Supporting Early-Career Secondary Mathematics Teachers to Impact Retention

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Introduction

Approximately 12% of teachers in the United States leave the profession within their initial three years of teaching (Gray & Taie, 2015), the average national teacher turnover rate is approximately 8% a year (Sutcher et al., 2016), and the financial costs alone for replacing one teacher are estimated at $20,000 or more (Barnes et al., 2008). Half of all teachers are reported to leave the profession within their initial five years, and more alarming is that this rate is even higher for mathematics positions in high poverty schools (Fantilli & McDougall, 2009; Goldring et al., 2014). These staggering statistics too often lead to classrooms staffed with underprepared and/or unqualified teachers, which profoundly affects the mathematical preparation of students in high school, college, and beyond.

Experts agree that addressing the mathematics-teaching crisis meaningfully will require building a more cohesive system of educator preparation, support, and development (Mehta et al., 2015). Early-career teachers often feel isolated and those feelings of isolation are often associated with teachers leaving the field (Carroll & Fulton, 2004; Schlichte et al., 2005).

STRIDES (Supporting Teacher Retention and Induction in Diverse Educational Settings) is a national research team that is part of the Mathematics Teacher Education Partnership (MTE-Partnership) organized in cooperation with the Association of Public and Land-Grant Universities (APLU)’s Science and Mathematics Teacher Imperative. Since 2014 STRIDES has focused their research on teacher support and retention, because according to Sutcher et al. (2016), first-year turnover is cut by more than 50% when a focus is put on early career teacher mentoring, collaboration, and inclusion in a strong teacher network. The work of STRIDES is centered on this “cohesive system” that supports teachers from their educator preparation program throughout the early years in their careers. STRIDES believes that the support system must include numerous constituents such as university partners, mentor and veteran teachers, cooperating teachers, and administrators, as well as early career teachers themselves.

Effective Teacher Support

Effective teacher support is necessary as early-career teachers navigate the challenges that may impact their decision to stay in the profession. A comprehensive induction program includes opportunities to: 1) work with other colleagues in learning communities, 2) observe experienced teachers’ classrooms, 3) be observed by expert mentors, 4) analyze one’s practice, and 5) network with other early-career teachers. Unfortunately, less than 1% of teachers receive all of these components in their induction programs (Ingersoll & Smith, 2016); however, one support that has been reported and perceived as beneficial is developing a relationship with a mentor teacher whom they can trust (Martin et al., 2015). It is helpful to have a person on campus to rely on for basic questions, someone to assist with the necessary paperwork and to be “a shoulder to cry on” in a time of need. In addition to this “buddy role,” the mentor teacher needs to have the training and skills to impact teaching practices and
When early-career and mentor teachers collaborate to improve instruction, students learn more and teachers have higher job satisfaction (Johnson et al., 2005; DuFour, 2015). Even though many reasons influence teacher retention, from pay and teaching assignments to support from administrators and opportunities for professional growth, research has shown that a teacher’s sense of being effective impacts their job satisfaction, which in turn, impacts retention (Johnson and Birkeland, 2016).

The Past Work of STRIDES

To respond to the teacher retention crisis, STRIDES created a survey as an initial step to study the current support systems of early-career secondary mathematics teachers. One research question guiding this work was: What is the perceived scope, nature, and impact of professional support for early career mathematics teachers? This survey was created through an iterative design and vetting process (protype, test, tweak, repeat) that extended from the fall of 2014 to early 2016. The main goal of the survey was to better understand the degree to which early-career mathematics teachers perceived various learning opportunities as influential to their interest in teaching mathematics. By better understanding current support systems, the team could develop interventions that would strengthen and replicate systems that were working and attempt to improve broken ones. The survey consisted of 25 questions asking respondents to report on their current support systems, job satisfaction, projected longevity in the field, and other related topics. The survey was given in November of 2016 and gleaned 141 responses from teachers across the nation. Results from this study are presented in Amick et al. (2020).

