Blended Learning: Is Meaningful Cost Avoidance Possible?

A review of blended learning models and their potential to contribute to sustainable school redesign

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Executive Summary

The Department of Elementary and Secondary Education (ESE) and the TIME Collaborative1 have partnered over the last three years to help schools and districts implement high quality, well designed expanded learning time (ELT) through proven, high-value delivery mechanisms. This paper examines the potential for blended learning models to contribute to financially sustainable ELT by freeing resources spent on traditional instruction and materials to achieve more learning time with limited funds.

When a school adopts digital learning on a large scale, most expect that the major savings will result from replacing textbooks with less expensive or free virtual content. However, eliminating traditional, hard-copy textbooks in practice recaptures few resources, mostly because textbooks are only a small part of most school and district budgets. For Massachusetts, a survey of End-of-Year Reports (EOYRs) for fiscal year 2014 shows that all instructional materials, of which textbooks are a subset, average only 4.7 percent of district instructional services expenses and only 2.8 percent of education spending as a whole. Reclaiming textbook expense, at approximately 0.5 percent of average per pupil expenditures statewide, simply will not generate significant cost savings, particularly in light of the

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technology costs that districts may incur to implement blended learning. Realizing meaningful savings by adopting digital learning will be more likely if it allows a school system to reduce or restructure staff costs (which average 64 percent of school budgets), especially considering that the cost of technology is rising, if at all, at a much slower rate than the cost of human capital.²

One approach to blended learning that has achieved particular celebrity for both gains in student achievement and cost-savings is a model championed by Rocketship Education (“Rocketship”). Rocketship is a charter school operator founded in 2006 that manages a network of 11 charter schools, 9 in San Jose, California and 1 each in Milwaukee, Wisconsin and Nashville, Tennessee.³ Rocketship originally planned to open 60 schools nationally by the 2017—2018 school year⁴, but growth projections have since been downscaled to 33 schools by 2018—2019.⁵ Because the network in part finances its growth through funds received from member schools in the form of management fees, its model is consciously constructed to sustainably operate its schools while supporting the growth of the network.⁶

Key to Rocketship’s model is that all students have at least one period per day of online learning, small-group work, and targeted intervention in a lab setting. Labs are staffed by paraprofessionals known as Rocketship tutors who are tasked largely with technical assistance and behavior management, although tutors have provided some instruction in more recent iterations of the lab model.⁷ Rocketship tutors are

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paid $29,790 a year on average, which is 35 percent of the average certified teacher’s salary at Rocketship of $85,000. Rocketship uses computer lab periods to employer fewer certified teachers, while claiming to provide better individualized learning and extending the reach of its most qualified teachers. Rocketship students, the majority of whom are English language learners (ELL) and low-income, consistently outperform their peers on state testing. One study, using 2012 data, estimated that Massachusetts districts could have freed up more than $300 million in salary expense in if all districts adopted a Rocketship-style lab rotation model for grades 1 through 5. However, this figure omits the cost for digital software, hardware, and infrastructure and does not take into account Massachusetts regulatory requirements for learning time and local teacher contracts, which that may require certified teacher involvement to a degree not required in states where Rocketship operates.

With its eye on the bottom line, Rocketship’s model provides evidence of blended learning’s capacity to change the economics of a school system. Rocketship adopted lab rotation not only to provide customized learning for students, but also as to generate sufficient savings to fund Rocketship’s rapid network growth. Most recently, Rocketship tested the limits of its model by adopting a computer lab rotation for entire grades and entire school days, dubbed “flexible classrooms.” Students were assigned by grade to large open spaces where they rotated throughout the day among different phases of digital and live instruction. This shift allowed Rocketship to realize a higher ratio of students to credentialed teachers, approaching 50 to 1, and to coax more surplus revenue from its model in avoided salary costs, as much as $200,000 more per school to redirect for network growth. Unfortunately, significant declines in both student assessments and teacher retention prompted Rocketship to eliminate this open-format

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8 Barrett 2013, 6.
9 Barrett 2013, 3.
10 Herold 2014, 4.
11 Simburg 2012, 7.
12 Herold 2014, 3, 6.
14 Herold 2014, 6.
classroom model for all but grades 4 and 5, which did show academic progress with the change, and to return younger students to its original lab rotation model.\textsuperscript{15}

Because Rocketship is a charter school network, it enjoys budget, program and staffing autonomies that facilitate cost-sensitive design and redesign of its blended learning programs that are not available to most district schools. However, the economic premise of its experience with blended learning may be transferable to district schools with the will to redesign with cost in mind: The Rocketship lab rotation model attests to the notion that blended learning, purposefully and carefully implemented, can allow reductions in the numbers of certified staff positions, thereby avoiding costs, while at the same time improving student learning. Charlotte-Mecklenburg Schools (CMS) in North Carolina recently adopted sustainable redesign at several of its district schools. This model focuses on extending the reach of a school’s best teachers without adding cost. CMS’ is implementing strategies developed by a nonprofit partner Public Impact and includes a blended learning option. Public Impact calls its strategy the Opportunity Culture Initiative, in part because it provides multiple opportunities for highly skilled teachers to remain in the classroom. As they advance in their careers, these teachers become responsible for more students’ learning both through targeted teaching and improving their teams’ skills and execution and earn more for doing so. Equally important in the redesign is managing resources to make changes without adding to the bottom line. The Public Impact approach uses design components that allow a shift of resources to more highly paid teachers without breaking the bank. Among other strategies, schools are encouraged to use digital labs and classroom technology, where appropriate, to supplement excellent live teaching.\textsuperscript{16} Of the four CMS schools that are using the Opportunity Culture approach to redesign, two have chosen to incorporate elements of blended learning. While CMS just finished its second full year of experience with its four original redesigned schools (17 more were added in 2014-

\textsuperscript{15} (Id., pp. 7--8).
2015), it expects to have more than half of the district’s schools implementing a customized Opportunity Culture strategy by the 2017-2018 school year.

Closer to home, among the Massachusetts district schools noted for adopting blended learning in earnest, Burlington Public Schools (Burlington) stands out. Burlington implemented blended learning starting in 2011 and included all grades by the 2014-2015 school year, ensuring that every student in grades 1 through 12 has a personal digital device. However, because Burlington embraced blended learning as an educational enhancement without particular attention to cost avoidance, neither its design nor its evaluation to date has focused particularly on cost savings. Nevertheless, Burlington’s transformation from traditional to blended learning, in place at the high school level for almost five years, resulted in the reallocation of some resources as a result of the adoption of the new learning platform. Most notably, Burlington can point to the following resource shifts:

- shifting away from lab-based learning and repurposing 9-10 computer labs (costing between $25,000 and $100,000 to construct and operate)
- instituting internally led professional development rather than using consultants
- eliminating 15 servers in favor of cloud-based computing
- reducing permanent high-school substitutes
- Decentralized curriculum development (from central office to schools, as school-based curriculum has been facilitated with the shift to digital learning and aided by technology integration specialists).

