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FOCUS SECTION

School Improvement in the Digital Age: A Study of the Alliance for Catholic Education Blended Learning Pilot

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This article presents a description of the Alliance for Catholic Education's (ACE's) approach to and experience of implementing a pilot blended learning and school improvement initiative in five Catholic schools in three U.S. (arch)dioceses. Program evaluation data is summarized, including results of teacher surveys measuring increases in perceptions of knowledge of and attitudes toward components of the model. The project description and findings offer a model for other Catholic schools considering introducing blended learning approaches as part of school improvement efforts.

Keywords

blended learning, technology, online learning, school improvement

The University of Notre Dame's Alliance for Catholic Education (ACE) is committed to strengthening and sustaining Catholic education and has developed a number of initiatives to respond to the needs of Catholic schools throughout the country. ACE recently began to develop new programming around the use of blended learning, which is the combination of teacher-led instruction with online learning. From 2013-2016, ACE piloted an approach that facilitated schools' adoption of blended learning as part of a broader school improvement process in five schools in three U.S. cities, hereafter referred to as the ACE Blended Learning Pilot. In this intervention, ACE provided intensive consultation and training over a 2.5-year period, including a strategic assessment, project management, leadership coaching, and teacher professional development in a range of areas with the aims of improving student academic performance and school financial health. ACE is now working to integrate the lessons from the ACE Blended Learning Pilot into a number of its existing programs, including its teacher and leadership formation masters degree programs and in select schools from its network of Notre Dame

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ACE Academies, ACE's model of university-school partnership. The ACE Blended Learning Pilot is described below, along with an analysis of the early impact of this approach.

ACE's work in blended learning and school improvement corresponds to a body of literature on school improvement practice and the factors that influence school improvement, as well as an emerging body of literature on blended learning and its potential value in improving instruction. While most research on school improvement and school turnaround has focused on public schools, the role of leaders, and the impact of particular interventions, relatively little research has been situated in the Catholic school context. Similarly, given the recent emergence of blended learning, little research has focused on how a blended learning intervention can be the occasion for broader school improvements. Therefore, in this study, we examine the degree to which the ACE Blended Learning Pilot influences key factors understood to be drivers of school improvement, as measured by changes in teacher's attitudes and perceptions.

Background: School Improvement and Blended Learning

With the publication of "A Nation at Risk" in 1983 and continuing through to today, there has been "a widespread feeling that [American] schools were performing poorly" (Murphy, 2015, p. 11-12). This perception of ineffectiveness has combined with new demands on schools in a knowledge economy (Murphy, 2015) and the institution of accountability mechanisms, placing pressure on schools to improve and catalyzing a field of study around school turnaround and school improvement. Catholic schools in the U.S. exist within this milieu and face many of the same pressures, though Catholic schools also struggle with changing demographics, declining enrollment, financial pressures, a transformation of the workforce from religious to lay, and attendant threats to academic quality and mission effectiveness (Notre Dame Task Force on Catholic Education, 2006).

The literature on school improvement recognizes that it is difficult, uneven, and multifaceted work (Anness, 2003; Murphy, 2015; Murphy & Torre, 2014). Scholars articulate the need for a mixed (Thompson, 2002), aligned, and multilayered (Miller, 1995) approach that together produces an "interaction effect," where simultaneous initiatives combine to result in improvements to the school (Hattie, 2008). Improvement efforts are deeply context dependent and effective change must be adapted to local conditions (Bryk, Gomez, Grunow, & LeMahieu, 2015; Bryk, Sebring, Allensworth, Easton,

& Luppescu, 2010; Leithwood & Jantzi, 2005; Murphy, 2015). In a Catholic school, therefore, improvement initiatives should include consideration of how the changes reflect and enhance the Catholic mission of the school while retaining the aim of improving academic outcomes (Grace, 2003).

