of $8.2M, $9.8M, and $10.5M we estimate the increase in salary costs to be approximately $9.5M.

Caveat. This analysis is an estimate of the direct impact of increasing Maine teacher salaries below $40,000 up to $40,000 only. It does not include indirect effects that may be anticipated. For example, benefit costs may increase. Also, SAUs with salary scales that currently start below $40,000 will likely increase some salary scale levels above $40,000 rather than keeping salaries flat at $40,000 throughout the early employment years. Furthermore, even SAUs whose starting salaries are currently above $40,000 may decide to increase teacher salary scales to keep their teacher salaries competitively favorable. As a result, the actual impact of the proposed teacher minimum salary increase, as well as its total annual cost, is likely to be higher than the estimate provided here.

Conclusion:

If a minimum teacher salary of $40,000 had been in place in FY2017, the teacher salary allocation would have been in the range of $8.2M to $10.5M higher as a conservative estimate.

In order to more accurately estimate the impact of an increase in minimum teacher salary on FY2020 EPS allocations, the salary matrix in Table D2 would need to be applied using the actual staffing patterns (experience and educational levels) reported to MDOE in December 2018.

Appendix E: Policy Options for Increasing Minimum Teacher Salaries

The following analysis presents several potential approaches for implementing an increased minimum teacher salary of $40,000. There are two key factors to decide about implementing an increase in minimum teacher salary: 1) the mechanism for funding the increase in costs, and 2) the timeframe for phasing in the new minimum salary. We begin with some discussion of these two factors, and follow with descriptions of four examples of potential scenarios.

Factor 1: Funding Mechanism

Increasing minimum teacher salaries will require that school districts increase their expenditures. Districts that are already paying most of their teachers $40,000 or more would see little or no direct impact from this policy change, while districts whose entry-level salaries are closer to the existing state minimum of $30,000 would need to increase their spending on payroll substantially. The uneven impact of this policy change is perhaps the most important consideration in weighing funding options.

Conceptually, the first question is whether the increase in costs should be borne by local taxpayers, state funds, or a mixture of the two. Because Maine's funding model is predicated on the assumption that education costs are shared between the state and local taxpayers, this analysis presumes that the final policy solution will involve an increase in both state and local spending. The second question, then, is how to implement additional funding within existing policy mechanisms.

When Maine adopted a minimum teacher salary of $30,000 in 2007, the state directly provided all of the "gap" funding to cover pay increases for teachers who were below the minimum salary. This minimized the local impact in districts where the pay gap was substantial. This remains a potential funding method, with various imaginable options for how, when, and under what conditions the state would provide direct funding to raise salaries.

The other readily available method for providing the additional funding needed to increase teacher salaries to at least $40,000 is to change the Essential Programs and Services (EPS) funding formula to increase minimum funding levels. By adjusting the EPS model, the additional costs would be split between state subsidy and local taxpayer shares. The EPS model prioritizes equity in its intent and design, and thus MEPRI recommends that policymakers use the model as the eventual policy solution for funding teacher salaries. However, the use of the EPS formula may initially present challenges. Some districts use a staffing model that differs substantially from the prototypical EPS values by employing teachers with lower salaries than provided in the salary matrix and/or hiring more teachers than provided by the staff ratios. Costs in these districts would increase proportionally more than in other local units where actual expenditures are closer to the EPS model assumptions. Essentially, they would have further to go to get to $40,000 per teacher. If this scenario occurs in a district that has a low state share, the increase could be burdensome. The SAU would have to make budget cuts in other areas and/or raise property taxes to raise the necessary revenue for the increase in payroll.

To ease transitions, the reliance on EPS funding and/or the mix of state and local shares could be phased in over time. To accomplish this, the state would calculate three numbers: the total amount of money needed to increase salaries in a district based on the most recently reported salary data; the additional amount of funding that would be provided to each district in EPS using a revised salary matrix; and the additional amount of subsidy that would be provided

as part of the increase in the EPS allocation. Criteria could then be established to provide supplemental state funding if the amount needed for payroll disproportionately exceeds the amount of additional funding to be received.