The vast majority of early-career teachers surveyed had received mentoring or coaching from someone at their school site, and almost (89%) all of them found that experience to be moderately or very influential to their enthusiasm for teaching mathematics. This finding is consistent with other research on induction programs (Ingersoll & Strong, 2011; Youngs et al., 2019). In their review, Ingersoll and Strong (2011) found that induction programs and especially teacher mentoring programs positively influenced early-career teachers’ satisfaction, commitment, and/or retention. This result suggests that local support from a mentor or coach is a vital component to new teacher success that needs to be replicated for new teachers lacking such support. Another survey finding was that approximately 10% of teachers wanted more meaningful support from their administration. Teachers reported going to administrators for a variety of needs (curriculum, classroom management, course assignments, assessment, instruction, collaboration and affirmation), but that desired support was often lacking or was “not valuable”. STRIDES identified this as a focal area because teachers who feel that they are supported by their administrators are more likely to be satisfied with their career and remain in teaching longer than those who do not feel supported (Djonko-Moore, 2016; Redding & Henry, 2018; Ronfeldt & McQueen, 2017).

Based on the survey findings and supported by past research, two interventions were designed and piloted during the 2018–2019 and 2019–2020 academic years. The interventions were designed to provide targeted support to first-year teachers by: (1) strengthening the mentor/mentee relationship with the school principal through monthly communications over suggested discussion topics, and creating these relationships where they did not currently exist; (2) strengthening the relationship between these teachers and their administrators via 5-minute video discussions on best practice strategies for teaching mathematics. The overall methodology for this work was a design experiment approach (Cobb et al., 2016), focusing on a problem in practice and pragmatically designing an intervention to impact that problem with multiple iterations of implementation and (re)design. In keeping with a design experiment approach, the interventions were modified over the two years, based on continuous analyses, in an effort to improve the interventions. The main data sources collected were end-of-the-year surveys from the participating teachers, mentors, and administrators, and informal
communications such as emails and personal conversations.

Over the two years that the pilot interventions were tested, one major finding arose: the idea that university support is most effective and useful during the pre-service years, but once teachers begin their first year teaching, university support gives way to local support and teacher self-efficacy. This is consistent with other research in the field such as Scherer (2012) and Hunt (2014) that both show university support to dwindle as the teacher progresses throughout his/her career. As much as STRIDES tried to dovetail the interventions into existing mentoring systems, the intervention tasks still felt like “one more thing” to the teachers and often were not a priority. This led STRIDES to realize that early-career teacher support occurs over a continuum, starting with the pre-service years, transitioning into the early years of their careers, and that the support each year looks different, with the major constituents changing over time. STRIDES research, supported by past research, shows that extensive, cohesive, and organized support systems are one of the most influential aspects impacting teacher retention (Ingersoll & Strong, 2011; Youngs et al., 2019; Sutcher et al., 2016). For these systems to operate optimally and have the greatest impact on teacher retention, STRIDES advocates that the support must begin during the pre-service years of a teacher’s career, extend through the first critical years, and involve numerous constituents with well-defined roles. Figure 1 shows the early years of a teacher’s career and how university partners provide substantial support early on, and are replaced by teachers’ colleagues/mentors and administration, with the teacher eventually relying heavily on self-efficacy for the main means of support.

![Figure 1. Cohesive Support System.](image)

**Support System Responsibilities**

Guarino et al. (2006) show that the more types of support teachers experience, the lower the likelihood of their leaving or changing schools. Support can and should include supportive administration, collegiality within their schools, professional development opportunities, community support, support from university partners, and even self-efficacy and self-advocacy. Those with roles in providing this support include: university partners, mentors/veteran teachers, administration, and the beginning teacher.

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University Partners

One way that the community can support early-career teachers is to have strong connections with university partners. School-university partnerships have potential for connecting theory to practice in meaningful ways in the first years of teaching (Hunt, 2014). University partners can champion and advocate for policies in the profession that better serve teachers and students. However, partnerships too often focus only on clinical experiences with pre-service teachers and mentors and therefore have limited impact during the induction years (Scherer, 2012). Nonetheless Bastian & Marks (2017) found increased retention rates for first year teachers utilizing a university-school induction program. Programs designed to support early-career teachers provide benefits to both universities and schools, leading not just to better outcomes for students, but also for educators at all levels to learn from each other (Ball & Cohen, 1999).

