

Supporting Early Childhood Educators with Obtaining a Professional Credential:

Increasing the Completion Rate for the Early Childhood Ancillary
Certificate

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Honor Statement

On my honor as a student, I have neither given nor received aid on this assignment.



Arielle Boguslav

Disclaimer

The author conducted this study as part of the program of professional education at the Frank Batten School of Leadership and Public Policy, University of Virginia. This paper is submitted in partial fulfillment of the course requirements for the Master of Public Policy degree. The judgments and conclusions are solely those of the author, and are not necessarily endorsed by the Batten School, by the University of Virginia, by the Louisiana Department of Education, or by any other agency.

Table of Contents

Acknowledgements	ii
Honor Statement	ii
Disclaimer	ii
List of Tables	v
List of Figures	vi
List of Acronyms	1
Executive Summary	1
Background	2
<i>Problem Statement</i>	<i>2</i>
<i>Early Childhood Education in Louisiana</i>	<i>2</i>
<i>Transforming Early Childhood Education in Louisiana</i>	<i>3</i>
<i>Early Childhood Workforce</i>	<i>3</i>
<i>Early Childhood Ancillary Certificate</i>	<i>4</i>
Understanding the Causes of Non-Completion	7
<i>ECAC Challenges & Supports</i>	<i>7</i>
Personal Context	7
Work Context	8
ECAC Program Context	9
State Policy Context	9
Attitudes and Beliefs	9
<i>Identifying Opportunities for Intervention</i>	<i>10</i>
Identifying Policy Alternatives	13
<i>Altering the Financial Incentives</i>	<i>13</i>
<i>Altering the Incentive Structure</i>	<i>14</i>
<i>Incentivizing Other Stakeholders</i>	<i>16</i>
Incentivizing Center Directors	16
Incentivizing ECAC Programs	17
<i>Designing Supplementary Nudges</i>	<i>19</i>
<i>Policy Alternatives</i>	<i>20</i>
Methodology	21
<i>Approach</i>	<i>21</i>

<i>Criteria</i>	22
Effectiveness.....	22
Cost	22
Well-being	23
Feasibility.....	24
Analysis of Alternatives	25
<i>Status Quo</i>	25
<i>Director Accountability</i>	25
<i>Conditional Scholarship Payments</i>	26
<i>Suite of Nudges</i>	28
Findings	30
<i>Recommendation</i>	30
<i>Implementation</i>	32
Stage 1: Director Accountability at Scale.....	32
Stage 2: Evaluation and Nudge Design.....	34
Stage 3: Nudging at Scale	34
Stage 4: Ongoing Monitoring & Adjustment	34
References	I
Appendix A: Data Sources	XV
Appendix B: Data Analysis	XVI
<i>Scholarship Records & ECAC Candidate Information Reports</i>	XVI
<i>2019 SEE-LA Teacher Survey</i>	XVII
<i>2019 SEE-LA Director Survey</i>	XIX
Appendix C: Effectiveness Analysis	XXI
Appendix D: Cost Calculations	XXV
Appendix E: Well-being Projections	XXVIII
Appendix F: Licensure Types in Louisiana	XXX
Appendix G: ECAC Policy Rationale	XXXI

List of Tables

Table 1: Wages and education of early childcare workers in Type III centers	4
Table 2: Outcomes matrix evaluating each alternative against established criteria.	31
Table 3: Conditions required for effective implementation of director accountability..	32

List of Figures

Figure 1: Process for obtaining an ECAC for teachers without a CDA, an AA in early childhood, or a BA.....	6
Figure 2: Theory of change illustrating the causes of completion and highlighting the causes of non-completion.	11

List of Acronyms

AA: associate's degree

ACF: Administration for Children & Families

BA: bachelor's degree

BESE: Louisiana Board of Elementary and Secondary Education

CDA: Child Development Associates, a nationally recognized professional certificate for early childhood teachers

ECAC: Early Childhood Ancillary Certificate

ECE: early childhood education

LDOE: Louisiana Department of Education

QRIS: quality rating and improvement system

SRTC: School Readiness Tax Credits

UVA: University of Virginia

Executive Summary

As part of larger efforts to improve the quality of early childhood education, the Louisiana Department of Education (LDOE) established a new policy in 2014 to change the credential requirements for certain early childhood teachers. The policy requires that all lead teachers in publicly funded early childhood learning centers obtain an Early Childhood Ancillary Certificate (ECAC) and is designed to help retain, support, and educate early childhood teachers in Louisiana. Once a teacher obtains an ECAC, they are entitled to up to \$3300 in annual tax credits.

For many teachers this process requires completing coursework through an ECAC program and then applying for the CDA and ECAC. While enrollment in ECAC programs has been high (1100+ teachers), completion rates are low (~30%), resulting in substantial spending on scholarships (\$5 million to date) with limited results (LDOE, 2019b). **In order to assess and realize improvements in teacher practice as a result of the ECAC policy, LDOE needs strategies for encouraging and supporting ECAC completion for those teachers who must obtain the ECAC through participation in an ECAC program.**

The first part of this report leverages administrative data and empirical literature to better understand the potential causes of non-completion. This analysis suggests multiple causes that require flexible policy alternatives that can address these multiple causes at the same time. I identify four policy alternatives:

1. Maintain the current tax credit incentives
2. Hold directors accountable for ensuring that their teachers obtain the ECAC
3. Provide financial incentives for ECAC programs to support teachers with completion
4. Support teachers directly through information, planning, and motivational nudges delivered by text-message

The second part of the report estimates projected outcomes under each of these policy alternatives using the criteria of effectiveness, cost, teacher and student well-being, and political and logistical feasibility. As a result of this evaluation, I recommend that LDOE implement director accountability. Once the initial impacts of this policy have been evaluated, I further recommend that LDOE design and implement nudges to continue to increase completion rates and counterbalance any negative impacts of director accountability.

Background

Problem Statement

As part of larger efforts to improve the quality of early childhood education, LDOE established a new policy in 2014 to change the credential requirements for certain early childhood teachers. The policy requires that all lead teachers¹ in publicly funded early childhood learning centers hold an ECAC by July 1, 2019 or within two years of their date of hire². Once a teacher obtains an ECAC, they are entitled to annual tax credits. The policy's primary goal is to professionalize the ECE workforce by retaining, supporting, and educating early childhood teachers.

Under the ECAC policy, teachers with more advanced education³ can obtain the ECAC simply by verifying their existing credentials. Teachers with less education, however, are required to complete a more complex process. For the latter group of teachers⁴ the credential is intended to provide professional development in order to improve teaching practice and ultimately student learning (Bassok, 2019). For these teachers, the ECAC process consists of completing coursework through an approved ECAC program, obtaining a CDA, and then applying for the ECAC. LDOE provides scholarships so that the entire ECAC process is free for teachers. While program enrollment has been high (1100+ teachers), completion rates are low (~30%), resulting in substantial spending on scholarships (\$5 million to date) with limited results (Louisiana Department of Education, 2019b). **In order to assess and realize improvements in teacher practice as a result of the ECAC policy, LDOE needs strategies for encouraging and supporting ECAC completion for those teachers who must obtain the ECAC through participation in an ECAC program.**

Early Childhood Education in Louisiana

LDOE oversees a vast array of organizations and programs that offer early childhood care and education to children under five years old. According to state regulations, any

¹ Lead teachers are defined as any teacher working 20 hours a week or more as the primary teacher in an early childhood classroom (Louisiana Department of Education, 2019a).

² Lead teachers hired into this role before July 1, 2018 were required to obtain the ECAC by July 1, 2020. All lead teachers hired into this role after July 1, 2018 have 24 months from their date of hire to complete the ECAC.

³ Teachers with a Child Development Associate (CDA), AA in early childhood, or BA or above in any field.

⁴ The exact number is unknown, but using the administrative data available to me, I estimate that approximately 30-45% of the teachers who are subject to the ECAC policy fall into this category. However, among teachers working in childcare centers, where education quality is lower on average, more than 50% of teachers subject to the ECAC policy fall into this category (Doromal, 2018).

person or program that provides regular care for seven or more children when a parent or guardian is not present must be licensed by the state. These licenses are known as Early Learning Center licenses. Louisiana offers three different licensure categories, depending on the extent of public funding provided to the center (see Appendix F).

The ECAC policy affects Type III centers only. Type III centers are the most common and include pre-K programs that operate within K-12 schools (44% of Type III centers), Head Start centers (13%), and early childhood centers (43%) (Doromal, 2018).

Transforming Early Childhood Education in Louisiana

As in many states, the quality of care provided by different programs and center types, has historically been highly variable in Louisiana. After taking on the role of Louisiana State Superintendent of Education in January, 2012, John White launched a comprehensive plan, called Louisiana Believes, for ensuring high quality education for every child in the state of Louisiana. Access to high-quality childhood education programs is one key pillar of this plan. This strategic priority drove a number of early childhood initiatives in Louisiana, all of which were aimed at unifying, expanding, and improving the quality of the variety of early childhood program options across Louisiana. The focus on expanding access to high quality education means that these initiatives have largely affected Type III centers, which are funded in order to serve low-income and disadvantaged families (Louisiana Department of Education, n.d., 2018b). The ECAC policy's focus on Type III centers is consistent with this targeted approach.

Early Childhood Workforce

In 2018, more than 12,000 people worked as care-givers, teachers, directors, or other staff across all types of early learning centers in Louisiana (Center for the Study of Child Care Employment, 2018). The wages and backgrounds of these workers vary substantially by role and licensure type. Even within Type III centers, there is substantial variation in the wages and backgrounds of early childcare workers. While BAs are required for all pre-K teachers in school-based programs and for 50% of Head Start teachers, there were no educational or credential requirements for staff in other early learning centers until the ECAC policy was passed (LDOE, 2018). This variation in credential requirements is reflected in the education levels and wages of teachers in these different program categories (see **Table 1**)

Table 1: Wages and education of early childcare workers in Type III centers

Program Category	Annual Salary ⁵	Percentage of Teachers without a Qualifying Degree ⁶
School-based pre-K	\$36,179 plus full benefits	0%
Head Start	\$28,700 plus some benefits	4-35%
Early Childhood Center	\$19,330 plus no benefits	55-63%

Given the large proportion of teachers working in early childhood centers and the relatively small proportion of Head Start centers within Type III, teachers in early childhood centers are the primary participants in ECAC programs. In addition to serving low-income students, many of these teachers face difficult financial constraints themselves. Unfortunately, little other information is available about the demographics of these teachers

Early Childhood Ancillary Certificate

For teachers who do not already hold a BA, AA in early childhood education, or a CDA, obtaining the ECAC is a time-consuming and complex process that can take anywhere from 8-19 months to complete. While the main tasks are 1) completing an ECAC program through one of the 22 program providers approved by the BESE, 2) obtaining a CDA, and 3) applying for the ECAC credential, each of these tasks incorporates numerous sub-tasks. The main steps of the process are detailed in **Figure 1**. While these steps are consistent across all ECAC programs, the day-to-day requirements, timeline, and supports provided for completing the initial ECAC training program vary substantially by provider (Bassok, 2019).

To help facilitate and incentivize completion, LDOE offers scholarships to cover the entire cost of attending an ECAC program and obtaining a CDA. There is also no cost for obtaining the ECAC. The ECAC credential process is therefore entirely free for teachers, except for certain coursework supplies and transportation, for which teachers

⁵ These salary figures reflect 2018 estimates from LDOE. How these estimates were calculated is unclear (Louisiana Department of Education, 2018a).