Research shows that superficial changes such as structures, resources, and policies do not change the instructional core of schools, and thus do not drive improvement (Ancess, 2003; Murphy, 2015). Instead, school improvement is driven primarily by effective school leadership (Bryk, Sebring, Allensworth, Easton, & Luppescu, 2010; Calkins, Guenther, Belfiore, & Lash, 2007; Kowal, Hassel, & Hassel, 2009; Leithwood & Jantzi, 2005; Murphy, 2015), and focuses on the combination of academic press and supportive school communities (Bryk et al., 2010; Murphy, 2015; Murphy & Torre, 2014; Shouse, 1996). Ancess (2000, p. 595) calls this “a combination of nurture and rigor” while Murphy and Torre (2014) emphasize the dual importance of culture and press as an amalgam that functions like two reinforcing strands of DNA (Dinham, 2005; Kruse, Seashore Louis, & Bryk, 1995; Strahan, 2003 cited in Murphy & Torre, 2014).

With regard to supportive communities, Murphy and Torre (2014) emphasize the norms of care, support, safety, and membership as defining an effective school culture. Murphy and Torre (2014), drawing upon the work of Hattie and others, emphasize the fundamentally relational nature of schooling in fostering student engagement in learning. “Critical to the creation of and maintenance of school culture are the leadership practices of the school principal” (Barnett, McCormick, & Conners, 2001, p. 25; as cited in Murphy & Torre, 2014). Norms of care include such practices as teacher effort, teacher knowledge of students, providing challenging and meaningful work, and treating students with respect. Support entails the provision of assistance, encouragement, and monitoring such that all students are given the support they need to succeed. Safety entails a warm and nurturing environment, while membership relates to student empowerment and voice and efforts to foster student participation in numerous elements of the school community (Murphy & Torre, 2014).

In terms of instructional rigor, school improvement depends on the development of a coherent vision focused on student outcomes (Kruse & Louis, 1993; Murphy, 2015). The role of the school leader is of critical importance, as research shows that schools exhibit improved instructional rigor when leadership is focused on improving instruction, identifying and retaining quality teachers, and providing instructional and teacher support (Bryk et al.,

2015; Hattie, 2008; Leithwood & Jantzi, 2005; Murphy, 2015). Additional key factors of instructional rigor include increased time on task and talent development through collaboration (Blase & Blase, 2000; Bryk et al., 2010; Firestone & Wilson, 1985; Murphy, 2015).

While these key factors that drive school improvement are relatively well defined in the research literature, much less is known about the potential role that blended learning instructional methods, tools, and approaches can have on school improvement efforts. The best-known and most often used definition of blended learning is from Staker and Horn:

Blended learning is a formal education program in which a student learns at least in part through online delivery of content and instruction with some element of student control over time, place, path, and/or pace and at least in part at a supervised brick-and-mortar location away from home. (Staker & Horn, 2012, p. 3)

Graham simplifies this by stating that blended learning means “learning experiences that combine face-to-face and online instruction” (Graham, 2013, p. 7). As blended learning increases in popularity throughout the United States and other countries, there is a need for research to further explore the challenges and opportunities associated with blended learning and its impact on student and school-level outcomes (Wills, 2015). Yet, the novelty of the approach and its diversity of iterations has left a dearth of quality studies on blended learning (Halverson, Graham, Spring, & Drysdale, 2012; Means, Toyama, Murphy, Bakia, & Jones, 2009).

While some have concluded that technology in most schools is “used in limited ways to simply maintain rather than transform prevailing instructional practices” (Cuban, 2001, p. 73), others have suggested that blended learning offers important opportunities to shift to student-centered instruction, increase student-teacher and student-student interaction, and integrate assessments for more effective use by students and teachers (Dziuban, Hartman, & Moskal, 2004).

At the heart of this benefit is what scholars and practitioners call personalized learning (Wills, 2015). Drawing upon studies that link the dramatic learning benefits of one-on-one tutoring over one-size fits all, cohort-based approaches (Bloom, 1984; VanLehn, 2011), scholars have claimed that personalization is essential in education and entails differentiation of instruction, and the use of variety and choice in instruction to enhance student agency (Patrick, Kennedy, & Powell, 2013).