Early-Career Teacher’s Colleagues

The early-career teacher’s colleagues have a lot of responsibility to help support and retain their newly hired colleague (Daly, 2010; Le Cornu, 2013). High quality collegial relationships on an emotional and social level support beginning teachers and help them feel part of the team (Thomas et. al, 2019). Being available for lesson planning assistance and feedback after an observation, while important, is often not enough. Early-career teachers report looking for their coworkers to show kindness, patience, and a willingness to collaborate and change practice based on what is best for students (Shoval et al., 2010). Early-career teachers often report feeling most supported by personal relationships with approachable colleagues (Resta et al., 2013). In fact, feedback is better received when it is based on a trusting relationship. For a couple of reasons the responsibility for developing these relationships falls on the early-career teacher’s colleagues. First, the early-career teacher is often too overwhelmed to make time to initiate these relationships, and, second, the early-career teacher often feels like an outsider as a new member to the school community.

Administrators

As evidenced by the graph above, administrators play a crucial support role, especially in the first year. Teachers who feel that they are supported by their administrators in carrying out professional responsibilities are more likely to be satisfied with their career and remain in teaching longer than those who do not feel this support (Djonko-Moore, 2016; Podolsky et al., 2016; Redding & Henry, 2018; Ronfeldt & McQueen, 2017). Teachers’ responses to administrative practices can affect teacher trust of administration, the ability of teachers to ask for support, and their general ability to do their job effectively (Corbell, Osborne & Reiman, 2010; Hanselman, 2016; Ladd, 2011). A number of studies focus on the ability of school administrators to ensure that the school environment is supportive of teaching, with effective professional development, substantive evaluations of teaching, and avenues for engagement with other teachers and members of the local community (Carver-Thomas & Darling-Hammond, 2017; Dizon-Ross, 2018; Ford, Urick & Wilson, 2018).

Early-Career Teachers

Early-career teachers themselves also have a responsibility for their role in this cohesive support system. They need to be willing to ask for help when they are struggling or feeling overwhelmed (Darvin, 2018). They should be aware that teacher burnout exists and take action to prevent it (Little & Bartlett, 2002), including not grading every paper that comes across their desk, making time for self-care, and working to create a manageable work-life balance. New teachers operate on a big learning curve, so embracing mistakes or hard situations as learning opportunities rather than internalizing them is another key to avoiding burnout (Sackstien, 2018).
In her book *Risk.Fail.Rise.: A Teacher’s Guide to Learning from Mistakes*, Maria Colleen Cruz (2020) argues that mistakes are not the problem. Rather the problem is the shame attached to mistakes and the inability to grow from them. Early-career teachers tend to be hard on themselves, so it is crucial they have a mindset that destigmatizes mistake-making. This will allow new teachers to do the real work of professional growth, as well as to model through their own mistake-making and improve their responses to others’ mistakes. Being a lifelong learner is important, and early-career teachers must be willing and eager to receive and act upon constructive criticism to improve their practice (Martin et al., 2015).

Putting effort into professional relationships and seeking professional development should also be a

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**Figure 2. Types of Support Over Time.**