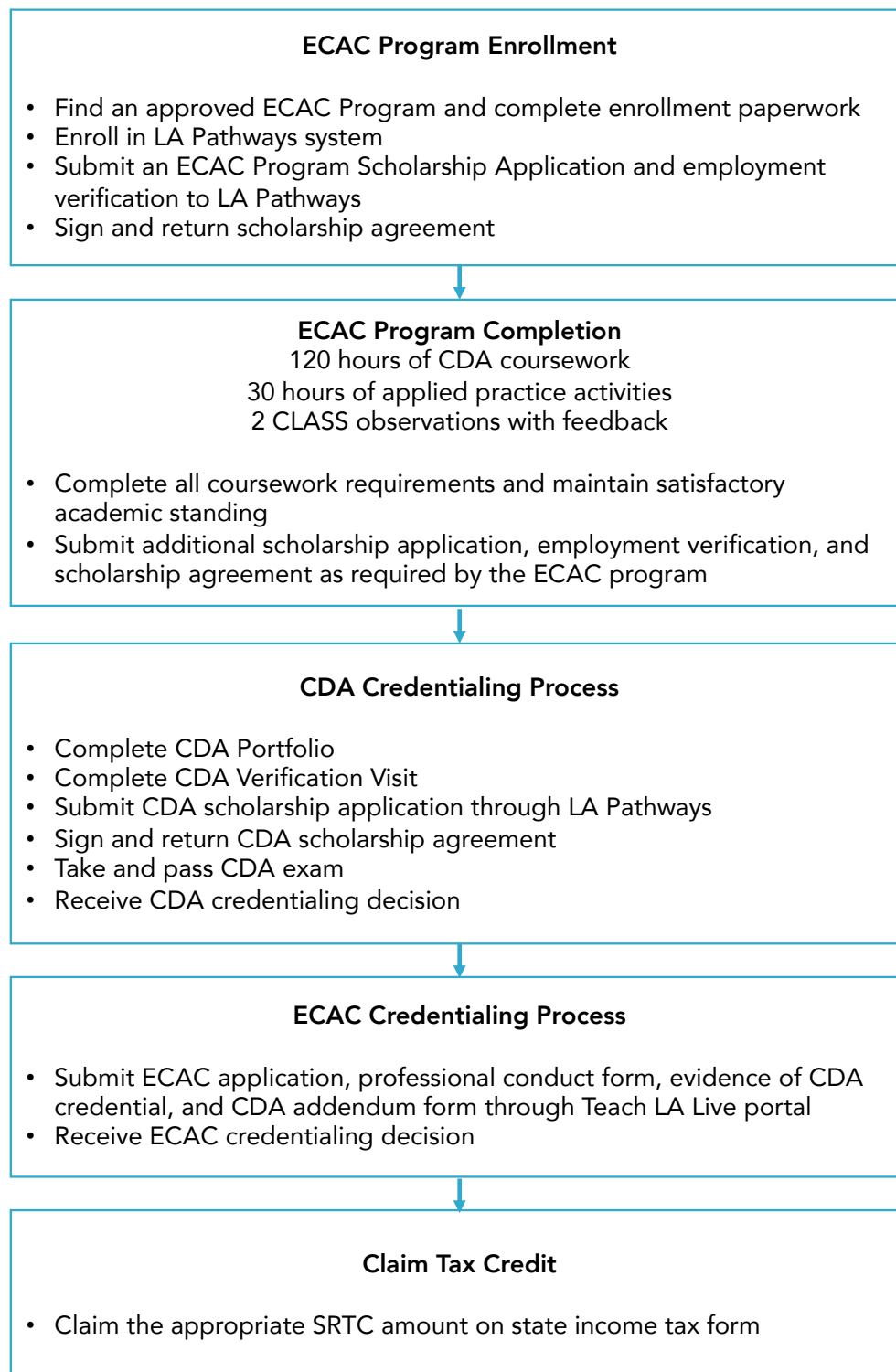
⁶ These figures estimate the percentage of teachers whose qualifications would require them to obtain an ECAC through participation in an ECAC program. The lower end of the range reflects the percentage of teachers with nothing more than a high school diploma. The higher end of the range reflects the percentage of teachers with nothing more than a high school diploma or an AA. Unfortunately, these data do not allow me to distinguish teachers with an AA in early childhood education, who are not required to obtain an ECAC through an ECAC program.

are generally responsible (Bassok, 2019; Burstein et al., 2018). However, access to scholarships for the ECAC program and CDA is dependent upon continued employment in a Type III center.

Finally, as an additional incentive for completion, as well as to incentivize teacher retention and supplement teachers' low wages, teachers holding an ECAC can earn substantial refundable annual tax credits through the SRTC program if they have also been employed in a Type III center for at least six months for an average of 30 hours per week. As of 2019, in the first tax cycle after earning an ECAC, teachers were eligible to receive \$2341. For teachers with an ECAC and one additional year of employment in a Type III center, the tax credit was \$2926. Finally, for teachers with an ECAC and at least two years of employment, the tax credit was \$3511. Historically, the tax credit amounts have increased each year (Northwestern State University of Louisiana, 2019). Obtaining an ECAC, therefore, provides teachers with access to ongoing annual tax credits for as long as they continue to be employed in a Type III center.

More information about the rationale for this policy is provided in Appendix G.

Figure 1: Process for obtaining an ECAC for teachers without a CDA, an AA in early childhood, or a BA.



Understanding the Causes of Non-Completion

Identifying effective policy solutions requires understanding the reasons why teachers fail to obtain the ECAC. I leverage anecdotal evidence from LDOE, empirical and theoretical literature, scholarship records from LDOE, ECAC candidate information reports, data from the SEE-LA teacher survey, and data from the SEE-LA director survey (see Appendices A and B) to develop a deeper understanding of potential causes for non-completion.

ECAC Challenges & Supports

Personal Context

Anecdotal evidence from LDOE and ECAC program directors suggests that teachers struggle to find time to complete ECAC coursework and CDA requirements, often because family responsibilities demand their time and energy and financial stresses make focusing on credential assignments difficult. This is corroborated by evidence from Cannon et al. (2019), who note that the time required to obtain an ECAC was frequently cited by the directors as a challenge for teachers. Additionally, in the 2019 SEE-LA survey, most teachers agreed that the ECAC was challenging for full-time teachers and family responsibilities, time, and being too tired to attend class were the most frequently cited reasons. These challenges may explain why in administrative data, ECAC programs reported that some teachers failed to complete coursework for personal reasons.

Data from Cannon et al. (2019) also suggest that cost may be a challenge for teachers in completing the ECAC. Cost is one of the more frequently cited challenges in the SEE-LA teacher data as well. This is interesting given the fact that LDOE covers the cost of tuition and credentialing for teachers, suggesting either that other costs, such as materials and transportation, are the issue and/or that some teachers don't realize that these scholarships are available.

Anecdotal evidence also suggests that teachers may procrastinate, struggle to meet assignment deadlines, and struggle with the academic requirements of coursework. This is corroborated to some extent by administrative data, in which some ECAC programs noted that teachers did not complete ECAC coursework because it was too difficult or the teacher failed.

Finally, anecdotal evidence and from Cannon et al. (2019) suggest that teachers may struggle with transportation to and from classes.

Work Context

Anecdotal evidence from LDOE and their discussions with ECAC program directors suggests that teachers' work context, especially the presence or absence of support from directors, may impact whether teachers successfully obtain an ECAC. There is some indication, for example, that teachers are more motivated and more likely to obtain an ECAC when directors pay them for their time spent in class, as is required for other professional development activities, and/or provide a raise once teachers obtain the credential. Cannon et al. (2019) similarly note that many directors reported that their teachers expected to earn higher wages after obtaining the ECAC, but that directors were unable to provide these wage increases without additional funding.

Anecdotal evidence suggests that in some cases, conflict between directors and teachers arises as teachers attempt to implement best practices learned during ECAC coursework. Directors may prohibit teachers from implementing certain practices or become frustrated with teachers' attempts to change center practices. These conflicts are likely frustrating for teachers and might make time spent completing ECAC requirements feel less motivating and valuable if they are unable to implement what they've learned. Additionally, teachers sometimes leave their jobs or are fired by directors because of these conflicts or because teachers are dissatisfied with their work in the center for other reasons. Without employment in an eligible Type III center these teachers are no longer eligible for scholarships and therefore must exit the ECAC program. In fact, in administrative data from ECAC programs, a number of teachers are noted as having left the ECAC program because they left or were terminated from their job.

Anecdotal evidence also suggests that directors may also disrupt teachers' attempts to complete steps in the ECAC process. Directors in some cases fail to complete and submit employment verification paperwork, preventing teachers from obtaining subsequent scholarships. In other cases, directors do not allow ECAC program coaches to observe teachers, preventing these teachers from completing a core component of the ECAC program coursework.

These reports of directors' negative effects on ECAC completion must be contrasted with evidence from survey data suggesting that directors have largely positive views of the ECAC policy. While some directors in the SEE-LA director survey noted that the ECAC requirement is challenging for leaders, it was not a majority. Moreover, a

majority of directors agreed that the ECAC helps improve their center's QRIS rating and provides teachers with valuable teaching strategies. Similarly, Cannon et al. (2019) report that the majority of directors surveyed supported the ECAC policy, thought it would improve the quality of teaching in Louisiana, and were optimistic that their teachers would meet the requirements by the deadline.

ECAC Program Context

In conversations with ECAC program directors LDOE has noticed substantial variety in the supports these programs provide to teachers in order to aid completion. Some program directors reported giving teachers prizes and gift cards as rewards for completing assignments. Others pay for transportation costs to enable teachers to get to class. Some use text-messaging to remind teachers about upcoming deadlines and assignments. Some programs also incorporate the steps of the CDA credential into their coursework so that teachers can be supported with that process as well. Others use strategies to keep teachers motivated and encouraged throughout the process, such as reminding them of the large tax credits they will earn once it is complete. Finally, some programs provide mentoring and other personalized support services in order to be responsive to teachers' varying needs and challenges.

State Policy Context

The SEE-LA survey data provide some indication that the SRTC may already be successfully motivating some teachers to complete the ECAC. Of the directors surveyed, most agreed that the SRTC made completing the ECAC worthwhile for teachers. Additionally, teachers who were aware of the SRTC were significantly more likely to have already obtained an ECAC instead of being in the process of obtaining it. This relationship is correlational rather than causal, but provides suggestive evidence that non-completion may at least in part be due to a lack of information about the SRTC.

Attitudes and Beliefs

Anecdotal evidence from ECAC program directors suggests that teachers' attitudes and beliefs may influence completion as well. They report that many teachers lack confidence in themselves and their ability to successfully complete all of the work required to obtain the ECAC, which may get in the way of completing assignments and tasks. They also note that many teachers have an incorrect understanding of the credential process. Finally, they report that some teachers find the ECAC process to be too much work relative to the wages they earn and therefore leave their job as an early childcare teacher in order to take other jobs that pay similar wages for less effort. Similarly, Cannon et al. (2019) note that many center directors reported that some of

the teachers they employed, especially more experienced teachers, were not “willing” to go through the ECAC process (p15).

On the other hand, teachers’ responses on the SEE-LA survey and in Cannon et al.’s (2019) study suggest that a majority of teachers have positive beliefs about the ECAC. A majority of teachers on the SEE-LA survey noted that they believed that the ECAC improves teachers’ interactions with students, provides individualized feedback, and helps teachers feel like professionals. Similarly, Cannon et al. report that most teachers were supportive of the ECAC policy and thought it would improve the quality of teaching in Louisiana.

Identifying Opportunities for Intervention

Unfortunately, the data described above do not highlight a small number of root causes for non-completion. Instead there seem to be a variety of challenges that teachers experience. Additionally, there are a variety of existing supports that may already be successfully assisting some teachers with obtaining the ECAC. Teachers, directors, and ECAC programs all seem to be an important part of the story and therefore may be appropriate targets for intervention. I am also unable to identify specific steps in the ECAC process that are responsible for non-completion, which means that any policy intervention intended to influence completion should attempt to support teachers throughout the ECAC process rather than targeting a particular step.