With regard to the use of computers for differentiated instruction, previous research has shown that student achievement can increase as a result of blended learning (Englert et al. 2007; O'Dwyer, Carey, & Kleiman, 2007), but research has not focused on other outcomes, such as how faculty and staff perceptions change as a result of implementing a blended learning approach. Teacher knowledge and beliefs are important factors that have been shown to contribute to outcomes such as student motivation and student achievement (Woolfolk Hoy, Davis, & Pape, 2006). Therefore, examining teachers' perceptions of implementing a blended learning model will add to the existing understanding of the impact of blended learning on school performance and educational outcomes.

In addition, research on blended learning in K-12 environments is lacking in the literature, as most blended learning research has focused on post-secondary education. In fact, a meta-analysis of online and blended learning studies by the U.S. Department of Education showed that only five of 84 studies reviewed included K-12 environments (Means et al., 2009). Therefore, this research will contribute to the field by answering the research question: To what extent does a blended learning and school improvement intervention impact teacher beliefs and perceptions about blended learning and key elements of school improvement in K-12 schools?

The ACE Blended Learning Model

Consistent with the research on effective school improvement efforts, the ACE Blended Learning Pilot was designed as a multi-faceted program that aims to enhance academic press and positive school culture, and incorporates the use of blended learning as one of seven key components, described below.

- 1. Leadership Capacity.** Research has affirmed that school leadership is central to school improvement (Bryk et al., 2010; Murphy, 2005, 2015). Studies have shown that the degree of leaders' focus on and competence in instruction is predictive of educational outcomes (Leithwood & Jantzi, 2005), and that school leaders have a central role in shaping vision, culture, and community, supporting teachers, fostering teacher leadership, and facilitating professional collaboration and development (Murphy, 2005, 2015; Murphy & Torre, 2014). Therefore, in order to support the change to blended learning and the adoption of systems and strategies for school improvement, this intervention supported the development of school leadership teams and shared leadership norms by working with the principal to identify lead teachers to support specific roles. These roles focused

on core elements aimed at improving instruction, including the adoption of blended learning, teachers' use of data to differentiate instruction, and supporting school-led professional development and Professional Learning Communities (PLCs).

2. **Intentional School Culture.** To enhance a shared vision for and culture of support and care for all students (Murphy & Torre, 2014) and high academic press (Murphy, 2015) that reflects the Catholic mission (Cook, 2001), the ACE Blended Learning Pilot focused on fostering a shared vision and school culture. This culture was conceptualized as including a) common language, beliefs, values, and goals, b) clear routines, procedures, and practices aligned to these beliefs and values, and c) norms that foster the holistic development of students and the cohesion of staff. The intervention began with faculty visioning and the collaborative development and adoption of a school culture framework and proceeded to the implementation and ongoing refinement of school culture norms, led primarily by the leadership teams.
3. **Data Driven Instruction.** While research on school turnaround and school improvement affirms a focus on the use of student assessment data as a common theme (Murphy, 2015; Herman et al., 2008), it is also integral to high quality blended learning implementation (Wills, 2015). As such, the ACE Blended Learning Pilot included diagnostic assessments throughout the year, structured time in the schedule for teachers to collaborate around data analysis and planning, and provided professional development sessions for teachers and leaders on data driven practices. These practices included the use of data walls, data meetings in PLCs, student and faculty goal setting, the use of student data folders, one-on-one conferring with students, and the use of online software assessment data for targeted intervention and remediation.
4. **Instructional Coaching.** To support the change effort and effective instructional practices, the ACE Blended Learning Pilot worked with leaders to implement more frequent walkthrough observations followed by quick feedback sessions with the intention of amplifying instructional support and development (Marshall, 2005; Murphy, 2015).
5. **Professional Learning Communities (PLCs) and Professional Development.** Research recognizes the benefits of peer collaboration and shared leadership (Murphy, 2005), effective and frequent professional development (Murphy, 2015), an orientation to continuous improvement

(Bryk, Gomez, Grunow, & LeMahieu, 2015), and norms of support for all students (Murphy & Torre, 2014). Seeking to instill these norms, the ACE Blended Learning Pilot included aligned and regular professional development in the form of monthly half-day workshops and the implementation of weekly Professional Learning Communities (PLCs) (DuFour & Eaker, 2005) focused on sharing effective practices and monitoring and supporting students.