With respect to staff reallocation, Burlington’s leadership refrained from reducing core instructional staff despite the potential to allow student-to-teacher ratios to rise as with Rocketship. Rather, the district reinvested resources in increased individual teacher attention to students that would not have been possible with the traditional classroom model.

For districts looking to affordably expand learning over longer days and a longer school year, an intentionally constructed blended learning model may allow schools to achieve quality instruction over more hours without a corresponding increase in numbers of certified teachers. For example, in Salem,
Massachusetts, Collins Middle School currently has an average class size of 19.1 students. If the average class size were hypothetically allowed to rise to 23 students by establishing classroom station rotations that included self-directed, digital learning for students during a portion of each class, Collins may be able to redeploy as much as $848,291 in staff time or $1,351 per student (based on average salaries) – which could cover the cost of an extended school day.\textsuperscript{17} Of course, some of these resources would likely be redirected to acquire hardware, software, and other startup materials associated with the blended learning model as well as adding some paraprofessional staffing.

The cost savings from blended learning models discussed in this paper do not account for all organizational limitations that may be encountered by individual schools and districts, such as:

- contractual transfer and bumping rights and limitations on class size or staff-student ratios
- regulatory requirements for special student populations
- district (rather than school) control of staffing and budget
- the potentially substantial upfront investment required to create and equip an appropriate digital learning environment.

Nor do the hypotheticals discussed here necessarily include expanded time for teachers to plan, collaborate and participate in professional development. However, with focused, creative planning and foresight, these limitations may be negotiated to allow cost savings and reveal new opportunities and synergies.

**BLENDED LEARNING AND THE BOTTOM LINE**

1. **Blended learning designed for savings**

   Despite the potential savings that technology represents, a simple trade-off of traditional learning modalities for a digital platform is unlikely to generate substantial savings unless resource reduction and/or redeployment is clearly identified as a primary goal of redesign. As one blended-learning research specialist noted, “It’s not hard to make [blended learning] cost-neutral, but it’s hard to make it a

\textsuperscript{17} Notably, Collins received funding through the MA ELT grant for school year 2015.
savings.” Though challenging, intentional inclusion of blended learning strategies as part of an ELT (or any) redesign can yield resources for reallocation, particularly through redeployment of human capital to more cost-effective configurations.

A. Blended learning models.

For students, blended learning can run the spectrum with respect to reliance on technology, including:

- **Smartboards** at the front of traditional classrooms to allow delivery of both digital and traditional content.

- **Classroom rotation**, defined as a system where “students rotate on a fixed schedule or at the teacher’s discretion among classroom-based learning modalities . . . [which] includes at least one station for online learning.”

- **Computer lab rotation**, defined as a system where “students rotate on a fixed schedule or at the teacher’s discretion among locations on the brick and mortar campus where large numbers of students pursue individualized online learning. At least one of these spaces is a learning lab for predominantly online learning, while the additional classroom(s) house other learning modalities,” this model, or a permutation thereof, forms the basis of Rocketship’s strategy, discussed herein.

- **One-to-one models** in which each student has and uses a portable electronic device (laptop or tablet) throughout the school day and beyond to receive and/or enhance instruction; and

- **Virtual schools** where “all [learning] activities occur at a distance, with interactions facilitated by technology.”

Clearly, then, integration of digital content into student learning is as diverse as educators’ imaginations and students’ needs. However, given its demonstrated potential for reducing expense, the computer lab rotation model (lab rotation) and classroom station rotation model are further explored here.

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20 Horn 2011, 9.


22 Because this report is principally an analysis of cost, it offers only anecdotal evidence of relative educational value of various models, usually in the context of reporting case-specific uses of technology and related expenses. In fact, one study noted that due to the relative youth of blended learning strategies, “limited availability of
Lab rotation model. According to Simburg and Roza, introducing technology as a path for reducing the need for human capital is a strategy that gets smarter, economically, with age. In a presentation of their research on the lab rotation model and its promise for cost savings, these researchers observe that computer-based models can allow increases in student-teacher ratios (and therefore free some teacher time for redeployment to a longer day, for example) without detriment to student learning. Their argument for shifting investment of educational resources to technology is rooted in recent trends in wage, salary, and benefits, all of which have steadily increased in cost, juxtaposed against a steady decline in the cost of hardware and software. Furthermore, they note that labor and benefits costs, which currently account for upwards of 53 percent of in-district educational spending in Massachusetts, will likely outpace the growth of local revenue if instructional strategies continue to be labor-intensive. Extending the reach of teachers with technology, then, makes good economic sense and good sense overall if doing so can simultaneously benefit student learning.

Using a calculation that employs some broad assumptions, Simburg and Roza calculate that Massachusetts could annually free up more than $300 million in educational funds if all of its district elementary schools adopted a lab rotation model like that used by Rocketship. To arrive at this figure, the authors assume that lab rotation will reduce the need for certified teachers by 25 percent along with their salary and benefit costs because labs, where students will spend 25 percent of their learning time, will be staffed with paraprofessionals, who are paid, on average, only 38 percent of a certified teacher’s salary. Interestingly, Simburg and Roza leave additional professional development necessary to bring digital learning online, as well as materials and reliable and consistent cost and outcomes data prevents robust conversations related to productivity.”

Butler Battaglino 2012, 2.
Simburg 2012, 1.
Simburg 2012, 2.
Simburg 2012, 7.
Simburg 2012, 5.
equipment, out of their analysis, stating that software costs vary too widely to assign a cost to adopting blended learning.

While avoiding the cost of technology is arguably irresponsible given that hardware, software, and related costs cannot be similarly avoided by schools and districts, the overarching point is well taken. Compared to staffing costs, technology has historically been less expensive. However, the cost of building and maintaining a digital environment, in both materials and human capital, is not insubstantial and must be figured into the funding mix for any district contemplating a move in the digital direction. As one researcher comments, the financial benefits of blended learning “must be balanced against additional investments to support blended learning. Several operators [in case studies] have experienced increased expense for computer labs, student laptops, network infrastructure, or licensing fees for online programs. In some instances, new staff positions have been essential supports for the blended model.”

As discussed earlier, Rocketship’s lab rotation model is perhaps the most well documented example of blended learning’s potential for resource reallocation. Rocketship has demonstrated initial success not only by improved student achievement, but also in terms of conserving and reallocating education dollars. Rocketship’s financial strategy was designed and was subsequently redesigned to generate surplus funding by reducing staff-to-student ratios in its nine schools. These funds were reinvested in part in school programming locally, but also to support ambitious network growth.

