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Spotlight on Instructional Management Systems: Impact on District Achievement Gains in Idaho

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Using educational data to improve decision making about teaching and learning has been a cornerstone of school district efforts extending back well beyond the last decade. The collection, analysis and use of student level data are central to the improvement of outcomes both students and school districts. NCLB legislation in 2002 was accompanied by a demand for data systems capable of providing a longitudinal record of each student's educational experiences and performance over time (Means et al., 2009). With the increase in longitudinal student data available to educators, the field of information and communication technology has grown exponentially. This whitepaper examines the effectiveness of one particular system widely used in Idaho—Mileposts. Mileposts is a web-based, instructional management system that uses student data collected from formative, benchmark and state summative assessments to provide educators opportunities to track individual and groups of students' progress over time.

A dashboard function presents data for teachers to compare individual students, groups of students, or whole classrooms. Students' data can also be compared to various state or district assessments. Teachers then use this collection of data to differentiate assignments for each student in the classroom and better plan for classroom instruction. The Mileposts software is designed to allow educators to make better teaching decisions, and not just at the student level. It makes it easier for administration to spot classroom and building wide trends — an intervention plan or a facet of the curriculum that is working, or not working. The district can use this in decision-making to scale up successes or stop programs that are not getting results.

What is an Instructional Management System (IMS)?

Research has shown that using data in instructional decisions can lead to improved student performance (Wayman, 2005; Wayman, Cho, & Johnston, 2007; Wohlstetter, Datnow, & Park, 2008). As data in the classroom has become abundant it has sown the seeds for technological solutions to make sense of the data. Information and communication technologies (ICT) have become common is all aspects of life, including education. ICT includes a varied collection of technological gear, hardware, software and resources which are made use of to communicate, generate, distribute, collect and administer information. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of educational systems (Wheeler, 2001). One branch of ICT includes Learning Management Systems which started to develop in the late 1990's and have grown exponentially. Learning Management Systems (LMS), also known as Course Management Systems (CMS) or Virtual Learning

Environment (VLE), are a set of software tools that are specifically designed to support the educational process at the classroom level such as Moodle or Blackboard (Piotrowski, 2010). Often confused with this LMS branch is another ICT called instructional management systems (IMS). An instructional management system is different than a learning management system and includes individual student learning plans, monitoring of interventions, and analysis of student and classroom levels of learning across classrooms, grade spans, as well as longitudinal data on a student's progress over time. It is important to distinguish between the two because they serve different purposes. An LMS is focused on delivering content and enhancing the teaching environment, whereas an IMS is focused on collecting information and data about student learning over time often using multiple measures and spanning across several classroom environments to enhance the learning of an individual student. An IMS is also designed to improve data informed decision making to better serve students. A conceptual framework adapted from the literature (e.g., Mandinach, Honey, and Light, 2006) that decisions may be informed by multiple types of data, including: input data, perceptual data, outcome data, satisfaction data. Research also suggests that certain types of decisions at the school or classroom level are more likely to be informed by data than others. District and school staff often use data, primarily test scores, to set improvement goals and targets (Ingram, Louis, and Schroeder, 2004). No single assessment can tell educators all they need to know to make well-informed instructional decisions, so researchers stress the use of multiple data sources. Also, lack of easy access to data has been identified as a significant obstacle if districts lack the technical capacity to facilitate easy access to data from educational assessments (Coburn et al., 2005).

Idaho's Background and Context

Beginning in 2009, Idaho policymakers (legislators, state superintendent, and state board members) desired a statewide IMS to provide teachers, principals, and administrators with accurate, up-to-date data on student performance as well as access to curriculum, professional development, and student assessment resources. According to a report by the Office of Performance Evaluations (Mohan, 2015) the state legislature and a private Idaho foundation put forth over $77 million dollars towards implementation of such a system and the districts represented in this study lived through this failed policy implementation. While Mileposts was not the IMS that the state tried to implement, it was a competitor and one the majority of districts ending up using after the failed statewide system was abandoned.

Methods of Study

This study utilized public data collected from the Idaho State Department of Education to investigate whether a whole-district's use of Mileposts software was an effective way to improve student achievement and college readiness. The sample groups in this study were comprised of 6 similar school districts in Idaho and the control groups were comprised of 3 similar Idaho school districts. In order to conduct the evaluation of the impact of Mileposts software a quasi-experimental

design was used to match subject groups and study longitudinal data looking at multiple system outcomes, which included third grade reading as measured by the spring ISAT, and eighth grade math as measured by the spring ISAT. Districts were matched in the three groups based on factors such as geographical location, demographics, and use of Mileposts software. Cluster 1 used Mileposts software for multiple years and represents 24,174 students; Cluster 2 also used the Mileposts software for multiple years with the enhanced feature of Edify Assess and represents 27,977 students; and Cluster 3 did not use any aspect of Mileposts software suite and served as the control or comparison group and represents 23,484 students.

Research Questions:

The hypotheses used took the following form:
Ha: Districts using Mileposts software will show greater change from the baseline through the third year than matched districts not using Mileposts.
$\mu 1d - \mu 1a > \mu 2d - \mu 2a$
Ho: Districts using Mileposts software will not show greater change from the baseline through the third year than matched districts not using Mileposts.
$\mu 1d - \mu 1a = \mu 2d - \mu 2a$

Findings

The study compared multiple student outcomes for school districts using the Mileposts software and not using the software, and in both the areas of English Language Arts and Mathematics districts using the Mileposts software saw a greater change over time than the control districts.

The numbers of students in each cluster that were identified proficient or advanced on the English Language Arts ISAT (grades 3-8 and 10) at the end of 2015 were compared to the same data set in 2017. Data was analyzed to look for changes over time, see Table 1.
Table 1.: All grades ELA

	Number proficient or advanced on spring ISAT ELA 2015	Number proficient or advanced on spring ISAT ELA 2017	Percent of change over time
Treatment Group Cluster 1 Mileposts use	12,195	12,795	4.9%
Treatment Group Cluster 2 Mileposts w/Edify features	14,473	15,356	6.1%
Control	9,385	9,728	3.6%

The numbers of students in each cluster that were identified proficient or advanced on the Math ISAT at the end of 2015 were compared to the same data set in 2017. Data was analyzed to look for changes over time, see Table 2.
Table 2.: All Grades Math

	Number proficient or advanced on spring ISAT Math 2015	Number proficient or advanced on spring ISAT Math 2017	Percent of change over time
Treatment Group Cluster 1 Mileposts use	8,992	9,549	6.2%
Treatment Group Cluster 2 Mileposts w/ Edify features	10,911	12,370	13.4%
Control	6,452	6,810	5.5%

Overall, the software proved useful as an intervention to increase test scores. Those districts using Mileposts with the Edify Assess feature outperformed the control as well as those districts just using the Mileposts software.

Significance of the Study

Educational assessment has a long, often contentious history. In competency or mastery based education, assessment is geared towards providing information on progress or mastery of learning tied to some standard or objective. As Idaho moves towards a mastery based educational system tremendous importance is placed on monitoring and measuring a student's progress toward and mastery of the desired competencies. Student-centered data systems like the Mileposts instructional management systems should collect, report, and provide transparent information on where every student is along a learning trajectory based on demonstrating high levels of competency to help educators customize learning experiences to ensure that every student can master standards and aligned competencies (Worthen & Pace, 2014, p. 11). Data collected and used this way may provide critical information that could guide teaching and ensure quality and accountability, as well as serve as a powerful instrument to personalize instruction. The findings support that student achievement scores improved at a greater rate in districts using the Mileposts software.

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