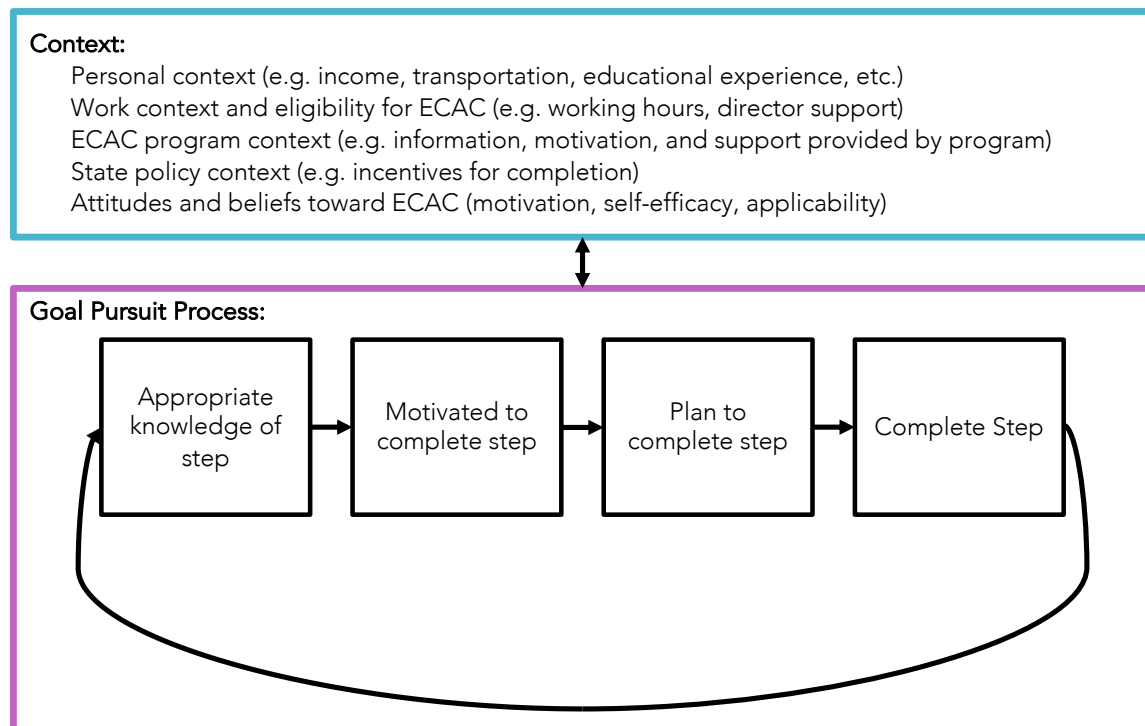
Given the complexity of the ECAC process and the factors that may influence whether a teacher successfully completes it, I synthesize these factors and their relationships in a theory of change (see **Figure 2**). The green box at the top describes the many ways that a teacher’s particular context may influence their likelihood of completing the ECAC process, synthesizing the evidence discussed in the previous section.

The pink box on the bottom leverages the literature on goal attainment to describe the general conditions required for a teacher to complete each step of the ECAC process, and ultimately the process as a whole:

- a teacher must know that a particular step is required and have some idea of how to complete it (Hoxby & Turner, 2015; Lavecchia et al., 2016; Weixler et al., 2019; York et al., 2019).
- once aware of the step, a teacher must be sufficiently motivated to attempt to complete it (Harackiewicz et al., 2012; R. M. Ryan & Deci, 2000).
- this motivation must be maintained and translated into goals and specific plans for completion, which ultimately result in execution and fulfillment of those plans

(Gollwitzer & Brandstätter, 1997; Höchli et al., 2018; Lavecchia et al., 2016; Rogers et al., 2013; Yeomans & Reich, 2017).

Figure 2: Theory of change illustrating the causes of completion and highlighting the causes of non-completion.



The arrows between these ingredients indicate causal linkages. For simplicity, I present a causal chain in a logical sequence, but these causal linkages are likely more complex. For example, a teacher’s motivation to complete a step may change as they engage in planning and executing their plan (Fishbach & Finkelstein, 2012; Sansone & Smith, 2000). This process then repeats for subsequent steps and the teacher’s experience of prior steps, such as how difficult they were, similarly influences whether and how the process unfolds for the next step (Fishbach & Finkelstein, 2012; Höchli et al., 2018; Wilkowski & Ferguson, 2016).

Finally, the two-way arrow between the two sections recognizes that features of the context influence the process of goal pursuit and the goal pursuit process may also influence features of the context. For example, the ECAC program context may influence teachers’ awareness of, motivation for, and plans to complete a particular step (Fishbach et al., 2010). Similarly, a teacher’s personal circumstances may influence

the cognitive bandwidth they have to plan and act on their completion intentions (Spiegel et al., 2020). Alternatively, a teacher's specific plan for how to complete a step may help them overcome contextual challenges such as transportation, long working hours, etc.

This theory of change therefore serves as a roadmap to potential policy levers for increasing completion rates. Interventions must ensure that teachers can successfully carry out the goal pursuit process, either by directly supporting teachers with that process or changing features of the context in order to indirectly make the goal pursuit process easier.

Identifying Policy Alternatives

While the professional development literature recognizes the challenge of getting teachers to participate in and complete credential and professional development activities, there is little understanding of the contributing barriers or empirical evidence for how to address them (Arthur et al., 2006; Koedel et al., 2015; Shakman et al., 2016; Stecher et al., 2018). I therefore draw on empirical research from a variety of other fields. As Louisiana aims to influence ECAC completion across the entire state and completion requires a series of steps that can take up to 19 months, I focus especially on interventions that aim to support completion of complex processes at scale within the domain of education.

Altering the Financial Incentives

According to economic theory, financial incentives change behavior by increasing motivation and effort expended to obtain relevant information, plan, and carry out the necessary actions (Fryer, 2013). Under the current policy, the SRTC serves as a financial incentive for ECAC completion. Given the low wage childcare workers receive, the incentive is quite substantial. In fact, the tax credit earned in the first year after ECAC completion would be equivalent to more than a 12% increase in earnings,⁷ not to mention the larger credit amounts in subsequent years.

While there is literature on the use of incentives to influence teacher behaviors, this literature generally focuses on incentivizing behaviors that are not necessarily analogous to the completion of a credential process. The few empirical studies investigating the impacts of incentives on credential completion suggest that incentives can have a positive effect in this arena, though these positive effects are not guaranteed. Three studies of Washington's Challenging Schools Bonus (Cowan & Goldhaber, 2019; Elfers & Plecki, 2014; Simpkins, 2011), which offered \$5000 to K-12 teachers who completed National Board certification, together suggest that the program meaningfully increased certification rates both by recruiting teachers who already held the certification and by encouraging previously uncertified teachers in eligible schools to complete the certification. This is notable given that the National Board certification process is intensive and generally takes three to four years for teachers to complete. Another study (Bridges et al., 2011) investigated the completion of college course credits among teachers participating in California's Child-care Retention Incentive program, which provided financial incentives for early childcare

⁷ Calculated using the annual salary for childcare workers reported by LDOE (2018a).

teachers who completed professional development programming and college courses. They observed that participating teachers completed 1-2 courses per program year. For one county they were also able to compare pre-program and post-program course completion rates and found that teachers completed almost two courses more during the program than beforehand. These results suggest that incentives can increase credential completion, but the observational design makes it difficult to draw causal conclusions.

In some cases, however, incentives for credential completion may result in changes in the labor market composition. Similar to the programs described above, the Washington State Child Care Career and Wage Ladder Pilot Project subsidized wage increases for teachers with additional credentials. However, an analysis of how teacher credentials in participating childcare centers compared with a matched control group, found that increases in educational attainment occurred through the hiring of new, more educated teachers rather than through increasing the education of existing teachers (Boyd & Wandschneider, 2004). One possible explanation for why the wage incentives did not encourage additional credential completion is that the program did not subsidize the cost of additional education, whereas in the other programs credential costs were covered by the program.

Given the evidence from Louisiana described in the previous section and the empirical literature described in this section, there is reason to believe that the SRTC may already be positively impacting whether teachers complete the ECAC credential. Additionally, the limited empirical evidence does not provide a clear sense of what incentive amount would be the most appropriate for this case in particular. As such, the effects of providing increased incentives beyond the SRTC are unclear. Therefore, I do not consider changing the financial incentives as a viable policy alternative for the purposes of this analysis, especially considering the potential expense and political effort that would be required for such changes to be implemented.

Altering the Incentive Structure

In addition to evidence that financial incentives can influence teacher behavior, there is some evidence that different incentive structures may have differential effects on the desired outcomes. Currently, teachers only receive the tax credit after they complete the entire ECAC process. However, incentives can be paid in a variety of ways

including upon initial enrollment and at interim stages throughout the process,⁸ each of which may have a different impact on credential completion rates.

One RCT (Fryer et al., 2012) compares the effects of two incentive structures on teacher effectiveness as measure by student performance on standardized tests. One treatment group was informed at the beginning of the year of the opportunity to earn bonuses based on their student performance, but only received the bonus at the end of year. The other treatment group received the bonus pay at the beginning of the year and were told that they would have to repay the money to the school if their students did not meet the minimum performance standards necessary to earn the bonus. While teachers in the first group did not perform significantly better than teachers who were not offered a bonus, teachers in the latter group performed substantially and significantly better than either of the other groups. In the context of the ECAC, this would mean requiring teachers to pay back the ECAC scholarships if they fail to obtain the credential.

While there are few studies that directly compare different incentive structures in education, synthesizing across studies with different incentive designs provides some indication that timely incentives for interim behaviors throughout a process are more effective than one-time payments for process completion. In their review, Allan & Fryer (2011) find that incentives for inputs are more effective than incentives for outputs. In the context of their research on using incentives to change student behaviors, this means that incentives for good study behaviors, such attendance and behavior, were more effective than incentives for outcomes such as good grades or test scores. In the context of the ECAC credential, this might mean providing incentives for necessary study behaviors throughout the credentialing process. Rewarding inputs often involves providing multiple interim incentives rather than one incentive at the end of the process. Lavecchia et al. (2016) suggest that this immediate timing may result in greater effects because it helps make the benefits of desired behaviors more salient when students are deciding how to spend their time.

While the literature suggests that restructuring the incentives for teachers may be effective, translating that evidence into an actionable policy alternative for LDOE is challenging. Given the economic instability that many early childcare teachers face and LDOE's interest in improving teacher well-fare and economic stability, requiring teachers to repay scholarship money is both misaligned with ECAC policy goals and

⁸ Some ECAC programs currently provide interim incentives, such as gift cards, to teachers in order to maintain their motivation and participation throughout the entire program.

ethically questionable. Providing smaller incentives at more frequent intervals for interim behaviors, on the other hand, may be economically beneficial and motivating for teachers, but is prohibitively complex from a feasibility standpoint. The existing tax credits could not be paid on a more frequent basis, so LDOE would have to find an alternative method to fund and administer interim incentives. Additionally, because different ECAC programs span different timescales and include different coursework activities, it would be difficult for LDOE to keep track of all teachers' progress through these interim steps, especially given how challenging it has been for LDOE to track teachers' completion of the ECAC's major components.

Incentivizing Other Stakeholders

In addition to restructuring how incentives are provided, we can also consider incentivizing additional stakeholders, beyond teachers, who may be able to influence completion rates. Given existing evidence for the role of center directors and ECAC programs in teachers' ability to complete the ECAC, these two stakeholders may be ideal targets for incentives.

Incentivizing Center Directors

LDOE told directors that compliance was required by July, 2019 or they would lose their Type III license and all public funding. Since 2019, Louisiana has required childcare directors to provide an annual report of whether their teachers meet the ECAC requirements, but LDOE has not revoked Type III licenses of public funding for centers not meeting the requirements. However, LDOE plans to implement these consequences in 2020⁹. Once implemented, directors will lose their Type III license and any public funding they receive if they employ any teachers who are not in compliance with the ECAC policy.

In addition to providing a financial incentive for compliance, the loss of Type III licensure reinforces the mandatory nature of the ECAC policies, which could influence both directors' and teachers' motivation to comply with the policy. With this increased motivation, directors may then dedicate more time and energy to supporting teachers with ECAC completion. This also provides the opportunity for directors to provide tailored supports based on their specific teachers' needs. In their survey of directors of Type III centers in Louisiana, Cannon et al. (2019) found that 84% of directors expected

⁹ This was LDOE's intention before the Coronavirus outbreak began. Given the enormous disruption to childcare caused by coronavirus and the fact that LDOE is currently focused on ensuring that essential workers continue to have access to childcare, it seems unlikely that LDOE will enforce the ECAC policy in this way in the near future.

to meet ECAC requirements by July, 2019. Only 5% reported that they did not expect to meet the requirements by that deadline and 3% (72% of those not expecting to meet requirements) expected to relinquish their Type III license.