As a charter school network, Rocketship has freedom to make staffing and budget decisions and set salaries and work rules without reference to collective bargaining agreements and navigation of the bureaucratic and political terrain that school districts firmly occupy.

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28 Butler Battaglino 2012, 3.
Despite this latitude, Rocketship has publicly committed to paying its professional staff salaries higher than district teachers working in the vicinity of its schools. While this policy ostensibly elevates costs, Rocketship’s founders have also committed to hiring at least 50 percent of its staff from Teach For America (TFA), thereby assuring that much of its staff will be young, relatively inexperienced, and occupy a lower rung on the pay scale relative to a more experienced teaching force. Because staff costs consume 60–80 percent of school budgets, the TFA pipeline, paired with the lab rotation model, supports Rocketship’s lower overall staff costs a large portion of its TFA teachers leave Rocketship after two or three years (TFA requires only a 2-year commitment), which has been the pattern for TFA,\(^{29}\) and will be replaced with a new group of junior staff. In 2013, Rocketship lost 29 percent of its teaching staff at the end of the school year.\(^{30}\) While staff turnover may ostensibly favor Rocketship’s fiscal strategy, it raises questions about potential cost in losses to organizational stability and student learning.\(^{31}\)

So how has Rocketship’s blended learning model benefited the bottom line in practice? One estimate puts the net yearly surplus at $750 per pupil or approximately $500,000 per school per year. The majority of these savings come from lower salary costs and higher student-to-teacher ratios. In fiscal year 2013, in an effort to coax more revenue from its model, Rocketship turned to a flexible classroom model that placed students by grade in vast open classrooms that could contain upwards of 100 students in an effort to further increase student-to-teacher ratios with an initial target of 50-to-1. With this change to its model, Rocketship sought to reduce costs


\(^{30}\) Herold 2014.

by an additional $200,000 per school.\textsuperscript{32} However, along with this design change, Rocketship experienced declining test scores and teacher dissatisfaction, causing it to quickly back off this-model, which in future will be limited to grades 4 and 5 (where students fared best academically). Younger grades will return to smaller classrooms and the original lab and station rotation model. Rather than an indictment of blended learning, Rocketship’s recent flexible-classroom stumble may be more a result of pushing its model to the point of failure—an extreme perhaps motivated by overly ambitious plans for growth—and not an inherent weakness in the concept of integrated digital learning. Adopting a less aggressive implementation of the lab rotation model continues to offer promise for a win-win: lower per-pupil costs and a more customized learning model, which may allow districts and schools to leverage resources for other important initiatives.

2. **Cost implications of other blended learning models.** While research on the financial component of blended learning models is scarce\textsuperscript{33} and often focused on charter schools,\textsuperscript{34} the fiscal experience of blended learning schools demonstrates some common patterns. Those schools and models that produced the largest per-pupil savings compared to traditional classroom expenses are those that reduced the number of certified or higher-paid staff by increasing student-to-teacher ratios overall. In some instances these schools use paraprofessionals instead of certified teachers for times when learning is primarily digital or allow teachers to reach more students through technology, as with virtual classrooms or a classroom station rotation arrangement. Savings from non-staff expense categories, like instructional materials, are generally insufficient to fund material redesign.

The Charlotte-Mecklenburg Schools’ (CMS, in North Carolina) recent redesign of teaching models and salary structure in some of its district schools may provide evidence for using blended learning as a component of revenue-neutral school improvement in a district setting. CMS finds itself at

\textsuperscript{32} Herold 2014, 6.
\textsuperscript{33} Davis 2014.
\textsuperscript{34} Butler Battaglino 2012, 4.
the intersection of numerous turnaround initiatives. It most recently added a strategy developed and
promoted by nonprofit Public Impact, known as the Opportunity Culture initiative. This initiative is
designed to affordably amplify the effect of the best teachers on the professional school culture as well as
to provide professional and monetary incentives for these teachers to remain in the classroom as an
alternative to administrative careers.35

CMS piloted the Opportunity Culture at four schools in the 2013-2014 school year, pulling
together teacher planning teams who met for more than a year before rollout at each school.36 The
Opportunity Culture stresses extending the reach of excellent teachers by giving each responsibility for
more students through teacher leadership roles, teaching one specialty subject to all elementary students,
and using blended learning to increase class size and allow collaboration time. Teacher salaries rise with
new responsibilities. In order to achieve revenue neutrality, Public Image provides a matrix of
possibilities to fund the chosen Opportunity Culture, many relying on thoughtful use of technology:

- differentiating responsibilities so that lower compensated staff, such as paraprofessionals,
can deliver basic content and monitor online learning;

- shifting nonclassroom specialists back into the classroom (except special education and
  language learning specialists); and,

- increasing class size.

Two of the first four CMS school teams to implement the Opportunity Culture in 2013-
2014 chose “Time-Technology Swaps” where students spend portions of their day learning in
computer labs or using 1:1 devices to stretch certified teacher time. While financial and
achievement data have not yet been reported for the pilot schools, CMS has been sufficiently

Roles Create Culture of Excellence in High-Needs Schools. An Opportunity Culture Case Study.” Public Impact.
content/uploads/2013/06/Charlotte_N.C._Project_L.I.F.T._An_Opportunity_Culture_Case_Study-
Public_Impact.pdf.
satisfied with the results to adopt the Opportunity Culture initiative in 17 additional schools in school year 2014-2015 and over half the district by school year 2017-2018.

In sum, the few studies of the financial benefits of blended learning\(^{37}\) demonstrate that cost avoidance is possible if the chosen design allows student-to-teacher ratios to grow, using technology for targeted and often individualized learning tasks. However, without a deliberate focus on using technology to bolster the bottom line, blended learning’s capacity to generate cost savings may not materialize and certainly will not be maximized.

**VIGNETTES FROM THE FIELD**

As with the case studies cited above, in Massachusetts districts the real potential for resource reallocation with blended learning lies in reducing or redeploying professional staff, which accounts for the most significant expense in most schools. Reducing or even eliminating traditional instructional materials like textbooks, which represent comparatively little expense, will not support material redesign.

More explicitly, pursuant to end-of-year district expense reports filed annually with ESE, Instructional Materials expense accounts for about 4.7 percent of all Instructional Services on average, statewide, and 2.6 percent, on average, of education and operating budgets.\(^ {38}\) Four Massachusetts districts, Salem, Boston, Fall River and Lawrence, all of which have expanded time in at least some of their district schools, spent only 1 and 3 cents of every instructional dollar for instructional materials in fiscal years 2012 and 2013, respectively, whereas an average of 50 and 60 cents of every dollar went to pay teacher salaries and benefits. Therefore, even if large savings were realized in the instructional materials line item due to implementation of

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\(^{37}\) Bernatek 2012 and Butler Battaglino 2012.