The following is excerpted from the 2015 MEPRI report of the salary matrix review (p. 187):

> In 1985, the Maine Legislature implemented a minimum salary requirement (20-A MRSA §13406). In 2005, this was updated as a $27,000 minimum starting salary beginning in 2006 then increasing to $30,000 in 2007. The law also required the state to provide a subsidy to districts not meeting the minimum requirement, making up the difference between the locally negotiated salary and $30,000. In 2011, the state had provided approximately $300,000, ranging from $10 to $31,000 to 37 districts with salaries lower than the required minimum. In 2011, the Legislature (LD 1816) repealed the state's subsidy commitment starting in 2012. The current version (as 2014) of the law still requires districts to pay certified teachers the statutory minimum FTE salary of $30,000.

In retrospect, the direct subsidy method of paying for teacher raises did not provide any incentive for districts to increase the amount they were paying teachers out of the local budget. In fact, the method may have provided a disincentive, as any additional amount paid by the district would result in a smaller gap and thus a smaller direct payment from the state. It is noteworthy that when the state funding was eventually ended, districts were expected to immediately meet the $30,000 minimum in the following year within existing mechanisms of state subsidy. Because some districts had not made any significant progress in closing pay their gaps, this change in spending was likely substantial in some districts. In the most recent component review, staff data included 32 full-time teachers reported as earning less than $30,000, an indication that some units are still struggling to meet state minimums.

Factor 2: Salary Ramp-Up Period

Another option for easing the transition to a $40,000 minimum teacher salary would be to spread the increase over multiple years. This would delay the benefits to teachers who are earning below $40,000, but would result in more gradual impacts on state and local budgets. Scenarios provided below depict a range of 1 to 4 years for implementation of a minimum salary.

Example Policy Options

In the following section, we present several potential scenarios for implementing the new minimum salary using various funding mechanisms and transition periods. These depictions are not exhaustive and are intended only to illustrate different possibilities.

Option 1: Increase minimum salary to $40,000 immediately via increased funding in EPS salary matrix

Year	Minimum salary	Salary Matrix
1	$40,000	Final Matrix

Option 1 uses the Final Matrix ($40,000 Minimum, see Appendix D) immediately and provides additional funding through the EPS model salary matrix allocations. The Final Matrix was generated by first raising any actual teacher salaries that were below $40,000 (about 19% of teachers) to $40,000, and then recalculating the salary matrix. As described in Appendix D, the total amount needed statewide for this increase in salary is estimated at about $9.5 Million.

The primary potential benefit to this approach is that it uses the existing EPS approach to equitably fund teacher salaries. However, the increase in local funding needed to immediately pay all full-time teachers at least $40,000 may be prohibitively high in some districts.

Option 2: Phase in $40,000 minimum salary increases over up to four years and provide funding through EPS. The salary matrices that could be used to fund these scenarios through the EPS model are presented in Appendix F. The transitional years (Ramp 1 Matrix through Ramp 3 Matrix) are calculated from the current and Final Matrix. A phased approach would lessen the impact of change on local and state budgets by providing more time to come up with additional funds.

Option 2 Minimum $40,000 Teacher Salary, Phase-In Up to 4 Years

Year	Minimum salary	Salary Matrix
0 (current)	$30,000	Matrix 0
1	$32,500	Ramp matrix 1
2	$35,000	Ramp matrix 2
3	$37,500	Ramp matrix 3
4+	$40,000	Final Matrix

If fewer years are desired, any of the intermediate steps could be skipped or modified. For example, if a three-year ramp is preferred, we recommend skipping directly to $35,000 in Year 1. There are comparatively few teachers earning below $32,500. As seen in the updated salary matrix, in 2016-17 the average Maine beginning teacher with a bachelor's degree and no experience earned 35,400. Thus increasing immediately to $35,000 would be a gradual change in most units and would also reach a greater portion of the teachers at the lower end of the salary spectrum.