6. **Targeted Enrollment Management and Financial Strategies.** In light of the declining enrollment and related financial challenges of many Catholic schools (Brinig & Garnett, 2014), the ACE Blended Learning Pilot supported schools in rebranding, proactively recruiting families, and developing systems to promote ongoing enrollment growth. Key strategies included an initial marketing effort focused on blended learning and its benefits, efforts to focus on key segments of the market (early childhood and feeder schools), and the development of parent ambassadors to enhance word-of-mouth for proactive recruiting efforts.
7. **Instructional Best Practices with Blended Learning.** Finally, the ACE Blended Learning Pilot provided project management and change management support to the school leadership around the transition to blended learning. This included guidance in the selection of content providers, training in blended learning instructional practices, and ongoing guidance and support to facilitate effectiveness in the adoption of blended learning.

The seven components described above were included in the intervention, which received guided support from ACE staff for a 2.5-year period. Pilot projects began by selecting, pre-assessing, and contracting with prospective schools. After identifying an interested school, ACE staff would conduct a readiness and needs assessment, including a key document review and onsite visit. This sought to ensure local engagement and interest in the project and foster positive working relationships with school personnel, while also allowing ACE staff to become familiar with the context-specific needs of each school.

Beginning in the spring prior to the implementation, the ACE Blended Learning Pilot focused on planning and capacity building to prepare for the launch of blended learning. ACE staff and the principal held weekly or twice-per-month calls, formed an on-site leadership team of lead teachers with desired skill sets, and engaged the leadership team in the planning process. Initial planning focused on developing a schedule for professional

development and PLC meetings and designing the school's blended learning program. The ACE Blended Learning Pilot used the "station rotation model," akin to centers, whereby students rotate between a computer station (using a 1 to 3 ratio of Chromebooks to students), a teacher led-station, and an independent station. An additional part of blended learning design included schools' selection of online content providers. ACE staff provided a list of recommended providers including iReady, Compass, Dreambox, Khan Academy, Think Through Math, ThinkCerca, Achieve3000, and NewsELA. Finally, professional development sessions in this pre-launch phase focused on blended learning, visioning and refining school culture, and the use of data to inform instruction.

Initial implementation began in August in the days immediately leading up to the start of the school year. Early in the first year the project focused on school culture and the initial use of blended learning methods, working with the leadership team to provide instructional support and change management through incremental goal setting and monitoring teacher implementation. Teachers pace of adoption varied, which was recognized and accepted as part of the process. Professional development sessions in year one sought to refine the use of blended learning and worked with teachers to develop differentiated instructional plans based upon student performance on diagnostic tests. Finally, around the middle of the first year, ACE staff worked with school leaders to enhance enrollment and marketing efforts, including the development of a parent ambassadors program to assist with word-of-mouth recruiting.

Though this study took place at the end of the first year of implementation, the ACE Blended Learning Pilot has continued in each of the schools. In the second year of the ACE Blended Learning Pilot, efforts were made to enhance the use and effectiveness of mechanisms for instructional support and faculty collaboration, namely, weekly walkthroughs and weekly PLC meetings, and to refine the emerging systems implemented in year one. Additionally, teachers were encouraged to incorporate one-on-one conferring in the classroom and facilitate student-goal setting to provide customized support for and foster ownership of learning. ACE staff conducted periodic site visits and continued regular calls with the principal to provide continued support.

In summary, the ACE Blended Learning Pilot is a broad approach to school improvement with the use of blended learning. It is based on principles from the literature on school improvement and the emerging knowledge

of blended learning in education. To evaluate the impact of this pilot on the schools and to explore the extent to which such a program can lead to school improvement, this study examines teachers' perceptions of the implementation.

Methods

Sample

Teachers in five schools participating in the ACE Blended Learning Pilot intervention were invited to participate in a survey study investigating the change in their attitudes and beliefs about components of the blended learning model. The five schools that received this intervention were diverse in many respects. One was a prek-8 parish school on the West Coast, serving primarily low and lower-middle income families with a predominantly African American and Asian population. The school had low academic performance prior to the project, declining enrollment, and challenges with leadership and faculty turnover.