Few evaluations are available of analogous accountability policies, however, those that are suggest that this alternative would be effective. One is a descriptive report of teacher compliance with a court-ordered mandate requiring all preschool teachers in 30 districts in New Jersey to hold at least a BA and a teaching license by September, 2004 (S. Ryan & Ackerman, 2004). Similar to the ECAC policy, New Jersey created scholarships to cover the cost of credential completion and provided salary incentives for completion to some teachers. Additionally, accountability for compliance rested at the school and district, rather than teacher, level. Unfortunately, the authors do not estimate the causal effect of the policy on the percentage of teachers holding the required credentials, nor do they have access to administrative data to calculate the number of teachers who met the requirement by the deadline. Instead, they predict compliance rates based on teacher self-reports of intention and progress toward credential completion in the year before the deadline. When looking at just the subsample of teachers with initial educational backgrounds similar to the relevant population for the ECAC policy, the authors find that 82% of teachers were actively pursuing a credential and intended to complete it within two years of the deadline (i.e. by September, 2006). Reporting on the same policy, another study (Mead, 2009) notes that 99% of all teachers working in the 30 New Jersey districts had at least a bachelor's and teaching license by 2005 and "virtually" all teachers met these credential requirements by the time the report was written (p13). However, Mead does not provide any additional details, making it impossible to determine whether this occurred primarily through the replacement of less qualified teachers with more qualified teachers or whether less qualified teachers were successful in obtaining the necessary qualifications.

Other studies also provide primarily descriptive rather than causal evidence of how directors respond to policies that provide financial incentives or mandate compliance in order to retain licensure. While the estimates vary across studies, they are all positive and, in most cases, suggest larger effects than those described above (Angrist & Guryan, 2008; Bassok et al., 2013; Elicker et al., 2011; Gormley & Lucas, 2000).

Incentivizing ECAC Programs

In addition to incentivizing center directors, LDOE could also provide incentives for ECAC programs to support teachers with obtaining the ECAC, especially since ECAC programs currently appear to do this to varying degrees. These programs exist solely

to serve teachers obtaining an ECAC and their primary income is scholarship payments from LDOE to cover the cost of tuition. Currently, ECAC programs receive a partial scholarship payment when a teacher first enrolls in the ECAC program and then receive the rest of the scholarship through one or two additional payments while the teacher completes the program, depending on the length of the ECAC program. If a teacher exits the program or loses scholarship eligibility before the second or third payment is made then the ECAC program will not receive these subsequent scholarship payments. However, the timing of these payments makes it possible for an ECAC program to receive the entirety of the scholarship money even if a teacher fails to complete the coursework, and the payments are not conditional on whether a teacher finishes the entire ECAC process. For this reason, LDOE is considering a restructured payment system, whereby ECAC programs receive an initial scholarship payment up front, but then all remaining payments are conditional on teachers' successful progression through the entire ECAC process.

I am not aware of any literature that evaluates conditional funding for organizations that provide professional development or education to early childcare teachers. However, conditional funding is frequently used in higher education and a substantial body of literature is dedicated to evaluating its effects on student outcomes. These policies have been structured in a variety of ways and have incentivized a number of different student outcomes, including grades, course completion, degree completion, and combinations of multiple outcomes. The evidence, primarily estimated using differences-in-differences approaches, overwhelmingly suggests that these policies had little or no effect (Bell et al., 2018; Hillman et al., 2018; Li & Kennedy, 2018). The only exceptions to this are evidence of small effects after the policy has been in place for four or more years (Hillman et al., 2014, 2015; Tandberg & Hillman, 2014) and evidence that these policies increased the rate at which students obtain short certificates, with null or negative effects on completion rates for more intensive certificates and degree programs (Hillman et al., 2015, 2018; Kennedy, 2016). The authors interpret the latter effects as evidence that higher education institutions are responding to these incentives by focusing their efforts on the low hanging fruit, i.e. encouraging more students to complete shorter and easier credentials.

Given LDOE's active consideration of a conditional scholarship payment structure, evidence that such policies can have effects on short-term credential completion, and the fact that influencing ECAC program behavior serves as a potentially important and distinct policy lever, I include this option in my evaluation.

Designing Supplementary Nudges

A large body of research in behavioral economics focuses on identifying low-cost, “low-touch” nudge interventions that use small additions or modifications to the context surrounding a process or decision in order to support people with achieving long-term goals and interests. Louisiana could add these interventions with little or no modification to the existing ECAC credential process in order support teachers in pursuing an ECAC. Reviews of the use of nudges in education provide substantial and rigorous evidence that a variety of different nudges can significantly influence a variety of behaviors (Damgaard & Nielsen, 2018; Lavecchia et al., 2016).

While there is no agreed upon typology of nudges in the literature, I identify a few categories that might be specifically relevant for ECAC credential completion (Oreopoulos & Petronijevic, 2019):

- **Informational nudges** influence behavior by filling knowledge gaps that prevent desired behaviors from occurring. These interventions may provide data, such as a child’s grades, or instructions, such as ideas for a literacy activity (Hoxby & Turner, 2015; Weixler et al., 2019).
- **Planning nudges**, such as reminders and goal setting prompts, help participants bridge the gap between intention and action by helping recipients make concrete plans for action and reducing the cognitive burden of task completion (Ariely & Wertenbroch, 2002; Cortes et al., 2018; Damgaard & Nielsen, 2018; De Paola & Scoppa, 2015; Hurwitz et al., 2015; Jackson & Makarin, 2018; Page et al., 2016; Weixler et al., 2019; Yeomans & Reich, 2017).
- **Motivational nudges** serve to change participants’ intentions and motivation. These interventions may leverage the power of social norms, provide reminders of the benefits or costs of a particular behavior, or reframe how specific choices or behaviors are presented in order to increase motivation (Coffman et al., 2017; Fischer & Wagner, 2017; Harackiewicz et al., 2012; Jensen, 2010; Mayer et al., 2015; McEvoy, 2016; Nguyen, 2008). Other motivational nudges help participants bridge the gap between intention and action by changing participants’ self-perceptions and therefore their beliefs about the relevance of target behaviors to their lives and/or their ability to carry out those behaviors (Chande et al., 2015; Damgaard & Nielsen, 2018; Lavecchia et al., 2016; Yeager et al., 2016).

Though the above categories identify distinct mechanisms for behavior change, nudge interventions may incorporate more than one strategy at a time. Evidence for the effects of integrating multiple nudge interventions is limited and mixed, with some nudge combinations resulting in greater effects and others resulting in no additional effect (Damgaard & Nielsen, 2018; Lavecchia et al., 2016; Oreopoulos & Petronijevic,

2019). Additionally, while many nudge interventions have positive effects, a substantial number of studies have also found no effects. Understanding of what nudges work in what situations, however, is currently lacking (Damgaard & Nielsen, 2018; Oreopoulos & Petronijevic, 2019).

Finally, it is worth considering whether nudge interventions might be successfully employed to influence the behavior of directors and ECAC programs in supporting teachers. While theory would suggest that such interventions might also have positive effects, I am not aware of any empirical evidence estimating the effects of nudges provided to one stakeholder on the behavior of another stakeholder, making it difficult to evaluate as a policy alternative. Additionally, given the two-step nature of this causal chain, changes in teacher behavior would necessarily be more distal and therefore likely smaller. Finally, given uncertainty as to the role of directors and ECAC programs in influencing teacher completion and the inclusion of other policy alternatives that target these stakeholders, I don't believe that evaluating these alternative nudge options would provide any additional value.

Policy Alternatives

Based on my analysis of the literature described above, I evaluate the following policy alternatives for increasing the rate at which teachers obtain an ECAC:

1. **Status quo:** LDOE continues to provide scholarships and tax credits to teachers and continues to require directors to report whether their teachers meet the ECAC policy requirements and, but no consequences are levied for failure to meet these requirements.
2. **Director accountability:** LDOE incentivizes and holds early childhood center directors accountable for ensuring that the teachers they employ meet the ECAC policy requirements by revoking Type III licensure and any public funding for centers that do not comply.
3. **Conditional scholarship payments:** LDOE incentivizes and holds ECAC programs accountable for ensuring that their teachers obtain the ECAC credential by making part of the scholarship money paid to ECAC programs dependent on their teachers' progression through the ECAC coursework and credentialing process.
4. **Suite of nudges:** LDOE uses text-messaging to expose teachers to a suite of nudging interventions designed to ensure that teachers have access to the necessary information for completing the steps of the ECAC process, establish and maintain motivation to complete the process, and are able to plan and carry-out their plans for completion.

Methodology

Approach

I employ four criteria in order to evaluate each policy alternative. I selected these criteria in order to capture and describe the key outcomes that are likely to result from each policy alternative and that would be important to LDOE in comparing these alternatives and deciding which, if any, to implement. I weight all criteria equally in comparing alternatives because they are equally important in determining a course of action that both meets LDOE's policy objectives and can be implemented in practice.

For each criterion, I make general assumptions that I use in order to estimate the outcomes across all policy alternatives. Since multiple criteria employ quantitative estimates, many of my general assumptions consist of estimates of specific features of the Louisiana context, such as how many early childhood teachers need to earn an ECAC and the rate of teacher turnover. These estimates are informed by a number of administrative data sources (see Appendix A) and supplemented or corroborated by empirical literature when possible and appropriate. Given the fragmented nature of the early childhood landscape across the U.S., high quality data is rare and thus estimates from the empirical literature must be interpreted with caution. Additionally, though LDOE has exerted extraordinary efforts to collect a variety of data about childcare center and teachers in Louisiana, the administrative data that I had access to at the writing of this report are incomplete and imperfect and should also be interpreted with caution. The quantitative assumptions that I employ in my analysis reflect my best attempt to provide reasonable estimates based on the data available to me.

In service of increasing ECAC completion rates, LDOE applied for and was awarded a federal grant from the ACF to, among other activities, pilot and evaluate an intervention for increasing the training completion rate in partnership with researchers from UVA. This analysis is therefore intended to inform decision-making both in the short-term and the long-term. As such, all criteria will be evaluated over two time scales. First, outcomes are calculated under the assumptions of the pilot study, namely that the intervention will be implemented over the course of one calendar year, allowing an additional year for teachers to complete the full credential process. This two-year time window is consistent with the time frame in which newly hired teachers are required to obtain the ECAC credential before being faced with termination. Secondly outcomes are considered under the assumption that the policy will be implemented as an ongoing and long-term support for credential completion, using a ten-year time horizon.

Criteria

Effectiveness

This criterion assesses how effective each policy alternative is at increasing the rate at which teachers complete the ECAC credential. While Louisiana does not have a specific target completion rate, larger increases in completion rates provide substantial political benefits especially because LDOE fears that money spent on scholarships for teachers who do not complete the process could be seen as wasteful. For this reason, larger increases in completion rates are more attractive than small increases, even if the latter is more economically efficient. I therefore consider effectiveness as a distinct criterion, rather than considering it only within the context of a cost-effectiveness measure.

I base estimates of effectiveness on effect sizes found in empirical studies that address analogous policy problems using analogous policy interventions¹⁰. I estimate effectiveness under three different scenarios in order to reflect the current uncertainty as to the effects of the ECAC policy on teachers' decisions to continue teaching once they earn an ECAC. Since the analysis focuses on the percentage of teachers in Type III centers that must complete an ECAC program in order to earn a credential, a teacher is considered to have turned over if they are no longer employed as a lead teacher in any Type III Head Start or childcare center. The SRTC schedule may reduce turnover if teachers decide to remain teaching longer in order to earn larger and ongoing tax credits. Alternatively, turnover may increase if obtaining the CDA provides teachers with access to new, higher-paying job opportunities (Cannon et al., 2019). Finally, the ECAC policy may not affect turnover at all. The details of these scenarios as well as additional assumptions are described in Appendix C). In presenting the results I privilege the scenario where ECAC completion reduces turnover as the most likely outcome given the available evidence.

Assumptions and estimates used to calculate effectiveness are described in detail in Appendix C.

Cost

Like many organizations, LDOE has a limited budget and therefore must consider the cost of each alternative in their decision-making. An alternative that is extremely effective, if prohibitively expensive, is unlikely to be a practical choice. Because of

¹⁰ When causal effect sizes are not available I use descriptive completion rates from analogous policy contexts as estimates for ECAC completion rates.

these constraints I first estimate the administrative costs to LDOE of implementing each policy alternative and then I calculate the social cost that stems from teachers who fail to complete the ECAC credential. This provides an estimate of the time and money that will be “wasted” on teachers who do not ultimately obtain a credential under each alternative. I do not calculate the total social cost for each alternative as this is driven primarily by the scholarships, tax credits, and time teachers spend completing the credential, which LDOE already decided was worthwhile when they chose to implement the ECAC policy in the first place.

Assumptions and estimates used to calculate costs are described in detail in Appendix D.