\(^{38}\) In calculating school expenditures, this memorandum adopts the ESE protocol of excluding certain categories of expense that tend to represent one-off expenses, as well as those expenses that are directed outside of the school system. Massachusetts Department of Elementary and Secondary Education. 2013. “District Analysis and Review Tools (DART), User Guide for DART Detail: Staffing and Finance,” October.
blended learning, the effect on a district’s overall education budget will not be sufficient to support substantial new programming.

However, as discussed above, purposeful implementation of blended learning can allow strategic repurposing of staff resources (including for such educational strategies such as ELT). The following vignettes provide anecdotal descriptions of changes (both programmatic and financial) in district schools that have a substantial digital learning component for curriculum delivery, as well as a hypothetical discussion of the potential for blended learning to help finance ELT in two district schools.

I. Burlington

Burlington has established itself as the headliner for blended learning among Massachusetts public school districts and was one of the few involved in districtwide, online field testing of the PARCC assessment in the spring of 2014. Currently, every student in the district (3,499 in school year 2014-2015) has a personal digital device (“1:1”), the use of which is integrated into the curriculum in various ways, depending on grade, subject, and instructor.

Financial analysis of Burlington’s spending over five years from fiscal year 2009 through fiscal year 2013, illustrated in Table 1, shows a slight decline in the total instructional materials expenditures after fiscal year 2011, when blended learning was rolled out in earnest, although the decline had begun two years before, and, counterintuitively, seems to be headed in an upward direction at least for fiscal year 2013. However, textbooks as a subset of all instructional materials expense has been in steady decline since fiscal year 2009, perhaps indicating a shift in the type of instructional materials being purchased as a result of the district’s digital priority. Notably, Burlington, unlike Rocketship, did not turn to blended learning as a cost-saving measure and has not focused exclusively on the net cost or savings as a result of its migration to technology-enhanced learning. In fact, it pointedly reinvests any freed funds into some facet of blended learning, including hardware, software, personnel, and training. That said,
even anecdotally, Burlington can point to major changes in resource use over the course of implementation in areas of central office staff, support staff (internal and vendors), content, and hardware that could be directed to other programming for districts so inclined.

Table 1. Trends in Instructional Materials Expense for Burlington Public Schools, FY09-FY13.

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<th>Year</th>
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<td>FY09</td>
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<td>FY13</td>
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Source: ESE financial data from Burlington Public Schools’ End-of-Year Reports.

The major areas of resource reallocation reported by Burlington are derived from two areas: redesign of educational staff resources and redesign of technology acquisition and deployment.

A. **Reallocation of classroom and technology staff resources.**

Burlington has been able to extend the reach of substitutes at the high school given absent teachers’ ability to assign digitally based work. Because substitutes can manage a larger number of students working digitally, the high school has reduced its need for permanent substitutes by one position. With respect to changes to classrooms, Burlington has intentionally refrained from using technology as a lever to increase class size, and thereby reduce certified teaching staff. Rather, the district has leveraged its technology to support an individualized approach to learning, including freeing teachers from the front of the class to circulate and individually support students.
Burlington has also refocused professional development resources as a result of its shift in technology. Burlington holds a three-day conference annually for professional staff (460 teachers). Most offerings are internally led (96 sessions in the summer of 2013). Because the district has cultivated internal expertise (including two mobile learning coaches, who work with teachers in context to strengthen use of technology in instruction), it is able to avoid costs of hiring outside consultants to provide training.

Embracing technology has resulted in a win-win value proposition for Burlington in the area of technology support. While Burlington created two essential positions to oversee technology implementation and integration for the district, its support is augmented by student-staffed help desks at both the middle-school and high-school levels. These help desks have provided opportunities for students to develop real-world expertise for trouble-shooting and advising on technology, while reducing schools’ technology support expense. At the high-school level, the help desk is also credit-worthy elective that allows students to have a diverse online presence, supporting both a blog and a Live Google hangout.39

Finally, in tandem with the rollout of blended learning, the district has reduced centralized, K-8 curriculum development positions in favor of a districtwide collaborative model, featuring a week-long professional development “summit,” enhanced connectivity across the school system promoting best practices and, recently, Mobile Learning Coaches serving schools districtwide. One of these coaches describes her role as “[p]roviding guidance and support to district ITS staff and district educators with mobile device management and infusing digital technologies throughout the district’s curricula in order to promote a shared culture of learning.”40

B. Changing views on technology acquisition and deployment.

Based on a cost-benefit analysis, Burlington determined that the cost of equipment and a three-year warranty is ultimately less expensive than the cost of maintaining older computers beyond three

years. Therefore, it turns over blocks of computers on a three-year rotation. Computer purchases are generally staggered by school in order to spread the expense. Although the superintendent acknowledges that squeezing another year or two of life out of some of its computer fleet may be possible, any financial benefit would be offset by the burdensome task of supporting numerous machines and various software operating systems within the same school.

Space needs for digital activities have also changed. Tablets have worked so well that Burlington has stopped using language labs, closing down or consolidating nearly half of all its computer laboratories (which cost an estimated $25,000-$100,000 per lab to construct, outfit and operate). Burlington now has 9-10 labs across the entire district, where it used to have 10 in the high school alone. Most remaining labs are specialized, i.e., used for art, media, or photo editing. 41

Equipping all students with a personal device has also affected how the school system invests in related hardware and equipment. While Burlington used to maintain its own on-site servers, it has been able to reduce the number of servers in favor of cloud-based and on-line capacity. This conversion has allowed its schools to shed 15 servers, which now maintain just nine. The district tech team estimated that this reduction amounts to $5,000 – $8,000 per server, exclusive of ongoing energy costs to run and control climate for these machines. The space that formerly housed this hardware has now been repurposed for office and other needs.

The move to a virtual culture has also allowed Burlington to reduce the number of supported printers from 86 to nine in its middle school. Other schools have also reduced the numbers of printers, although less dramatically. High-capacity printers are strategically placed to accommodate all who need to print documents, although schools encourage use of electronic documents rather than hard copies.

Burlington has made two strategic software decisions that have contributed to both affordability and versatility. First, the district does not invest in Microsoft Office software when purchasing its new

41 A lab rotation model may not realize these savings, given that labs are essential learning spaces in that design.
computers. Instead, it has taken advantage of no-cost or low-cost software, notably Google Apps for Education and WordPress. Second, BPS has decided not to purchase a learning management system in favor of allowing and encouraging teachers to build their own systems. Burlington uses a central, free web space that generally includes a blog where assignments, lessons, and videos can be posted, and also allows two-way communication between students and educators. One drawback of Burlington’s opting for customization is that its tech team has to support seven or eight different platforms used by teachers, although the technology staff believes this cost to be less than and preferable to the substantial annual fees associated with standardized learning management systems.