Three parish schools in one mid-west city were also included. Two of the schools served primarily Caucasian and middle to upper income families, but faced declining enrollment and competition from high quality public schools and experienced leadership transitions prior to the intervention. A third school served a diverse, largely immigrant, lower income population, but had stable leadership for a number of years prior to the project.

Finally, one prek-12 multi-parish school in a different mid-west city also received the intervention, which served a socio-economically and ethnically diverse student population. The school had consolidated a number of parish schools relatively recently and had rather stable leadership, but was still emerging from this considerable transition. Enrollment was stable, but financial health and quality faculty retention were significant concerns.

A pre-project needs assessment conducted by ACE revealed that none of the schools were doing significant blended learning prior to the intervention, and all but one school had a majority of teachers using teacher-centered, cohort-based instructional approaches prior to the intervention. Each school was regarded as having significant room for improvement in terms of shared leadership, instructional leadership, the use of data to inform and differentiate instruction, and strengthening a shared, and intentional school culture. Similarly, every school had enrollment challenges and financial constraints that threatened their short to long-term viability.

Most schools had moderate to strong and stable leadership in the princi-

pal position and had the support of local foundations, the (arch)diocese, and a strong interest in participating in the collaboration.

In May 2015, an ACE staff person sent the survey via email to the principals of each participating school and requested that it be sent to all faculty members in each school. A reminder email was sent approximately two weeks later in an attempt to encourage participation. The final sample included 33 teachers distributed across the five schools with a range of five to nine participants per school. Due to the small sample sizes in the individual schools, data is combined for all schools for the following analyses. The sample included 21 elementary school teachers, nine middle school teachers, two administrative or professional staff members, and one preschool teacher. All but one teacher had been working at their school for at least one year prior to the implementation of the ACE Blended Learning Pilot.

Measures and Data Collection

Survey items used a retrospective pre-post design that asked participants to report their attitudes and knowledge following the program as well as *before* they began the program. Compared to traditional pre-post designs, this approach allows participants to more accurately report changes in perceptions and knowledge because they have a better understanding of their baseline condition (Pratt, McGuigan, & Katzev, 2000).

ACE Blended Learning Pilot components. Teachers were asked to rate their knowledge of and attitude towards five major components of the ACE Blended Learning Pilot (blended learning, differentiated instruction, data-driven instruction, teacher professional learning communities, and instructional coaching) both before the implementation and at the current time following the implementation of the model. For both questions about knowledge and about attitudes, ratings were on a 5-point likert-scale where 1=Very Low and 5=Very High.

General teacher satisfaction. Teachers were asked to think back to the beginning of the year, before the school implemented the ACE Blended Learning Pilot. They were asked to rate their agreement with a list of ten statements about their school on a 5-point likert-scale where 1=Strongly Disagree and 5=Strongly Agree. Then they were asked the same question about their perception of their school currently. Items were created by the researchers to measure aspects of school climate that are known to influence student achievement and motivation, such as belonging, academic press, and general teacher satisfaction. The full list of items is included in the table in the results section.

Results

Data from the teacher surveys was analyzed using SPSS statistical software. Descriptive statistics, including means and standard deviations, were calculated for each item. Paired sample t-tests were conducted for each item on the pre and post implementation response in order to determine if there were significant differences between the time points. Table 1 shows means and standard deviations for teachers' ratings of their knowledge of and attitude towards components of the ACE Blended Learning Pilot as well as results of the corresponding t-tests. Table 2 reports means and standard deviations as well as t-test results and effect sizes (Cohen's *d*) for the items measuring general teacher satisfaction with the schools.