Well-being

A full benefit-cost analysis is beyond the scope of this project, given data limitations that make estimating benefits in monetary terms difficult. However, it is important to consider both the positive and negative impacts of each policy alternative that are not captured in the measurement of the policy’s effectiveness at increasing completion rates. LDOE designed and implemented the ECAC credential policy as a means to professionalize and support the well-being of the early childcare workforce, with the understanding that these supports would translate to improved outcomes for the children being served. It is therefore important to evaluate the extent to which each policy alternative would result in outcomes for teachers and children that are consistent with these goals.

I qualitatively assess potential positive and negative impacts for teacher well-being based on empirical and theoretical literature connected with similar or analogous policy interventions and policy problems. Specifically, I draw on the outcomes, mechanisms, and unintended consequences highlighted in the literature. Potential benefits to teachers include increased self-efficacy or reduced financial constraints. Potential negative impacts on teachers include perceived coercion or decreased motivation. Potential negative impacts for children include reductions in the supply of childcare if centers close as result of not meeting ECAC requirements. In estimating these effects, I exclude any outcomes caused directly by credential completion, including any changes in teacher turnover and retention.

Given the variety of potential positive and negative outcomes, as well as variation in the likelihood any given outcome is realized, I then translate these qualitative assessments into a quantitative rating. For each alternative I synthesize all potential positive impacts into a single score between 0-3 representing the intensity of the

overall impact relative to the status quo. I then similarly synthesize all potential negative impacts into a single score between -3 and 0 relative to the status quo. These scores are then averaged together, weighted by an estimate of how probable or uncertain these impacts are. A final score above zero indicates net positive impacts, while a final score below zero indicates net negative impacts relative to the status quo. The status quo is given a score of 0 for both positive and negative impacts. Final scores for all alternatives, their components, and sensitivity analyses are included in Appendix E.

Feasibility

This criterion qualitatively assesses the extent to which each policy alternative can be successfully implemented within LDOE's political and administrative context. More specifically, feasibility is measured categorically as low, medium, or high. I define a highly feasible alternative as one where implementation will not require LDOE to make any substantive changes to their administrative structures, internal policies, or to the legislation that they enforce or abide by. I will consider an alternative to have medium feasibility if one or more substantive changes are required, but there is high confidence in LDOE's ability to make these changes. Finally, I will consider an alternative to have low feasibility if one or more substantive changes are required and there is not strong confidence in LDOE's ability to make these changes. These distinctions will be important for identifying what policy interventions LDOE can actually implement in practice.

Analysis of Alternatives

Status Quo

Under this alternative the current ECAC policy continues in place without any modifications. Using LDOE's scholarship records and ECAC candidate information reports, I estimate a current coursework completion rate of 63%, averaging the rate from 2018 and 2019 only, under the assumption that completion rates from the first two years of the program are likely not reflective of the current status quo given the expansion of the program over time. Given the incomplete nature of the ECAC credential completion information from these data sources, I calculate this completion rate using LDOE's certification records, restricting the sample to teachers whose educational levels and employment characteristics match the population of teachers who are required to obtain the ECAC credential through an ECAC program. I estimate the rate of 30% by dividing the number of teachers who earned the credential in 2018 and 2019¹¹ by the average number of teachers who started in 2018 and 2019 (from the scholarship records), again under the assumption that the earlier years of data are not representative of the current status quo. As described in the methodology section, I assume that teachers who complete the coursework but fail to obtain the ECAC will never complete the ECAC since the coursework requires substantially more time and effort than the post-coursework steps.

As this is the status quo option, feasibility is high and well-being is centered at zero.

Director Accountability

Under this alternative LDOE executes its intentions to hold early childhood center directors accountable for ensuring that all lead teachers they employ hold the ECAC credential within two years of beginning employment. This accountability is intended to be administered via the existing center accountability system and is therefore estimated to require only minimal additional administrative labor and no additional materials or services.

Based on an earlier qualitative study of the ECAC policy's impacts on childcare centers, I assume that 5% of childcare centers will close or choose to operate privately instead of receiving public funding in response (Cannon et al., 2019). I estimate the corresponding reduction in teachers by combining data on the number of Type III

¹¹ I do not average across these two years because the number of credentials in 2019 is substantially smaller than those in 2018 (9 vs. 133) and so it appears that the data from 2019 are incomplete.

centers in Louisiana, the percentage of Type III centers that are Head Start or Early Childcare, and subtracting the average number of teachers per center (Doromal, 2018; Louisiana Department of Education, 2018a). Given the few studies that might provide empirical evidence for estimating the effect on completion rates, I use the estimated completion rates provided by Ryan & Ackerman (2004) in their analysis of New Jersey's court-order requiring all teachers to obtain a BA. While these rates are estimated through teachers' self-reported completion expectations at the halfway mark between policy implementation and the credential deadline, they provide the most analogous case and are also the most conservative estimates. I use their estimate of the percentage of teachers without a BA who expect to meet the credential requirement on time (36%) as the rate at which teachers complete the ECAC. I use their estimate of the percentage of teachers who are enrolled in coursework (82%) as the rate at which teachers complete the ECAC coursework. Finally, the two-year grace period alongside the fact that Type III centers are held accountable to ensuring that their teachers meet ECAC requirements provide reason to expect that teachers who complete coursework but struggle to complete the credential might do so in the subsequent year. I estimate this rate using the authors' estimate of the percentage of teachers with a BA (analogous to completing ECAC coursework) who are expected to obtain their teacher license (analogous to obtaining ECAC licensure), resulting in a rate of 77%.

Given that LDOE has intended to implement this policy option from the conception of the ECAC policy and it operates entirely based on existing accountability structures, I consider the feasibility of this alternative to be high. In calculating well-being, I consider that the increased accountability pressures for directors may induce directors to provide more supports for teachers in completing the ECAC, which may ease teachers' workload and stress and thereby improve well-being (Cannon et al., 2019). At the same time, however, there is a clear risk that directors may close their centers or fire teachers who struggle to obtain the credential, which would create substantial emotional and financial stresses for teachers (Cannon et al., 2019). Additionally, these closures might impact child well-being if alternative care is not available or is lower quality. Finally, the additional accountability pressures created for directors and teachers may affect the quality of care they provide, even if they successfully comply with ECAC requirements, by reducing their intrinsic motivation (Allan & Fryer, 2011; Bénabou & Tirole, 2006; Cowan & Goldhaber, 2019; Firestone, 2014; Fryer, 2013).

Conditional Scholarship Payments

Under this alternative, LDOE shifts the timing of its scholarship payments to ECAC programs. Currently, ECAC programs receive scholarship money when a teacher begins the ECAC program and half-way through the program. Under this alternative,

ECAC programs would receive some part of the scholarship money up front, but the remainder of the scholarship money would be provided with some dependency on the teachers' progression through the coursework and credentialing process, though LDOE has not yet established detailed plans for this conditional allocation.

To estimate the effect of holding ECAC programs accountable for teachers' progress, I turn to the literature on performance-based funding in higher education. The vast majority of the empirical literature suggests that performance-based funding has null or negative effects on student outcomes, including course completion, grades, and graduation rates (Bell et al., 2018). However, given that LDOE is actively considering this option, I draw on the few studies with positive results to provide a "best-case scenario" picture of this policy's effects. Though there is some evidence that effects may increase over time or only begin a number of years after policy implementation, I assume a stable increase in completion rates across all years for simplicity and to align with the idea of providing a best-case scenario estimate (Hillman et al., 2014; Tandberg & Hillman, 2014). I therefore use the largest multi-year average effect size in the literature (rounded up) for an increase of 3 percentage points resulting in a 33% ECAC completion rate and 66% coursework completion rate (Hillman et al., 2015)¹². I also assume that this increase in completion rates similarly applies to teachers who initially complete coursework but fail to obtain the ECAC, resulting in an estimate that 3% of these teachers obtain the ECAC in the subsequent year. Finally, in estimating the effect on teacher completion rates, I assume that this new accountability does not have any effects on the supply or capacity of ECAC programs. LDOE has explicitly voiced the desire to identify a payment structure that will avoid creating undue financial burden on ECAC programs and few studies mentioned university closure as an effect of the introduction of performance-based funding.

While LDOE already has administrative structures in place to manage scholarship payments, shifting these payments to a conditional system will require new system

¹² The largest effect size averaging across all years of policy implementation and reported as a percentage point increase is 2.4 in short-term credential completion (Hillman et al., 2014; Hillman et al., 2015). Other studies report average effect size as percentage increases, ranging from 30-85% (Li & Kennedy, 2018; Hillman et al., 2018). I privilege the former estimate for two reasons. First, the magnitude of the effect is much more similar to the estimated effects for the other alternatives and therefore more conservative, which I think is important given the many null effects in the literature on conditional funding policies. Second, in the same study similar effects are seen on AA completion after six years of policy implementation suggesting that the policy's effects were not limited to shifting more students toward credentials requiring less time and effort. Since ECAC programs cannot shift students toward an easier program and coursework must meet state content and duration requirements, it is important that the estimate reasonably reflect other mechanisms for increasing completion rates.

design, piloting, and ongoing tracking. As such, I rate the feasibility of this alternative as medium and include the cost of one additional full-time administrative staff member in the cost estimates. Similar to director accountability, the increased accountability pressures for ECAC programs may induce programs to provide additional supports for teachers which will reduce teacher stress and increase teachers' well-being (Dougherty & Reddy, 2011; Rabovsky, 2012). However, the increased accountability may alternatively induce ECAC programs to focus on easy ways to manipulate completion metrics without improving support for teachers, reduce instructional quality and rigor in order to increase completions, and/or turn away applicants perceived to be less likely to succeed, all of which have substantial negative implications for teachers' well-being (Hillman, 2016; Hillman et al., 2015; Li & Kennedy, 2018; Orphan, 2018; Umbricht et al., 2017).

Suite of Nudges

Under this alternative, LDOE uses text messaging to expose teachers to a suite of nudging interventions designed to ensure that teachers have access to the necessary information for completing the steps of the ECAC process, establish and maintain motivation to complete the process, and are able to plan and carry-out their plans for completion.

Restricting the interventions to those that have demonstrated positive effects in analogous educational settings with some empirical measure that can be used to estimate the effect on ECAC completion, I identify 8 different nudging interventions that LDOE could implement¹³:

1. prompts to plan for next steps,
2. prompts to set goals,
3. increasing motivation through comparison with others,
4. increasing motivation through reminders of benefits,
5. increasing and sustaining motivation through exposure to growth mindset,
6. increasing and sustaining motivation through highlighting that struggle is normal,
7. increasing and sustaining motivation through values affirmation,
8. and increasing and sustaining motivation through encouragement and social connection with peers.

These interventions generally have effects of 1-4 percentage points, with many individual intervention types having multiple estimates throughout this range and a few

¹³ Based on the literature, there are certainly other possible nudge interventions, but these either lack empirical evidence or the available measures of effectiveness are difficult to translate into an estimate of an ECAC completion rate.

interventions having effects that seem anomalously large within the broader context of nudge interventions (Chande et al., 2015; Coffman et al., 2017; Jensen, 2010; Kizilcec et al., 2017; Mayer et al., 2015; Weixler et al., 2019; Yeager et al., 2016; Yeomans & Reich, 2017). Given limited evidence for the effects of combining multiple nudge interventions, I assume that the effects are additive, but balance this by conservatively assuming that all interventions provide an average effect of only 2 percentage points, resulting in a total increase of 16 percentage points. I therefore assume that 79% of teachers complete the coursework and 46% obtain the ECAC. This is additionally useful in ensuring the effect estimate is not overly optimistic given that some of the larger effect sizes are for outcomes that are much more short-term and less distal than the completion of a 9-18 month ECAC program and credential process. Finally, similar to my assumptions for the status quo, I assume that if the nudge interventions were not successful in supporting a teacher to obtain the ECAC in the first place, then this teacher will not obtain the ECAC at a later point in time.

Given the need for substantial design effort, piloting, and ongoing administration of a suite of nudge interventions that would not easily integrate with any ongoing programs or structures, I rate the feasibility of this intervention as medium. For the same reason, I include the cost of one full-time administrator with a medium level of specialized training. Additionally, I estimate the cost of the text-messaging service based on the per teacher cost estimate for the year-long provision of weekly text messages provided by Chande et al. (2015). Finally, I am not aware of any potential negative effects on well-being, but some of the motivational nudges, such as encouragement and social connection with peers may reduce teacher stress and improve well-being.