Option 3: Increase minimum teacher salary to $40,000 immediately and provide funding through the EPS funding formula along with a 4-year declining state direct pay mechanism to reduce the burden on local units. The direct pay ramps down as EPS funding ramps up. By using "ramping up" matrices (Ramp 1 Matrix – Final Matrix, see below) the allocation (state and local share) increases over the 4 year period. To ease the burden on local units, the state direct pays to help them close salary gaps but the direct pay amount decreases over time. The direct pay amount is calculated as $40,000 minus what they are actually paying each teacher with a declining maximum direct pay. For example, in year 1, assuming the lowest paid teachers are earning $30,000, the state will cover the full gap with a $10,000 direct payment per teacher; in year 2, the direct pay maximum is reduced to $7,500 and so on until year 5 when the direct pay ceases.

Option 3. Minimum Teacher Salary of $40,000 in FY2020 with Transitional State Supplementary Funds Through FY2023

Year	Minimum salary	Salary Matrix	Maximum Direct Pay for Salary Gaps ($40,000 – Actual)
0 (Current)	$30,000	Matrix 0	$0
Year 1	$40,000	Ramp Matrix 1	$10,000
Year 2	$40,000	Ramp Matrix 2	$7,500
Year 3	$40,000	Ramp Matrix 3	$5,000
Year 4	$40,000	Final Matrix ($40k min)	$2,500
Year 5+	$40,000	Final Matrix ($40k min)	Direct Pay Ceases

Option 4: Phase in minimum salary increases and provide funding through EPS with additional assistance to local units during the phase-in via a more limited state direct pay mechanism. By using ramping up matrices (Ramp 1 Matrix – Final Matrix) the allocation (state and local share) increases over the 4-year period. To ease the burden on local units this option provides up to $2,500 per each teacher earning below the (rising) minimum. This option requires less assistance to local units due to the more gradual transition, thereby reducing the amount of funds the state needs to pay relative to Option 3.

Option 4. Minimum Teacher Salary Increasing to $40,000 in FY2023, with State Funds

Year	Minimum salary	Salary Matrix	Maximum Direct Pay for Salary Gaps Between Minimum and Actual Salary
0 (current)	$30,000	Matrix 0	$0
Year 1	$32,500	Ramp Matrix 1	$2,500
Year 2	$35,000	Ramp Matrix 2	$2,500
Year 3	$37,500	Ramp Matrix 3	$2,500
Year 4	$40,000	Final Matrix ($40k min)	$2,500
Year 5+	$40,000	Final Matrix ($40k min)	Direct Pay Ceases

Appendix F: Revised Salary Matrices and Resulting Allocations

Matrix 0 (2016-17 Updated Data): Minimum Salary $30,000 (Base salary: $35,395)

	Matrix Values				Salary Allocations			
	BA	BA+	MA15	MA30/ Doc	BA	BA+	MA15	MA30/ Doc
0 years	1.00	1.07	1.16	1.28	35,395	37,873	41,058	45,306
1-5 years	1.05	1.12	1.21	1.33	37,165	39,642	42,828	47,075
6-10 years	1.20	1.27	1.35	1.48	42,474	44,952	47,783	52,385
11-15 years	1.36	1.43	1.52	1.64	48,137	50,615	53,800	58,048
16-20	1.52	1.59	1.67	1.80	53,800	56,278	59,110	63,711
21-25	1.65	1.72	1.80	1.93	58,402	60,879	63,711	68,312
26-30	1.71	1.79	1.87	2.00	60,525	63,357	66,189	70,790
31+	1.74	1.81	1.89	2.02	61,587	64,065	66,897	71,498

Final Matrix: Minimum Salary $40,000 (Base salary: $ 40,559)