Table 1

Knowledge of and Attitude Towards Model Components

Model Component	M (SD) Before BL	M (SD) Currently	Difference	<i>d</i>
Knowledge of:				
Differentiated Instruction	3.66 (0.86)	3.97 (0.82)	0.31	
Blended Learning	2.55 (0.99)	3.72 (0.65)	1.17*	1.40
Data-Driven Instruction	2.72 (0.96)	3.55 (0.63)	0.83*	1.02
Teacher PLCs	2.97 (0.57)	3.45 (0.57)	0.48*	0.84
Instructional Coaching	2.62 (0.78)	3.07 (0.59)	0.45*	0.65
Attitude toward:				
Differentiated Instruction	3.86 (0.74)	4.28 (0.65)	0.42*	0.60
Blended Learning	3.41 (0.78)	4.10 (0.67)	0.69*	0.95
Data-Driven Instruction	3.38 (0.78)	3.90 (0.72)	0.52*	0.69
Teacher PLCs	3.41 (0.78)	3.79 (0.56)	0.38*	0.56
Instructional Coaching	3.14 (0.58)	3.52 (0.69)	0.38*	0.60

Note: * indicates that the difference was statistically significant at the 0.05 level.

According to Table 1, all comparisons but one resulted in significant differences between time points with medium to large effect sizes. Furthermore, all differences were positive, indicating that teachers believe their knowledge has increased and their attitude towards components of the ACE Blended Learning Pilot has improved through the implementation of the program.

Table 2

School Satisfaction Before and After ACE Blended Learning

Item	M (SD) Before BL	M (SD) Currently	Difference	<i>d</i>
My administrator supports me.	4.18 (0.82)	4.10 (1.01)	-0.08	
The people I work with respect me.	4.50 (0.58)	4.52 (0.57)	0.02	
I enjoy teaching at this school	4.57 (0.50)	4.59 (0.63)	0.02	
The academic program at this school is challenging.	4.00 (0.67)	4.28 (0.59)	0.28*	0.44
Quality work is expected of every child.	4.18 (0.67)	4.41 (0.63)	0.23*	0.35
Teachers are confident they can motivate students.	4.11 (0.57)	4.07 (0.70)	-0.04	
Teachers believe every child can learn.	4.46 (0.64)	4.62 (0.56)	0.16	
Learning is fun at this school.	4.18 (0.55)	4.34 (0.55)	0.16	
I feel like I belong in this school.	4.57 (0.50)	4.59 (0.57)	0.02	
There is a shared vision in this school.	3.79 (0.74)	4.28 (0.78)	0.49*	0.64

Note: * indicates that the difference was statistically significant at the 0.05 level.

As Table 2 shows, teachers reported a significantly higher agreement to the statements regarding the challenging academic program, the expectation of quality work, and the shared vision in the school after the implementation of the ACE Blended Learning Pilot, with small to medium effect sizes. For all other items, changes in perceptions were not significant.

Discussion

This study investigated teachers' knowledge, attitudes, and perceptions of their schools before and after the implementation of the ACE Blended Learning Pilot. Focus was placed on five of the core components of the ACE Blended Learning approach, including differentiated instruction, blended learning, data-driven instruction, teacher PLCs, and instructional coaching, to ascertain the extent to which teachers grew in their knowledge of and

attitude towards these components. The other two areas in the model, enrollment and finances and school leadership teams, had less direct involvement of all teachers and so were not included in the survey. The results showed that teachers perceived that their knowledge increased and their attitude improved towards the components listed above throughout the intervention period.

While one might expect to see these perceived increases in knowledge due to the fact that the professional development for the intervention targeted these topics, these results are still noteworthy since research suggests that most teacher professional development is ineffective in changing teachers' knowledge or practice (Darling-Hammond, Chung Wei, Andree, & Richardson, 2009). The success of this intervention in changing teachers' perceived knowledge is likely due to the ongoing nature of the intervention as opposed to a one-time workshop and the continuous local support through the leadership teams and coaching throughout the program, both factors known to contribute to effectiveness of professional development offerings (Corcoran, McVay, & Riordan, 2003).

With regard to the positive changes in teachers' attitudes, these results speak to the success of the intervention in fostering teacher buy-in for the school improvement efforts particularly around efforts to strengthen core instructional systems and capacity. Through the initial engagement with and pre-assessment of the schools, ACE sought to ensure that there was a general openness to blended learning prior to the implementation of the model. However, these results indicate that teachers still perceived that their attitudes related to the multi-faceted intervention model improved throughout the experience.