Burlington is transitioning away from traditional textbook companies both as a source of hard-copy textbooks and packaged digital content, the pricing of which is often more expensive than hard copies. While there are some traditional textbooks still in use, the district is committed to internally amassing sufficient digital content to avoid adopting a new textbook series in hard copy.

The final key area of cost saving/ cost shifting arises from a district-town technology partnership, which allowed each to enhance its digital footprint more affordably. The evolution of the partnership is described in town budget narratives from FY11 – FY16. At the outset of Burlington’s technology initiative, the town configured its budget to participate in the school department’s bulk purchase of computers and printers.\(^42\) For a number of years, the town and the district also shared a full-time IS employee, and in FY14 formally created a Director of Information Systems “that will lead both the Town and School technology departments,” entering into a Memorandum of Understanding to guide the technology partnership.\(^43\) A notable efficiency arises from the fact that Burlington is connected to the town’s fiber optic network, and jointly completed an upgrade of IS infrastructure in FY13 (“we [Burlington Public Schools] are continuously working with the Town to consolidate functions in ways that expand services and save money”).\(^44\)

In summary, Burlington’s conversion to a digital environment for learning

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\(^{42}\) Town of Burlington. “Proposed Operating Budget, FY11.”

\(^{43}\) Town of Burlington. “Proposed Operating Budget, FY14,” 27.

\(^{44}\) Town of Burlington. “Proposed Operating Budget, FY13,” 42.
was accompanied by significant start-up costs, although a technology collaboration with the Town of Burlington has allowed some portion of that cost to be shared. Given its pursuit of value in its digital programming, Burlington expects that resource reinvestment will expand capacity and continue to promote diverse and exciting learning opportunities for all students. While Burlington did not adopt blended learning expressly as a strategy to save or reallocate funds (most adopters to date likewise are not looking principally for cost savings\(^4^5\)), its experience supports the possibility of doing so for districts with a cost-saving agenda. Savings were realized by: reducing the number of permanent substitutes, reducing reliance on external providers for professional development, sharing costs with other town offices and departments for technology infrastructure, reducing purchased curriculum and textbooks (where Open Source content is used or internally developed) and reducing printers and construction and maintenance of separate computer labs.

**II. Salem**

Salem Public Schools (Salem) does not currently have a formal, district-wide or school-wide blended-learning strategy. Two of its schools, Nathaniel Bowditch Elementary School (Bowditch) and Collins Middle School (Collins), took part in the TIME Collaborative’s planning year in school year 2013-2014 for schools intending to add substantial time to their schedules. Because these two schools were both planning and in need of resources for ELT,\(^4^6\) the author chose these schools to provide a purely hypothetical look at the potential of blended learning to structure affordable ELT.\(^4^7\) If carefully planned, blended learning may provide an option for redeploying staff time (the largest cost center of the district

\(^{4^5}\) Cost avoidance is often not the primary motivation for schools and districts that adopt blended learning, perhaps because the financial and cultural cost of startup is a and therefore prohibitive unless the overarching goal is to improve student learning. Davis 2014 and Butler Battaglino 2012, 10-11. For example, one survey of California charter schools indicates that they employed blended learning for its educational benefits first and foremost, and, despite the severe financial pressures exerted by California’s budgetary shortfalls, financial benefits were secondary considerations. Davis 2014.

\(^{4^6}\) Collins received MA ELT grant funds in FY15 and FY16 to help cover its ELT costs.

\(^{4^7}\) This hypothetical was generated independently by the author and does not necessarily reflect any component of the models actually adopted by the district and Collins and Bowditch.
budget\(^{48}\) over a longer day without adding appreciably to individual workloads or the school’s budget\(^{49}\) and without compromising high-quality learning time for students.

A. **Instructional materials expense.**

As with other districts, discussed *supra*, Salem’s textbook budget is small, relatively (See Table 2), and does not provide a material source of funds for reallocation.

**Table 2.** Comparison of Salem Public School’s FY14 District Budget: Textbook Versus Instruction, Regular Day and Noncapital (in Millions).

<table>
<thead>
<tr>
<th>Category</th>
<th>Millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Textbook Budget</td>
<td>0.102</td>
</tr>
<tr>
<td>Total Budget for Instruction</td>
<td>19.207</td>
</tr>
<tr>
<td>Total Regular Day Budget</td>
<td>21.909</td>
</tr>
<tr>
<td>Total Noncapital Budget</td>
<td>53.614</td>
</tr>
</tbody>
</table>

Note: The District Noncapital Budget includes all school system spending except capital costs, and the Regular Day and Instruction Budgets cover school-based activities but do not include services for English language learners and students with disabilities.

Source: Salem Public Schools FY14 Budget Materials retrieved from its website.

Disaggregating textbook and instructional materials by school and on a per-pupil basis underscores the relative insignificance of recapturing textbook expense or even the more

\(^{48}\) Salem’s FY14 budget totals $54,696,000, of which nearly $1,000,000 is allocated to capital expenditures. A full 81% of the noncapital school budget reflects personnel costs, most of which are for teachers and paraprofessionals. Salem Public Schools. 2013. “FY2014 Salem Public Schools Budget.” [http://salem.learningnetworks.com/Pages/SPS_DistAdmin/finance](http://salem.learningnetworks.com/Pages/SPS_DistAdmin/finance).

\(^{49}\) After, perhaps, a required initial investment for sufficient internet connectivity and computers for students, although a variety of outside funding sources may be available to subsidize this cost. See, e.g., [http://www.doe.mass.edu/odl/grants.html](http://www.doe.mass.edu/odl/grants.html).
inclusive instructional materials expenses when attempting to fund a substantial new program like ELT that can cost over $2,000 per pupil.\textsuperscript{50}

**Table 3.** FY14 School-Based Per-Pupil Expenses For Collins Middle and Bowditch Elementary Schools, including Textbooks.

<table>
<thead>
<tr>
<th>School</th>
<th>Textbooks</th>
<th>Instructional Materials and Supplies</th>
<th>All School-Based Instructional Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collins Middle</td>
<td>$10.67</td>
<td>$4,859.84</td>
<td>$5,370.92</td>
</tr>
<tr>
<td>Bowditch Elementary</td>
<td>$10.44</td>
<td>$3,240.31</td>
<td>$3,529.13</td>
</tr>
</tbody>
</table>

Note: These figures do not include the cost of incremental services for English Language Learners and students with disabilities at these schools.

Source: Salem Public Schools FY14 Budget Materials retrieved from its website.