	Matrix Values				Salary Allocations			
	BA	BA+	MA15	MA30/ Doc	BA	BA+	MA15	MA30/ Doc
0 years	1.00	1.06	1.12	1.24	40,559	42,993	45,426	50,293
1-5 years	1.01	1.06	1.13	1.25	40,965	42,993	45,832	50,699
6-10 years	1.07	1.12	1.19	1.31	43,398	45,426	48,265	53,132
11-15 years	1.19	1.25	1.31	1.43	48,265	50,699	53,132	57,999
16-20	1.33	1.38	1.45	1.57	53,943	55,971	58,811	63,678
21-25	1.44	1.49	1.56	1.68	58,405	60,433	63,272	68,139
26-30	1.50	1.55	1.62	1.74	60,839	62,866	65,706	70,573
31+	1.52	1.57	1.64	1.76	61,650	63,678	66,517	71,384

Matrices 1 through 3:

The following matrices were interpolated between the initial Matrix 0 (minimum salary = $30,000) and Final Matrix (minimum salary = $40,000). The base salary increases and the range of indices narrows, which brings bottom salaries up while at same time limiting increases on the higher education and experience categories.

Salary Ramp Matrix 1: Base salary $36,686

	Matrix Values				Salary Allocations			
	BA	BA+	MA15	MA30/ Doc	BA	BA+	MA15	MA30/ Doc
0 years	1.00	1.07	1.15	1.27	36,686	39,254	42,189	46,591
1-5 years	1.04	1.11	1.19	1.31	38,153	40,721	43,656	48,059
6-10 years	1.17	1.23	1.31	1.44	42,923	45,124	48,059	52,828
11-15 years	1.32	1.39	1.47	1.59	48,426	50,994	53,928	58,331
16-20	1.47	1.54	1.62	1.74	53,928	56,496	59,431	63,834
21-25	1.60	1.66	1.74	1.87	58,698	60,899	63,834	68,603
26-30	1.66	1.73	1.81	1.94	60,899	63,467	66,402	71,171
31+	1.69	1.75	1.83	1.96	61,999	64,201	67,135	71,905

Salary Ramp Matrix 2: Base salary $37,977

	Matrix Values				Salary Allocations			
	BA	BA+	MA15	MA30/ Doc	BA	BA+	MA15	MA30/ Doc
0 years	1.00	1.07	1.14	1.26	37,977	40,635	43,294	47,851
1-5 years	1.03	1.09	1.17	1.29	39,116	41,395	44,433	48,990
6-10 years	1.14	1.20	1.27	1.40	43,294	45,572	48,231	53,168
11-15 years	1.28	1.34	1.42	1.54	48,611	50,889	53,927	58,485
16-20	1.43	1.49	1.56	1.69	54,307	56,586	59,244	64,181
21-25	1.55	1.61	1.68	1.81	58,864	61,143	63,801	68,738
26-30	1.61	1.67	1.75	1.87	61,143	63,422	66,460	71,017
31+	1.63	1.69	1.77	1.89	61,903	64,181	67,219	71,777

Salary Ramp Matrix 3: Base salary $39,268

	Matrix Values				Salary Allocations			
	BA	BA+	MA15	MA30/ Doc	BA	BA+	MA15	MA30/ Doc
0 years	1.00	1.06	1.13	1.25	39,268	41,624	44,373	49,085
1-5 years	1.02	1.08	1.15	1.27	40,053	42,409	45,158	49,870
6-10 years	1.10	1.16	1.23	1.35	43,195	45,551	48,300	53,012
11-15 years	1.23	1.30	1.36	1.48	48,300	51,048	53,404	58,117
16-20	1.38	1.43	1.51	1.63	54,190	56,153	59,295	64,007
21-25	1.49	1.55	1.62	1.74	58,509	60,865	63,614	68,326
26-30	1.55	1.61	1.68	1.81	60,865	63,221	65,970	71,075
31+	1.58	1.63	1.70	1.83	62,043	64,007	66,756	71,860