These results suggest that teachers perceived the program to have succeeded in increasing their knowledge and appreciation of areas that are regarded as critical to strengthening the *instructional core* of a school and that collectively comprise one of two drivers of school improvement (Ancess, 2000; Bryk et al., 2010; Dinham, 2005; Murphy, 2015; Murphy & Torre, 2014; Seashore Louis, Kruse, & Bryk, 1995; Shouse, 1996; Strahan, 2003). These core instructional areas include perceived change in support for teachers through collaboration structures (i.e. PLCs) and instructional coaching (Bryk et al., 2015; DuFour & Eaker, 2005; Hattie, 2008; Marshall, 2005) the use of data (Murphy, 2015; Herman et al., 2008) and blended learning to differentiate instruction (Wills, 2015).

The results of the measures of school satisfaction showed that teachers reported generally high levels of satisfaction with their schools at both time points. Therefore, the data may have been subject to ceiling effects, that is, when initial responses are so high that there is little room for significant growth (Lammers & Badia, 2005). Nevertheless, a significant increase in ratings was reported for the perception of the schools having a shared vision. This suggests that the emphasis on developing intentional, positive school culture through the intervention was perceived by teachers to be successful. Additionally, significant increases were reported on items related to the academic program being challenging and quality work being expected of all students. This speaks to the emphasis on academic press and rigor. Combined, these suggest an increased focus and clarity on a shared culture of support and high expectations for students that is considered to be the other of the two pillars or “strands of DNA” of school improvement (Acess, 2000; Bryk et al., 2010; Dinham, 2005; Murphy, 2015; Murphy & Torre, 2014; Seashore Louis et al., 1995; Shouse, 1996; Strahan, 2003). In summary, the results of this teacher survey suggest meaningful progress in the two critical drivers of school improvement.

Due to the simultaneous implementation of multiple components of the intervention, it is impossible to disentangle the impact of blended learning, or any other single component, from the overall impact of the school improvement model. This apparent challenge to evaluating such an intervention may also represent one of the greatest affordances of a multi-faceted approach: the opportunity to use an innovation that is in vogue (i.e. blended learning) as an occasion to promote broader institutional changes in accordance with research-based best practices.

It is worth considering whether there is something particular about blended learning that lends itself to strengthening core systems of school improvement. It may be that schools simply desired blended learning and were willing to accept the other dimensions of the program to get the “new innovation,” like sugar that helped the medicine go down. If this was the case, any attractive or novel innovation (i.e. STEM, project based learning, etc.) could serve as the deal sweetener to broader, perhaps more mundane, school improvement practices.

However, key factors that ACE personnel regarded as necessary to implementing *blended learning* well, like using data to differentiate instruction and strengthening student autonomy and active learning, are also regarded as key drivers of *school improvement*. This suggests that there may be particular

advantages or synergies where a quality blended learning implementation demands that schools do other core practices well also. By stretching to implement blended learning well, the school actually simultaneously raises multiple areas of performance, with the benefits going well beyond the adoption of a trendy, isolated software program or piece of technology.

Yet, other aspects of the intervention, like the instructional support systems and teacher leadership elements, that were deemed necessary to assist with change management and ongoing teacher support, are also consistently referenced as keys to school improvement. These structures do not appear to be related in any special way to blended learning and could equally be used when introducing any change to the instructional core of a school. In sum, we would suggest that there are some benefits to using blended learning as a sweetener, as it may have unique characteristics that appear to help foster other school improvement practices. This is an area worth further inquiry in future studies, perhaps comparing blended learning adoptions with the introduction of other new programs to understand if and under what circumstances these tangential benefits arise.

There are clear limitations to this study that should be noted. Because this was a pilot program, the sample size of only five schools and the absence of a control group limit the generalizability of these findings. Also, this study only measured the perceptions of teachers. Future directions could include exploring students' and parents' perceptions of the intervention and including additional outcome data, such as student achievement and academic motivation, as well as looking at school improvement around the adoption of other innovative programs.

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