**B. Redistributing staff costs.**

If Collins and Bowditch were to adopt either a computer lab rotation model with labs staffed by paraprofessionals or a classroom station rotation model that would allow for larger classes, the ratio of students to certified teaching staff could rise, resulting in savings that could be reallocated to pay for an expanded schedule.

1. **Classroom station rotation.** In the 2013-2014 school year, Collins had an average class size of 19.1 students (compared to the district average of 16.9 and state average of 18.2). If the average class size were hypothetically allowed to rise to 23 students by including individualized digital learning activities at one or more stations to supplement the teacher’s instruction, the number of classes could theoretically

have been reduced by 62. Assuming 5 classes per teacher, a reduction in staff by roughly 12 teachers might have been possible. At an average district salary in fiscal year 2013 of $68,719, Collins Middle school might be able to save as much $848,291 or $1,351 per student in teacher salary during the traditional day – possibly enough to have made an extended school day financially feasible. (Table 4).

Table 4. Calculation of Savings by School after Increasing Class Size: Salem and Fall River.

<table>
<thead>
<tr>
<th>SY 2012-2013</th>
<th>No. Students</th>
<th>Average No. Students Per Class</th>
<th>Current Total Classes</th>
<th>Total Class Hours</th>
<th>New No. Students Per Class</th>
<th>New No. Classes</th>
<th>Difference in No. Classes</th>
<th>No. Positions Saved</th>
<th>Average Teacher Salary</th>
<th>Total $ Saved Based on Average Salaries</th>
<th>Savings Per Pupil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salem</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collins Middle School</td>
<td>628</td>
<td>19.1</td>
<td>364</td>
<td>6952.4</td>
<td>23</td>
<td>302</td>
<td>62</td>
<td>12.34</td>
<td>$68,719</td>
<td>$848,291</td>
<td>$1,351</td>
</tr>
<tr>
<td>Nathaniel Bowditch K-8</td>
<td>470</td>
<td>19.6</td>
<td>196</td>
<td>3841.6</td>
<td>23</td>
<td>167</td>
<td>29</td>
<td>6</td>
<td>$68,719</td>
<td>$398,212</td>
<td>$847</td>
</tr>
<tr>
<td>Fall River</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morton Middle School</td>
<td>690</td>
<td>18.9</td>
<td>251</td>
<td>4743.9</td>
<td>23</td>
<td>206</td>
<td>45</td>
<td>9</td>
<td>$67,069</td>
<td>$600,180</td>
<td>$870</td>
</tr>
</tbody>
</table>

Note: Number of Positions Saved is based on each teacher teaching 5 classes.
Source: ESE databases.

Admittedly, relying on average class size to propose changes may not adequately account for the needs of Collins’ student population, which had 11.6 percent limited English language learners and 25 percent students with disabilities in FY13. Both subgroups implicate practical (if not regulatory) considerations that may correspondingly lower average class size. Therefore, using rudimentary ESE statistics on average class size may not account for purposeful variation among class sizes within a school (some may already contain 23+ students, while others many fewer), which may reduce the savings potential of this model. However, the increasing

51 Pursuant to the most recent teacher contract (2011-2014), middle school teachers must be given 400 minutes per week for administration and preparation in addition to 150 minutes per week for lunch, leaving approximately 4.67 hours per day for teaching. Salem School Committee and Salem Teachers Union, Local 1258. 2013. “Agreement Between the Salem School Committee and the Salem Teachers Union, Local 1258 Teachers, American Federation of Teachers, AFL-CIO, 2011-2014.” [http://educatorcontracts.doemass.org/view.aspx?recono=237](http://educatorcontracts.doemass.org/view.aspx?recono=237). The calculations for Salem assume that each teacher is scheduled to teach 5 blocks of approximately 55 minutes.

52 Reducing teaching staff here refers only to the number of teachers needed during the regular day. The teaching force would not necessarily be reduced in ranks, but may be redeployed for expanded time instruction of core content or enrichment as part of the school’s ELT plan.
sophistication of digital content may be used to target effective differentiated support for students with individualized needs, including ELLs and students with disabilities, and may allow student-teacher ratios to rise without sacrificing differentiated support.

2. **Lab rotation.** Another approach to reorganizing staff at Collins would be to employ the Rocketship model where students rotate through learning labs once for every three blocks of live teaching, thereby requiring 25% fewer certified teaching hours for students. Because MA ELT schools are required to add 300 hours per year to traditional school schedules, which is about 26% more than total annual hours of a traditional school schedule (6.5 hours/day or 1170 hours), adding lab rotation could theoretically cover the additional school schedule with the savings in teacher time from the “traditional” part of the day, especially if the time added were configured using lower cost staff, such as paraprofessionals and/or community partners.

3. **Paraprofessional support.** The foregoing calculations of cost savings do not include the cost of adding paraprofessional staff to assist with implementation of an online learning component of the school day. The best case scenario would be redeployment of existing paraprofessionals, if doing so sufficiently meets the school’s needs. Because Salem’s model already employs more paraprofessionals than the statewide average (1 paraprofessional to every 25 students in Salem compared to a 1:40 ratio statewide), a station rotation or lab rotation model may not require substantial hiring of paraprofessionals. However, if new hires need to be made or significant training costs will be incurred, cost savings will be correspondingly reduced.

Paraprofessional salaries are generally a fraction of average teacher salaries, one study estimates 38% on average, although the range across districts can be considerable (See Table 5). In the Rocketship lab rotation model, schools hire one uncertified lab aide for every 70

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53 Simburg 2012, 5.
students, and the lab learning time reduces the need for certified teaching by 25%. In the example provided above for Collins, the need for certified teaching is reduced by 19% by raising class size; in the interest of sufficient adult coverage, we will use Rocketship’s 1:70 paraprofessional-to-student ratio. Collins had 628 students in the 2012-2013 school year, therefore requiring 9 paraprofessionals to staff the lab using Rocketship’s ratio. However, Collins already employed 27 paraprofessionals for that school year. Therefore, it is quite possible that sufficient lab aides might be selected from existing staff or with minimal additional hiring. This is especially true in the classroom rotation model, where the number of students rise, but a certified teacher is present and a paraprofessional would be serving as a teaching aide, in contrast to a computer lab, where paraprofessionals are principally responsible for managing all aspects of the laboratory environment (although content would be delivered digitally).

If a computer lab rotation were adopted at Collins, changes might need to be made to paraprofessional compensation in order to attract and retain candidates with appropriate skills necessary for managing digital learning labs. Salem’s average paraprofessional salary is relatively low (see, for example, Burlington, which has a districtwide digital learning design and compensates paraprofessional at a rate more than three times Salem’s average (Table 5)). If Salem raised salaries of at least 9 paraprofessional positions designated for computer labs at Collins to 38% of its average teacher salary, this increased expense would add $108,652 or $173 per pupil to the redesign budget. This cost might be recouped by recruiting outside partners to teach enrichment blocks, who may bring resources with them and/or cost less than certified

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54 Simburg 2012, 3-4.
55 This calculation does not adjust benefits to reflect either fewer teachers or more paraprofessionals.
teaching staff. Additional conversion expenses, such as building out and equipping lab space, training, a third-party learning management system, a tech manager and so forth may also reduce the total cost avoided, at least initially.