Findings

I include an outcomes matrix below (see **Table 2**), privileging estimates for the scenario where completing the ECAC credential decreases teacher turnover. The relative order of these outcomes across scenarios is robust when only short-term outcomes (first two years) are considered and when alternative assumptions for teacher turnover are employed.

Except for well-being, director accountability is consistently highly ranked across all criteria, whereas all other alternatives have less consistent outcomes across criteria¹⁴. The biggest remaining concerns with implementing director accountability, therefore, are the greater potential for negative effects on well-being and the relative weakness of the evidence used to estimate the effects for this alternative as compared with the others.

Recommendation

Given that LDOE has already chosen to implement director accountability and has been communicating these accountability expectations to directors for multiple years, I recommend that LDOE go ahead with this intervention while also implementing another intervention that can mitigate some of the negative effects on teachers' well-being and is also likely to increase completion rates in case director accountability turns out to be less effective than currently estimated. I recommend implementing a suite of nudges as the additional intervention because of its positive score for teacher well-being and because it can be flexibly scaled up or down depending on the effectiveness of director accountability and LDOE's needs. Nudges are also more effective than any of the other remaining alternatives. While this alternative has higher administrative cost, this cost is nonetheless minimal relative to LDOE's spending on scholarships for non-completers.

¹⁴ In sensitivity analyses of well-being (Appendix E), the rank order of alternatives changes depending on the specification, but director accountability consistently scores worse than the suite of nudges.

Table 2: Outcomes matrix evaluating each alternative against established criteria.

Short-Term Outcomes: Year 1-2							
Alternative	Feasibility	Well-being	Administrative Cost	Cost of Non-Completion	Effectiveness		
					Year 1	Year 2	
Status Quo	High	0.00	\$0	\$6 million	37%	40%	
Director Accountability	High	-0.40	\$24,000	\$2 million	60%	74%	
Conditional Scholarship Payments	Medium	-0.50	\$105,000	\$5.5 million	39%	44%	
Suite of Nudges	Medium	0.33	\$115,000	\$5 million	45%	51%	
Long-Term Outcomes: Year 1-10							
Alternative	Feasibility	Well-being	Administrative Cost	Cost of Non-Completion	Effectiveness		
					Year 1	Year 5	Year 10
Status Quo	High	0.00	\$0	\$21.5 million	37%	45%	45%
Director Accountability	High	-0.40	\$105,000	\$9 million	60%	79%	79%
Conditional Scholarship Payments	Medium	-0.50	\$467,000	\$20 million	39%	49%	51%
Suite of Nudges	Medium	0.33	\$501,000	\$17 million	45%	56%	59%

Implementation

Realizing the benefits of implementing both policy interventions together requires the development of one integrated implementation plan and the following sections are therefore organized in order to provide a starting point for this development. These implementation recommendations assume that after the Covid-19 crisis passes, LDOE will eventually be able to return its attention to the ECAC policy and the goals for the policy will not have changed substantively. However, given LDOE's current concerns that the Covid-19 crisis will decimate the early childcare sector in Louisiana, this is by no means guaranteed. Depending upon how this crisis unfolds, LDOE may need to turn its attention to rebuilding early childcare and focus on reducing barriers to entry rather than enforcing and supporting compliance with the ECAC policy.

Stage 1: Director Accountability at Scale

According to the principal agent theory of action, a director accountability system will be effective at increasing the ECAC completion rate only if directors have certain beliefs about the accountability system (Bell et al., 2018), described in **Table 3**.

Table 3: Conditions required for effective implementation of director accountability.

Director Beliefs	LDOE Actions
understand what they are being held accountable for and the consequences of non-compliance and care enough about these consequences that the benefits of avoiding them off-set the costs of requiring their teachers to complete the ECAC	communicate requirements, consequences, and benefits to directors in order to motivate them to comply
believe that LDOE has accurate information about directors' compliance	track compliance in a way that is visible to directors
Believe that LDOE will follow-through with consequences associated with non-compliance	levy consequences in a way that is visible to directors
know how to successfully motivate and support their teachers in completing the ECAC	support directors with motivating their teachers

Communication: LDOE has already invested substantial energy, and has been quite successful, in ensuring that directors understand the ECAC requirements and the consequences of non-compliance (Cannon et al, 2019). Additionally, there is some evidence that directors believe the ECAC credential will benefit the quality of instruction in their centers, but anecdotal evidence from conversations with LDOE

suggest that for many directors these benefits may not be salient or convincing enough to outweigh the costs of compliance. Therefore, additional efforts to motivate directors may be beneficial. Given LDOE's success with implementing other reforms through director accountability, I defer to LDOE's context-specific knowledge in determining the best methods for doing so.

Tracking Compliance: LDOE piloted a tracking system in the spring of 2019, when as part of their existing director accountability system, all childcare centers were required to report on whether their teachers met ECAC requirements. Incorporating ECAC compliance in this existing accountability process provides a clear signal to directors that LDOE is taking the ECAC requirements seriously. However, there are a number of additional steps that may help LDOE continue to strengthen its tracking system. First, LDOE should change the Academic Assurance form to require directors to individually list the names of their teachers and each teacher's status with respect to the ECAC regulation, instead of providing a yes/no response about their center's compliance as a whole. This both requires directors to provide more substantive detail, which may increase the probability with which they provide truthful information, and also facilitates LDOE's ability to match teachers' names to their database of teachers who have already earned ECAC credentials in order to verify these reports. Second, LDOE should continue their current work to integrate and enhance their administrative data systems so that the Academic Assurance and ECAC Credential databases can be merged to facilitate efficient verification of center reports. Thirdly, LDOE should build off of their CLASS observation system to systematically require CLASS observers to ask both directors and teachers about their ECAC credentials in order to provide an additional tracking mechanism and signal to directors¹⁵. Given the large number of CLASS observers, implementing the final recommendation will require additional communication and accountability efforts.

Levying Consequences: Though LDOE has begun to track ECAC compliance, they have not yet levied consequences for centers that are out of compliance. While the main consequence has already been established, namely loss of public funding and Type III status, it is not clear how this will be carried out. LDOE will need to determine whether these consequences are levied immediately, or whether, as with low CLASS ratings, centers will have additional time to implement an improvement plan. Given the integration with the Academic Assurance process, I recommend that LDOE keep the

¹⁵ In earlier discussions with LDOE they mentioned that CLASS observers were at least sometimes asking about ECAC credentials during their observation visits. Unfortunately, I was not able to verify whether this was a systematic process that LDOE is supporting because of the current Covid-19 situation.

process for levying consequences as similar as possible for the purposes of clarity and efficiency.

Supporting Directors: I am not aware of any current efforts on LDOE's part to support directors with motivating teachers. One option would be disseminating a list of strategies and practices that directors can use. Another is to label a portion of center tax credits as intended to enable directors to provide financial resources to support teachers, such as through prizes and payment for time spent attending courses. Finally, LDOE could ask ECAC programs to communicate with directors about supporting their teachers.

Stage 2: Evaluation and Nudge Design

Leveraging a suite of nudges to offset potential negative effects of director accountability and increase completion rates requires a clear understanding of how director accountability operates. Therefore, LDOE should spend the first 1-2 years after director accountability implementation evaluating the effects on teachers as well as documenting the main causes of teacher non-completion. This information should then be used to identify the goals of the nudging intervention as well as design and pilot these interventions (Damgaard & Nielsen, 2018). Depending on how Covid-19 ultimately affects the use of ACF grant funds, LDOE should consider leveraging these funds and their partnership with UVA for the nudge design and pilot process.

Stage 3: Nudging at Scale

In order for the suite of nudges to be effective at scale, the timing and content of the nudges must match each teacher's stage in the ECAC credential process. Receiving reminders or encouragement about submitting CDA scholarship paperwork when one has only just started the ECAC coursework is more likely to serve as an annoyance than an effective support or motivator. Given that different ECAC programs are different lengths and require different assignments, I recommend that LDOE partner with ECAC programs to ensure that the suite of nudges is tailored to each specific program's steps and is delivered to teachers at the right time.

Stage 4: Ongoing Monitoring & Adjustment

One notable advantage of nudges is their ability to be adapted over time with little cost. This advantage can only be achieved if teachers' challenges and needs are monitored and used to adjust the nudges on an ongoing basis.

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Appendix A: Data Sources

Below are the primary data sources used in my analysis:

Data Source	Description
Scholarship Records	Records of the ECAC program scholarship applications submitted to LDOE. In principle, these data represent all scholarship applications through June, 2019.
ECAC Candidate Information Reports	Records submitted by ECAC programs to LDOE detailing the teachers who have participated in their program and their completion status. Importantly, these data only include reports from about 50% of the ECAC programs currently in operation.
2019 SEE-LA Teacher Survey	Annual workforce survey administered by UVA researchers to early childhood teachers in two parishes in Louisiana.
2019 SEE-LA Director Survey	Annual workforce survey administered by UVA researchers to early childhood center directors in two parishes in Louisiana.
ECAC Autopsy	A summary presentation created by LDOE providing initial internal estimates of ECAC completion rates as well as program-specific information such as the number of cohorts and applicants that attended the program.
Certification Records	A record of all teachers who have been issued an Early Childhood Ancillary Certificate.
Gold Database	A database of early childcare teachers in Louisiana.

Appendix B: Data Analysis

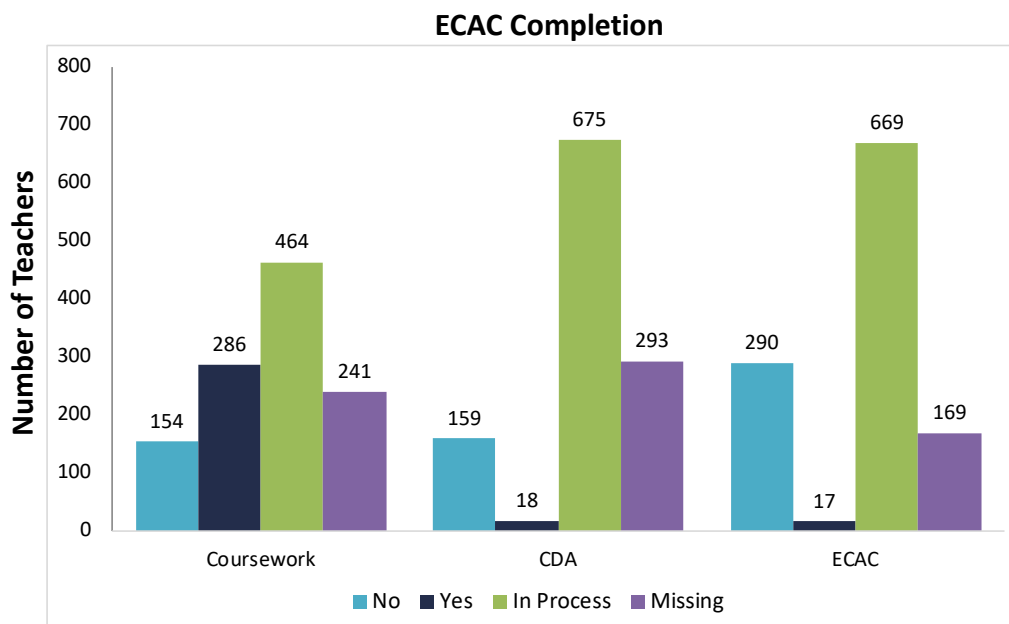
Scholarship Records & ECAC Candidate Information Reports

These data were merged by teacher name to create a single teacher by scholarship application panel database. I cleaned and reshaped the data to create a single observation per teacher capturing all scholarship and ECAC program information. The primary variables of interest were completion status for each stage: coursework, CDA, and ECAC and reasons for non-completion.