<table>
<thead>
<tr>
<th>Teaching Year</th>
<th>Constituent</th>
<th>Level of Support</th>
<th>Types of Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preservice Year</td>
<td>University Partners Early Career Teachers' Colleagues</td>
<td>strong</td>
<td>model and promote research based teaching practices, provide seminars for teacher candidates on job securing process, coordinate field placements for teacher candidates, build relationships with classroom teachers and administrators</td>
</tr>
<tr>
<td></td>
<td>Administration</td>
<td>minimal</td>
<td>encourage preservice teachers in the building and provide constructive criticism on teaching</td>
</tr>
<tr>
<td></td>
<td>Pre-service Teacher</td>
<td>moderate</td>
<td>focus on learning outcomes, create a professional network and begin to use it</td>
</tr>
<tr>
<td></td>
<td>University Partners Early Career Teachers' Colleagues</td>
<td>moderate</td>
<td>be available for content and pedagogy questions and resources, encourage community within newly graduated teacher cohorts, keep current on research that shows positive effects on teacher retention, working with mentors and administration to help with on-site support, discuss with principals how to specifically support new teachers</td>
</tr>
<tr>
<td></td>
<td>Administration</td>
<td>strong</td>
<td>ask for help and be open to constructive criticism, prioritize tasks, set limits and focus on effective processes, put time and effort into professional growth, use your professional network (mentor, cooperating teacher, university professors, etc.)</td>
</tr>
<tr>
<td>Year 1</td>
<td>University Partners Early Career Teachers' Colleagues</td>
<td>strong</td>
<td>and consider lighter teaching loads, less extra curriculars, and or extra prep periods, develop personal and professional relationships of mutual respect with new teacher, purposefully assign a mentor and create time and space for that relationship to develop, conduct early on, low-stakes observations with meaningful feedback, recognize and support the teacher as the subject matter and pedagogical expert</td>
</tr>
<tr>
<td></td>
<td>Administration</td>
<td>strong</td>
<td>provide meaningful feedback via observations that are content and pedagogy specific</td>
</tr>
<tr>
<td></td>
<td>Novice Teacher</td>
<td>moderate</td>
<td>Seek out professional development opportunities, use your professional network</td>
</tr>
<tr>
<td>Year 2</td>
<td>University Partners Early Career Teachers' Colleagues</td>
<td>minimal</td>
<td>provide professional development as needed</td>
</tr>
<tr>
<td></td>
<td>Administration</td>
<td>moderate</td>
<td>serve as mentors, advocate for less classes or an extra prep period</td>
</tr>
<tr>
<td></td>
<td>Early Career Teacher</td>
<td>moderate</td>
<td>champion educational friendly policies, advocate for the professionalization of teaching, stay abreast of current research and use it to update programs to meet the changing needs of educator preparation programs</td>
</tr>
<tr>
<td>In General</td>
<td>University Partners Early Career Teachers' Colleagues</td>
<td>moderate</td>
<td>be approachable and make early career teachers feel welcomed and part of the team, assist with lesson planning, analyzing student work, assessment data, and assist with classroom management</td>
</tr>
<tr>
<td></td>
<td>Administration</td>
<td>moderate</td>
<td>champion equitable working conditions for teachers (class size, supplies, planning time, etc.), provide technical infrastructure as needed, offer meaningful and effective professional development, be trustworthy and approachable, foster a school climate that is supportive of growth mindset and mistake making, advocate for community support, acknowledge teacher accomplishments and successes, effectively evaluate teaching in a collaborative manner</td>
</tr>
<tr>
<td></td>
<td>Pre-service Teacher</td>
<td>moderate</td>
<td>maintain healthy work/life balance, use reflective practices such as journaling and professional noticing to improve teaching, continually update and utilize professional networks, seek out professional growth experiences</td>
</tr>
</tbody>
</table>

focus, as those professional networks have shown to impact retention (Johnson et al., 2005). Not only is each constituent’s role important in the early-career teacher support process, but those roles change over time. For example, university support is strong during the pre-service years but gives way as the early career teacher develops self-efficacy and local connections. Figure 2 begins to outline what this support looks like in the pre-service year, the first two years of teaching, and also lists some general support strategies that the supporting constituents can use. This figure was created by the STRIDES team as a way to merge past research into the work they have done over the past several years. This tool can be used by districts to provide a meaningful and cohesive support system for their early-career teachers.

**Conclusion**

While much focus is on why teachers leave the profession, there are teachers who persist. Identifying the factors that impact stayers and leavers is important in creating the support systems for early-career teachers (Inman & Marlow, 2004; Hong, 2012). Veteran teachers value interactions and support of colleagues, and what keeps them coming back is a desire to master their craft and have an impact with meaningful work (Barnes, 2019). Teachers who stay and thrive do so because of a combination of supports that are strong, reliable, and consistent with professional goals and expectations. With strong support systems, the hope is to have more teachers persist and have an impact on the teacher attrition issue.

**Author Note**

We have no known conflict of interest to disclose. Correspondence concerning this article should be addressed to Lisa Amick, College of Education, Department of STEM Education, University of Kentucky, 105 Taylor Education Building, Lexington, KY 40506-0017.

**Definitions**

- **Pre-service Teacher** - a student enrolled in an education preparation program prior to certification/licensure
- **Cooperating Teacher** - certified teacher mentoring a pre-service teacher in the area of certification
- **Early-Career Teachers** - teachers in their initial three years of teaching

**References**


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*Preventing School Failure, 50*(1), 35–40. [https://10.3200/psfl.50.1.35-40](https://10.3200/psfl.50.1.35-40)