Table 5. Comparing Average Salaries of Teachers and Paraprofessionals by School District.

<table>
<thead>
<tr>
<th>School District</th>
<th>2013 Average Teacher Salary</th>
<th>Average Para Salary</th>
<th>Para Salary as Percent of Teacher Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burlington</td>
<td>$85,901</td>
<td>$50,484</td>
<td>58.77%</td>
</tr>
<tr>
<td>Salem</td>
<td>$72,467</td>
<td>$15,465</td>
<td>21.34%</td>
</tr>
<tr>
<td>Fall River</td>
<td>$66,138</td>
<td>$25,469</td>
<td>38.51%</td>
</tr>
</tbody>
</table>

Source: ESE databases: Edwin Analytics and School and District Profiles for 2013

Salem may also need to clarify certain of its collective bargaining agreement provisions to allow the shift to lab rotation at Collins and/or Bowditch, as well, such as the ostensible limit on the number of students allowed to be in a lab at any one time (18), which seems directed at regular science lab groups rather than online learning.

Undertaking the same analysis for Bowditch (K-8), which has an average class size of 19.6, through the same hypothetical calculation and with the same caveats, it may be possible for the school to save approximately $398,212 ($847 per student) by reducing staff by 6 teachers through classroom station rotation. If computer lab rotation were preferred, Bowditch has only 9 paraprofessionals on staff for 470 students. To achieve the Rocketship 1:70 paraprofessional to student ratio, it may need to hire an additional 6.75 aides to staff its lab (assuming conservatively that none of the existing paraprofessionals could be reassigned), at 38% of teacher salary. Hiring 7 dedicated lab paraprofessionals would cost approximately $395.48 per pupil – a cost that would difficult to recoup through other economies, such as


57 Salem’s 2011-2014 teacher contract indicates that the school administration will attempt to maintain an average class size of 18 in lab-type classes. Salem School Committee and Salem Teachers Union, Local 1258 2013, 26.
affordable outside partnerships. Given that Bowditch would likely have to create additional paraprofessional positions if it adopted a lab rotation model, a classroom station rotation model and a concomitant rise in class size may be more a financially feasible model to affordably extend the school day because increasing paraprofessional positions may be avoided. Again, this analysis does not include the cost of hardware, software, tech support or training.

In summary, to fund redesign school schedules and/or programs at Collins or Bowditch, Salem would need to approach blended learning strategically as a means of reducing costs and reallocating its teaching staff in order to generate meaningful savings, in addition to achieving its learning goals. To maximize the potential of blended learning all-around, changes to both physical and contractual infrastructure may be necessary (i.e., expanding and fortifying the wireless capabilities of the schools and renegotiating those contract provisions conceived for traditional classrooms. Further, because the conversion to blended learning may consume resources in order to build staff and structural capacity, staff reallocation should not be the only resource available for ELT or other school redesign.

III. Fall River

Fall River is included here because it has schools actually implementing both blended learning and longer school schedules, although the two have not necessarily been studied in concert from a resource perspective.

A. District Background.

Fall River is a school district that has historically been stretched extremely thin financially, but has embraced redesign at the school and district levels in recent years to revitalize learning and catalyze improved student achievement for its predominantly high-needs student population (82 percent high needs students in the school year 2013-2014). For context, Fall River has been within a hair’s breadth of

its required educational spending\textsuperscript{59} over the last 6 years, whereas statewide, municipalities spent an average of 15.4 percent \textit{more} than required amounts over the same period.\textsuperscript{60}

\textbf{B. Staff Cost.}

Fall River’s school budget process is detailed and shared publically through the district website, providing a source of information about district and individual school priorities.\textsuperscript{61} A review of these documents for fiscal year 2014 demonstrates that salary and benefits comprise 78 percent of the school system’s entire budget (teacher compensation accounts for approximately 63 percent), and, after distributing personnel among the schools (FTEs), each school has very little discretionary funding (less than 10 percent of total educational spending).

Despite tight local funding, Fall River has implemented expanded learning time at a number of its elementary and middle schools through two major grant opportunities, the Massachusetts ELT initiative (MA ELT), at Matthew J. Kuss Middle School, Carlton Viveiros Elementary School, and North End (Silvia) Elementary School and through the TIME Collaborative/21\textsuperscript{st} Century Community Learning Centers at James Madison Morton Middle School. The John J. Doran (K-8) School, which exited a Level 4 designation in 2014, also has an extended day, although amounting to fewer additional hours than the others mentioned and appears to rely on local rather than grant funding.

\textsuperscript{59}“Chapter 70 is the Commonwealth’s program for ensuring adequate and equitable K-12 education funding. It determines an adequate spending level for each school district (the foundation budget). It then uses each community’s property values and residents’ incomes to determine how much of the [district’s] foundation budget should be funded from local property taxes. Chapter 70 state aid pays for the remaining amount [to reach the total foundation budget] . . . . Each district must spend the sum of its required district contribution and its Chapter 70 aid. This sum is referred to as the ‘net school spending requirement.’” (Emphasis supplied). Massachusetts Department of Elementary and Secondary Education. n.d. “School Finance: Chapter 70 Program,FY15 Chapter 70 Aid and Required Contribution Calculations.” \url{http://www.doe.mass.edu/finance/chapter70/chapter_15p_explain.html}.

\textsuperscript{60}Massachusetts Department of Elementary and Secondary Education. 2014. “Net School Spending Trends, FY14.” Accessed March 26, 2014. \url{http://www.doe.mass.edu/finance/statistics/ppx12.html}

The teacher compensation structure for expanded time varies somewhat among these schools, but generally provides a stipend based on additional annual hours, $4,000 for every 90 hours of time above traditional district hours. At some schools, teachers are paid a pro rata share of salary for extra time and some teachers receive $37 per hour (which is not creditable for retirement purposes) if they teach enrichment\(^{62}\) versus academic classes. These variations appear to be vestiges of earlier agreements negotiated for individual schools as they added time through grant programs or as part of turnaround plans.

The $4,000 stipend for teaching 90 additional hours was reportedly based roughly on the average hourly salary, at the time of adoption, for a teacher with a master’s degree plus 4 years’ experience or a bachelor’s degree plus 5 years’ experience (both receiving roughly the same compensation) and is covered by the MA ELT grant allocation received from the state for three of Fall River’s ELT schools. In addition to facilitating thoughtful school redesign, ELT stipends have reportedly helped make the district more competitive for attracting and keeping teaching talent by raising Fall River’s teacher compensation, at least for its ELT schools.