Because of the many observations with missing values for the primary variables of interest I applied the following rules to impute values where possible:

- When a later stage was listed as complete, earlier stages were imputed as complete
- When an earlier stage was listed as incomplete, later stages were imputed as incomplete
- For any candidates listed as having dropped during the CLASS observation component, CDA and ECAC stages were imputed as incomplete
- Any candidates with missing completion data were labelled as “in process” based on scholarship start and end dates and program length
- For any candidates with a scholarship application status of deferred or withdrawn and no record of later approved scholarship applications, all stages were imputed as incomplete

This resulted in the following completion frequencies:



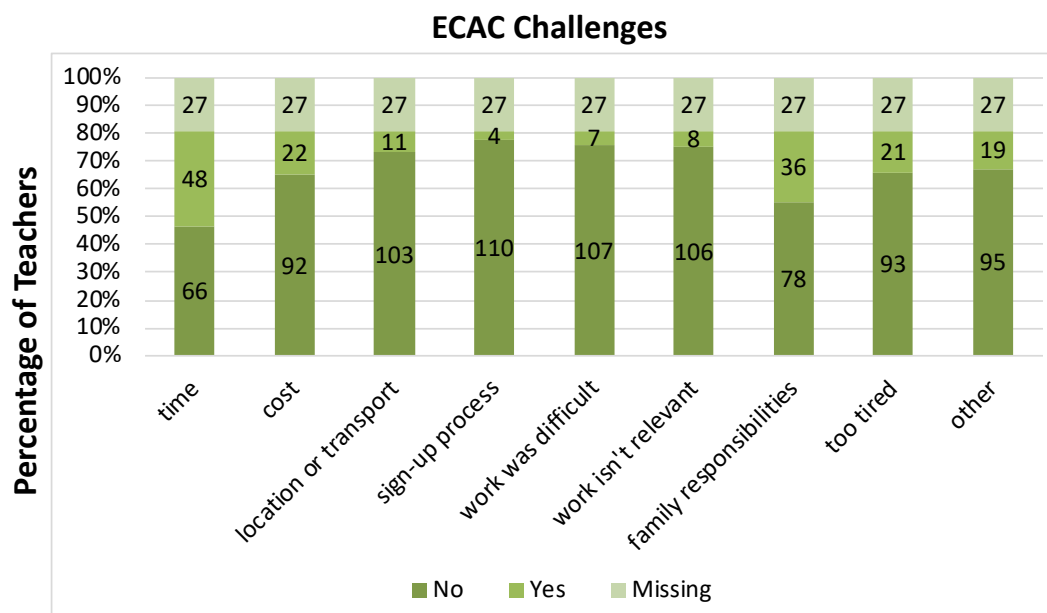
2019 SEE-LA Teacher Survey

Any teaching staff working in any Type III childcare centers and schools in the sampled parishes were eligible to complete the survey. In order to limit the sample to teachers who could reasonably be expected to be subject to the requirement to obtain an ECAC through an ECAC program, I restricted the data in the following way:

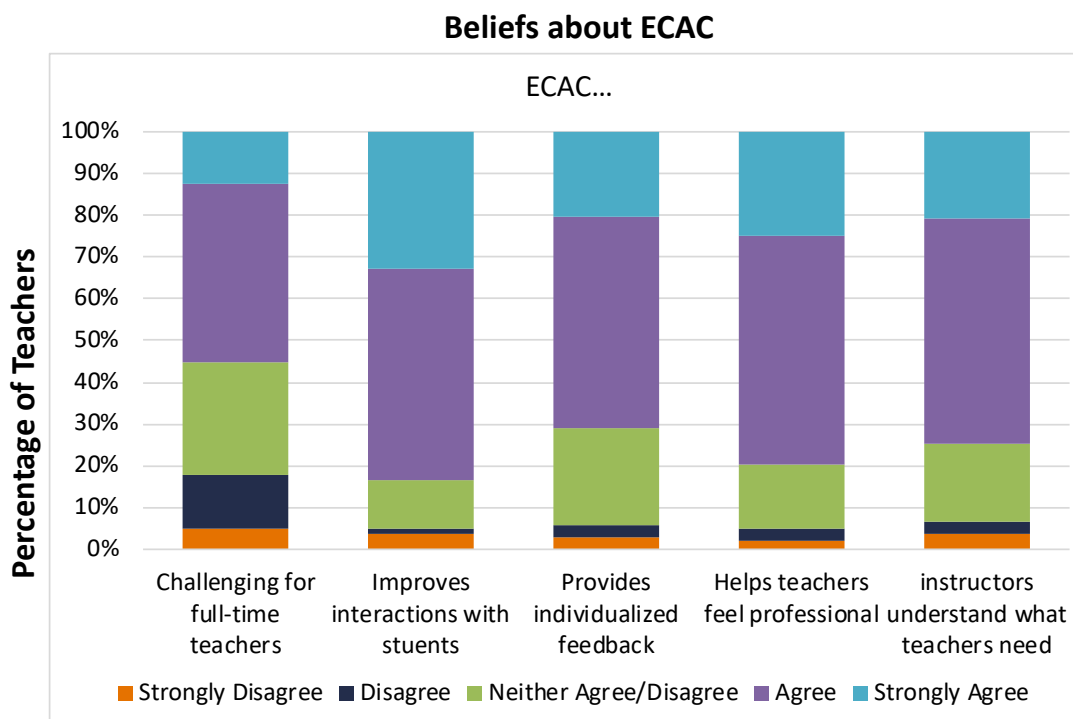
- I excluded all pre-K teachers in schools, leaving just Head Start and child care center teachers
- I excluded anyone who indicated they taught students in kindergarten or above
- I excluded anyone who was not a lead teacher, keeping anyone for whom this information was missing
- I excluded anyone with an AA in early childhood, a BA, or an advanced degree
- I excluded anyone who had missing data for all ECAC-related variables

I then analyzed teachers' perceptions of the challenges of obtaining an ECAC. The results below are limited to teachers in the process of obtaining the ECAC, but the results are similar for teachers who already obtained the ECAC. There were 15 teachers who indicated that they were not working toward an ECAC. These teachers reported not getting the ECAC for the following reasons:

- They didn't know about the ECAC
- Family responsibilities
- Other



I also analyzed teachers' beliefs about the ECAC, shown in the chart below for teachers who were in the process of obtaining the ECAC. Results were similar for teachers who had already completed the ECAC.



Finally, I used OLS regression to investigate the relationship between SRTC awareness and likelihood of having completed the ECAC, controlling for variables related to teachers' experience working in early childhood and their intentions to remain. Teachers who indicated that they had not completed or were not pursuing an ECAC were excluded. ECAC/CDA completion is a variable equal to 1 if the teacher completed an ECAC or CDA and equal to 0 if the teacher was in the process of completing one of these credentials. ECAC completion is a variable equal to 1 if the teacher completed an ECAC and equal to 0 if the teacher was in the process of completing an ECAC, excluding teachers who reported completing or pursuing a CDA on its own.

Regression Results

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	ECAC/CDA Completion			ECAC Completion		
Q179 Aug 2020 I Will Be Working at This Site			-0.0303 (0.0714)			-0.0319 (0.0814)
Q180 ECE is my LongTerm Career			0.00868 (0.0361)			-0.00643 (0.0397)
Q179 3 Years From Now I Will Be Working at This Site			0.0377 (0.0597)			0.0483 (0.0689)
Q190 Aware of School Readiness Tax Credit	0.269** (0.118)	0.327*** (0.0990)	0.388*** (0.0864)	0.416*** (0.148)	0.472*** (0.120)	0.526*** (0.103)
Q55 Years Worked in Current Site, Any Position	0.00200 (0.00593)			0.00269 (0.00673)		
Q55 Years Worked in ECE, Any Position		0.00357 (0.00384)			0.00380 (0.00443)	
Constant	0.597*** (0.111)	0.517*** (0.0909)	0.439** (0.181)	0.424*** (0.140)	0.348*** (0.110)	0.317 (0.206)
Observations	116	130	156	97	108	127
R-squared	0.049	0.104	0.129	0.086	0.159	0.186

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

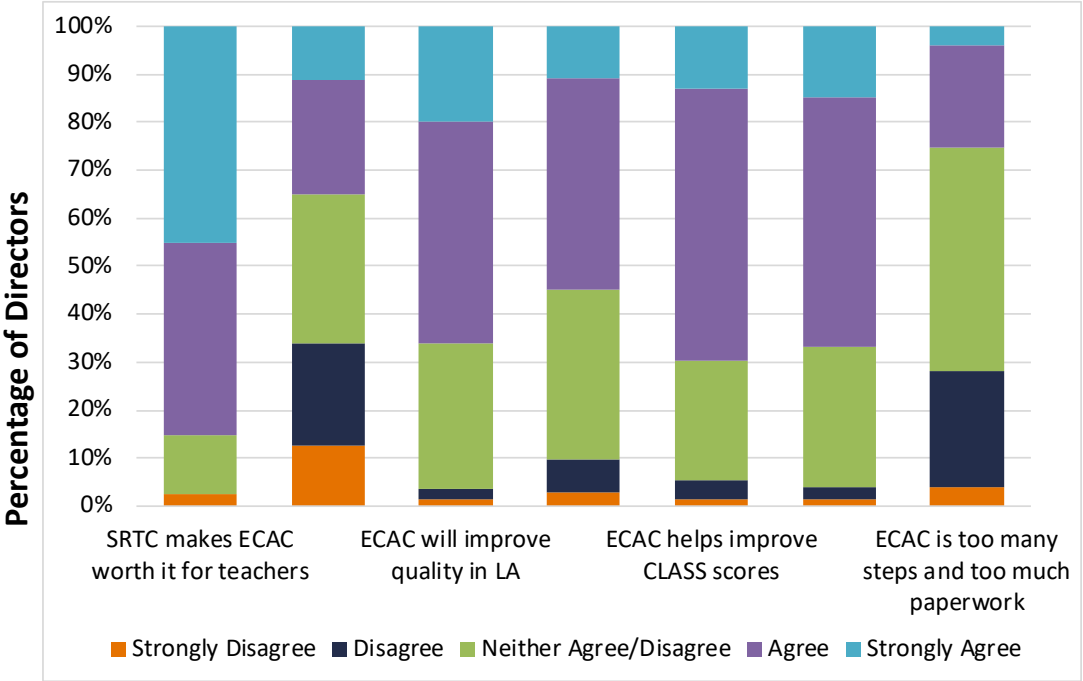
2019 SEE-LA Director Survey

Any directors working in any Type III childcare center or school in the sampled parishes were eligible to complete the survey. In order to limit the sample to directors whose teachers could reasonably be expected to be subject to the requirement to obtain an ECAC through an ECAC program, I restricted the data in the following way:

- I excluded all directors in schools, leaving just Head Start and child care center teachers
- I also excluded respondents who said that they were not familiar with the ECAC or that the ECAC requirement wasn't applicable to them

I analyzed directors' beliefs about the ECAC, shown in the chart below.

Beliefs about ECAC



Appendix C: Effectiveness Analysis

Effectiveness Scenarios:

Scenario	Estimated Teacher Turnover	Source
ECAC reduces turnover	<ul style="list-style-type: none">• 24% for teachers who complete the ECAC• 30% for teachers who complete coursework only	<ul style="list-style-type: none">• National estimate of turnover in childcare centers (Bassok et al., 2013)• Median of national estimate (Bassok et al., 2013) and estimate for scenario where ECAC doesn't affect turnover¹⁶
ECAC doesn't affect turnover	<ul style="list-style-type: none">• 35% for all teachers	Average of national and Louisiana-specific estimates ¹⁷ (Bassok et al., 2013; Bassok et al., 2020)
ECAC increases turnover	<ul style="list-style-type: none">• 45% for teachers who complete the ECAC• 35% for teachers who complete coursework only	Estimate of turnover ¹⁸ in childcare centers in Louisiana (Bassok et al., 2020)

In all scenarios and for all policy alternatives, teachers who do not complete coursework are treated as a single group without differentiating those who turnover from those who don't. It is assumed that the same rate of ECAC completion will apply to all teachers without an ECAC, regardless of whether they are new to their position or not. While there are many possible reasons that this may not be the case in practice, there is no clear empirical basis for estimating differential completion rates. Additionally, LDOE's attempts to increase completion rates, whether they involve

¹⁶ I assume that completing coursework also reduces teacher turnover because the skills provided may increase teacher self-efficacy and well-being. However, I assume that turnover for these teachers is reduced to a lesser extent than for the teachers who obtain the ECAC since tax credits are only provided to the latter group.

¹⁷ I average these estimates to account for the fact that the national estimate is older and not specific to Louisiana, but uses the same definition of turnover as I do, while the Louisiana estimate is more recent but defines turnover as leaving a job in a specific center.

¹⁸ In this study turnover was defined as leaving a specific center rather than leaving any work in a Type III Head Start or early childhood center and so serves as an upper bound for turnover as I define it.

supports or mandates, may also affect retention for teachers who fail to complete an ECAC adding additional complexity to estimating separate turnover and completion rates.

In calculating effectiveness, I apply effect sizes from the literature to my estimate of the current ECAC completion rate in order to generate an estimated annual completion rate for each alternative. This completion rate is used to project the percentage of eligible teachers that complete ECAC coursework and obtain an ECAC credential by the end of each year, considering teacher turnover and the number of new teachers that earn an ECAC in that year. Thus, effectiveness measures the percentage of teachers in the workforce who hold an ECAC rather than the percentage of teachers who complete an ECAC, since the goal of the policy is to ensure that all early childhood teachers have the credential rather than to simply raise the percentage of teachers who obtain the credential. I calculate completion rates based on the number of teachers who start the ECAC coursework as compared to the number of teachers that complete the coursework and/or ECAC credential. This leaves out any teachers who do not start the credential. For the purposes of the analysis I assume that all teachers who are required to start the ECAC process do so and apply these estimated credential rates to the entire estimated population of teachers who are subject to the ECAC policy in Louisiana.

Additionally, I assume that the total population of teachers and demand for early childhood services remains stable over time unless there is evidence to suggest that a particular policy intervention would directly induce a change. I estimate the population of teachers as the total number of lead teachers who do not hold a CDA, AA in early childhood, or a BA, resulting in an estimate of 2330 teachers¹⁹. I estimate the number of teachers who already hold an ECAC credential using LDOE's scholarship records for a total of 625 teachers²⁰. Unless there is reason to believe otherwise based on a policy's theory of action, I assume that teachers who complete the coursework but fail

¹⁹ I calculated this using LDOE's Gold Database, which is intended to include all lead teachers in Louisiana, but for which I have no way to assess accuracy. I estimated this using two different methods and then averaged the results to generate the final estimate. First, I calculated the number of teachers whose educational background is categorized as "none" or "no degree". Second, I applied the percentage of teachers with an AA unrelated to early childhood, some college, or less in the SEE-LA data to the total number of teachers in the Gold Database. I do not use estimates from the ECAC candidate information reports because of the high proportion of missing data.

²⁰ I counted the number of teachers across all years who are listed as having a "career diploma." This assumes that none of these teachers have since stopped working as a lead teacher in a Type III Head Start or early childhood center. However, this assumption is potentially balanced by the fact that the credential data from 2019 are likely incomplete.

to obtain the ECAC will never complete the ECAC since the coursework requires substantially more time and effort than the post-coursework steps.

Below I provide an example of how these effectiveness calculations are carried out for the status quo. First, I start with 625 of 2330 teachers who have earned an ECAC and 843 who completed coursework only in Year 0. I then calculate the number of teachers with an ECAC and teachers with coursework only who turnover. Since they turnover these teachers become part of the population who need to complete an ECAC in Year 1. I use this number to calculate the total number of teachers who need to complete an ECAC by adding the number of teachers who failed to complete an ECAC in Year 0. I then use this total to calculate the number of teachers who complete the coursework only and the number who complete the full ECAC in Year 1, using the estimated coursework and ECAC completion rates. I also estimate the number of teachers who completed the coursework in Year 0 and who successfully obtain the ECAC in Year 1. Finally, I calculate the total number of teachers with no credential, with only coursework completed, and with the full ECAC by the end of Year 1. Then I divide the number of teachers with a full ECAC by the total number of teachers to calculate the cumulative completion rate. These calculations repeat for each subsequent year. The tables below illustrate this process.

Assumptions		Year 1 Calculations	
Turnover Rate for Completers	24%	<i>Beginning of year calculations</i>	
Retention Rate for Completers	76%	turnover for teachers with ECAC	150
Turnover Rate for those who complete coursework only	30%	turnover for teachers with coursework only	253
Retention Rate for Non-Completers	70%	total # of teachers didn't complete anything	862

Coursework completion rate	63%	teachers who need ECAC & coursework (all teachers who turnover and all who didn't complete anything)	1265
ECAC completion rate	30%	teachers who need only ECAC	590
Percent who complete ECAC late after doing coursework before, conditional on doing coursework but not doing ECAC	0%	additional teachers who get ECAC only because they completed coursework in the previous year	0
Total teachers in year 0	2330	additional teachers who get ECAC and coursework	379
		additional teachers who get coursework only	417
		<i>final calculations (end of year)</i>	
		Total teachers with nothing	468
		Total teachers with coursework only	1007
		Total teachers with ECAC & coursework	854
		Total Teachers	2330
		% of teachers with ECAC	0.37

Appendix D: Cost Calculations

I consider the following costs in calculating the administrative cost to LDOE:

Cost Category	Measurement Method	Cost Bearer
Administrative labor required to plan and administer the policy	Wage estimates for LDOE staff	LDOE
Materials required to plan and administer the policy	Market prices	LDOE
Services required to plan and administer the policy	Market prices	LDOE

I consider the following costs in calculating the social costs that stem from teachers who fail to complete the ECAC credential:

Cost Category	Measurement Method	Cost Bearer
Administrative labor required to plan and administer the policy	Wage estimates for LDOE staff	LDOE
Materials required to plan and administer the policy	Market prices	LDOE
Services required to plan and administer the policy	Market prices	LDOE
Scholarships to cover ECAC program tuition, varies by program	Average scholarship amount from the scholarship data provided by LDOE	LDOE
Scholarships to cover CDA fee, does not vary by program	Scholarship amount from the scholarship data provided by LDOE	LDOE
Opportunity cost of teachers' time to complete credential activities	Market wages	Teachers

I separately account for all costs incurred by teachers who complete only the coursework and teachers who complete neither the coursework nor the credential. For the latter category, I estimate the costs of LDOE scholarships and time as half the cost for coursework completion. I estimate scholarship cost by averaging scholarship amounts across the different ECAC programs. This average is not weighted based on program enrollment under the assumption that these enrollments might change over time and a weighted average would therefore provide false precision. I estimate the cost of the CDA scholarship by averaging the cost of the online and paper CDA

processes (Council for Professional Recognition, n.d.). I estimate the opportunity cost of teachers' time using the average hourly wage for childcare teachers in Louisiana (Center for the Study of Child Care Employment, 2018). Finally, I estimate the number of hours required based on ECAC program information and information from the CDA Council. A complete list of cost estimates is included below:

Scholarship costs per teacher	
Average coursework scholarship per teacher	\$2,687.26
CDA scholarship	\$462.50
Teacher Hourly Wage	\$8.95
Hours spent completing ECAC	
coursework	120
applied practice	30
homework (assume 1 hour per course hour)	120
CDA Activities exam = 1.75 hours exam studying = 10 hours Portfolio = 10 hrs Verification visit = 4 hours	25.75
Coursework Paperwork (assume 1 hour per form) LA pathways 2 scholarship program enrollment	4
Post-Coursework Paperwork (assume 1 hour per form) CDA scholarship CDA paperwork ECAC paperwork	3
Coursework Total Hours	274
Post-Coursework Totals Hours	28.75
Hourly Wage for LDOE administrator for director accountability policy	\$23

Annual Wage for LDOE administrator for suite of nudges & conditional scholarship alternatives	\$54,735
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Total costs across both time horizons are calculated using a standard discount rate of 3% and presented in net present value.

Appendix E: Well-being Projections

The final well-being projections for each alternative are presented below.

Alternative	Positive Impact	Weight	Negative Impacts	Weight	Total
Status quo	0	1	0	1	0
Director accountability	2	0.5	-2	0.75	-0.4
Conditional Scholarship payments	2	0.5	-3	0.5	-0.5
Suite of nudges	1	0.5	0	1	0.33

In evaluating positive and negative impact for each alternative, I use the following rubric:

Impact Score	Meaning
0	No impact
1	Limited impact
2	Some impact
3	Substantial impact

Translating evidence from the literature into quantitative measures such as these necessarily requires substantial judgment and therefore results may differ meaningfully under alternative assessments of potential impacts. In order to avoid false precision, I conducted a few sensitivity analyses with alternative evaluations of the literature.

Since the probability weighting is necessarily uncertain, I first reverse score (i.e. 3 = no impact and 0 = substantial impact) negative impact and recalculate well-being using a simple average without any weighting:

Alternative	Positive Impact	Negative Impacts	Total
Status quo	0	0	0

Director accountability	2	1	1.5
Conditional Scholarship payments	2	0	1
Suite of nudges	1	3	2

We can see from these results that the relative ranking remains the same and therefore continues to suggest the value of implementing director accountability and a suite of nudges over the remaining alternatives.

Second, I assume that the negative effects of conditional scholarship payments are more comparable to those of director accountability:

Alternative	Positive Impact	Weight	Negative Impacts	Weight	Total
Status quo	0	1	0	1	0
Director accountability	2	0.5	-2	0.75	-0.4
Conditional Scholarship payments	2	0.5	-2	0.5	0
Suite of nudges	1	0.5	0	1	0.33

This does change the relative ranking, with director accountability having the lowest well-being score. Similarly, if the negative effects of director accountability are assumed to be more comparable to those of conditional scholarship payments then director accountability continues to have the lowest well-being score unless the weighting of the negative impact for both alternatives is changed to match, in which case the well-being score would be equal for both alternatives.

Appendix F: Licensure Types in Louisiana

Louisiana offers the following licensure types:

License Type	Definition	Number of Centers ²¹
Type I	Centers that are owned or operated by non-profit religious institutions and receive no state or federal funding of any kind.	277
Type II	Centers with no religious affiliation that receive no public funding other than federal funding for food and nutrition.	193
Type III	Centers that receive state or federal funding beyond food and nutrition funding, including Head Start centers, pre-K programs operated by licensed public or private schools, and all other publicly-funded early childhood centers.	1011

Programs serving fewer than seven children are known as family or in-home child care centers and are subject to less stringent licensing requirements (Bulletin 137 Louisiana Early Learning Center Licensing Regulations, 2017).

²¹ These numbers are from December 2018. These numbers historically fluctuate even within a single calendar year, but the relative proportion of Type I, Type II, and Type III centers is reasonably stable (Louisiana Department of Education, 2018a).

Appendix G: ECAC Policy Rationale

A substantial body of research demonstrates that ECE programs can influence important student outcomes in the short and long-term (Bassok & Engel, 2019; Phillips et al., 2017; Yoshikawa et al., 2013). Concurrently, policy makers across the US increasingly see access to ECE as a key policy lever to address educational inequity (Friedman-Krauss et al., 2018). However, research also demonstrates that access alone is not sufficient to ensure positive effects on child outcomes. The quality of the educational experiences provided to program participants matters greatly, is often lowest for the most disadvantaged students, and is heavily influenced by the practices of ECE teachers (Bassok & Galdo, 2016; Burchinal et al., 2010; Peisner-Feinberg et al., 2013).

Research on professional development and credential programs demonstrates that these supports can influence teacher practice and student outcomes (e.g. Hamre et al., 2017) and suggests the need for large-scale policy efforts to professionalize the ECE workforce (Early et al., 2006; National Research Council, 2015; Phillips et al., 2016). However, there is limited understanding for how to design effective policies to accomplish these goals. Evidence for the effects of education, professional development, and credential programs on classroom quality and student outcomes is mixed, likely in part because of the substantial variety in program structures and approaches (Bassok, 2019; Phillips et al., 2016). Furthermore, existing policies are often criticized for placing additional burdens on or forcing out teachers who already face difficult circumstances, rather than supporting these teachers with obtaining additional education (Phillips et al., 2016; Whitebook et al., 2014).

Louisiana's ECAC policy is a unique large-scale policy effort to professionalize the ECE workforce. The policy provides a required but free route for practicing teachers to obtain the widely recognized Child Development Associate (CDA) credential and participate in sustained professional development focused on student-teacher interactions with opportunities for practice, mentoring, and coaching. These features are well-aligned with researchers' current understanding of the best practices for effective professional development for early childhood teachers (Desimone, 2009; National Research Council, 2015) and there is some evidence that student outcomes may be positively related to CDA completion (Early et al., 2006). Additionally, though teachers can obtain the credential through a variety of different program providers, Louisiana has established standardized ECAC program requirements that all providers must meet in order to obtain and maintain their authorization. As such, there is good

reason to believe that Louisiana's ECAC credential may improve teacher practice and student outcomes. However, since few teachers are currently completing the process, little benefit can be expected nor can the effects be evaluated. Increasing ECAC completion may therefore benefit both Louisiana's teachers and students in the short-term, but may also inform early childhood policy across the country in the long-term.