C. Blended Learning.

In the 2013-2014 school year, Fall River piloted a blended learning initiative for approximately 500 sixth grade students at Edward E. Talbot Innovation Middle School (Talbot) and James Madison Morton Middle School (Morton), which was funded in large part through ESE-administered grant funds. The chosen model was a hybrid of both classroom rotation (laptops and Chromebooks) and lab rotation. Fall River expanded blended learning to sixth and seventh grade in the 2014-2015 school year, and has plans to add grades to its digital program as the inaugural group of sixth graders advance. Because

\(^{62}\)Per the district/union agreement governing working conditions and compensation for Morton Middle School for the school year 2014, third-party partners cannot be paid more than $30 per hour for providing “teaching or non-teaching” services. Fall River Public Schools and Fall River Educators Association. 2014. Agreement Between the Fall River, Massachusetts School Committee and the Fall River, Massachusetts Educators’ Association: September 1, 2013 –August 31, 2014; September 1, 2014 – August 31, 2017, Appendix K.
Morton also expanded its school schedule in school year 2013-2014 by 300 hours through TIME Collaborative planning funds and federal implementation funding (21st CCLC grant) and has used blended learning as a key element of its redesign, Morton offers a unique chance to examine the synergies and challenges the two opportunities present for student achievement and stretching resources.

Of the start-up funds for Fall River’s digital transformation, totaling approximately $400,000, about a third was spent to acquire digital software/content, a small amount was used for hardware, and the remaining funds were used to retain consultants (the National Center on Time & Learning and Education Elements, which have provided coaching, planning, a learning management system and ongoing support). Other structural changes accompanying the migration to blended learning include retaining a technology department head at each of the implementing schools.

While no formal causal link has been established, these two blended learning schools are showing improvements in student achievement on district-wide benchmark assessments. Morton’s sixth graders led district performance in the pilot year of digital learning, after two years at the back of the pack. Statewide achievement scores (MCAS) for the 2013-2014 school year also showed positive gains across all measures, despite a year wrought with transitions for students and staff (new building, longer day, addition of blended learning, merger of schools). Notably, at the same time as the introduction of blended learning, Morton planned for and added 300 hours to the school schedule. One of the priorities reinforced through the TIME Collaborative is the use of additional time for teachers – for planning, collaboration, data analysis and professional development – which likely are also supportive of adoption and maintenance of an effective blended learning strategy. In fact, teachers and school leadership at

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63 MCAS results for 2014-2015 also showed gains in many areas, including an increase in the percentage of students scoring proficient or higher for ELA (55%) and Math (35%), and the school moved from the 10th percentile in 2014 to the 20th percentile in 2015 in performance compared to peer schools.
Morton reported during a year-end presentation to TIME Collaborative participants in 2014 that Morton’s emergent “data” culture is a proud and revolutionary achievement for all.

Grant funds designated for blended learning at Morton expired at the close of the 2013-2014 school year. While the district is committed to maintaining and expanding blended learning at Morton as a result of the early successes of its pilot project, the source of funding remains a concern. One potential resource could be staff reallocation, for the reasons discussed in Section I. Using fiscal year 2012 figures, which pre-date the current blended learning initiative, and the same rudimentary assumptions as employed for Collins and Bowditch in Salem, if Morton were able to use digital learning in a class station rotation design to allow average class size to increase to 23 students, it theoretically could save approximately $870 of staff cost per pupil, which could be redeployed to fund some longer day and digital expense. New hardware expense to increase the number of computers per classroom (to accommodate an increase in class size) may further reduce the per pupil savings.64

For Morton, the use of digital resources to strategically fund additional time would be much less hypothetical than for the Salem schools, given Morton’s experience and the resources in place for its blended learning program, as well as the emergent data culture at the school. Therefore, if class size is expanded for Morton, as described above, as much as $500 per student might be available to expand blended learning to Morton’s upper grades, maintain support from external partners, and fund other ELT expense.

Conclusion

Blended learning can offer a path for reallocation of resources from traditional educational programming to new designs, like ELT, or to reduce or reconfigure the overall cost of education for a

64 Assuming Chromebooks can be acquired at a cost of approximately $100, reducing the per pupil saving by $25-$33, assuming they are used by 25-33% of students in classrooms at any given time.
district over time. To achieve maximum financial impact, blended learning must be deliberately designed to reduce salary expense, usually by increasing the student-to-certified teacher ratio, either by class or overall. To date, the best documented illustrations of cost avoidance are found at those schools using a digital rotation model, either classroom station rotation or lab rotation, both of which extend the reach of certified teachers. Replacing traditional textbooks with free digital content, while certainly possible, would not yield significant savings given that textbooks account for so little of instructional spending – well under 3 percent in most Massachusetts districts.

A transition to digital learning may require an infusion of resources for start-up and maintenance, including creation of wireless infrastructure, acquisition of software and hardware, retooling skill sets of all educational and many administrative staff, and integrating digital content into instructional programming. While these critical elements of a technology-intensive learning platform may continue to require some investment over the long term as educational technology and applications evolve, they may already exist at least in part at many schools or may be required as a corollary part of other initiatives and mandates (such as online assessment or project-based learning). Furthermore, digital infrastructure has historically become less expensive over time or at least does not grow at near the rate of staff-related expenses (salary, insurance and retirement benefits, especially), making it a sound long-term investment.

Finally, while Rocketship has created excitement around the many benefits of digital learning, it has concomitantly highlighted some potential design limitations. Its flexible classrooms demonstrated that a 50:1 student-teacher ratio did not produce the same good results across grades attributable to ratios of 26:1 or 27:1 of its earlier iterations. Also, as a charter school network, Rocketship enjoys many autonomies over budgeting and staffing, which many individual district schools do not have. The recent work in Charlotte-Mecklenburg schools using Time-Technology swaps as one component of a sustainable design for extending teaching may yield more readily transferable experience about use of blended learning in district schools to achieve learning goals as well as fiscal costs and savings. In addition, the hypotheticals presented here suggest reconfiguring existing staff to fund a longer school day for students,
but do not necessarily provide additional time for teachers for collaboration and professional
development, which is a target for many ELT models and will add to total cost.

To succeed and generate financial capacity, then, blended learning must be deliberately planned
with resource reallocation (or at least cost avoidance) at the forefront, most likely from staff redesign, as
well as an understanding that a gateway investment in technology may not be recaptured for several
years. However, for schools and districts able to take the long view, technology’s cost trajectory, unlike
almost any other educational expense, generally trends downward over time, making blended learning a
prime candidate for a sustainably longer school day.

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