Technology Considerations for a Successful Student Learning Objectives Program

Kimberly Fleming, PhD

INTRODUCTION

Student Learning Objectives (SLOs) hold great promise for improving student learning. A Student Learning Objective is an academic goal for an educator's students or a subset of students that is focused on the most important course content. An SLO sets a bar for academic growth that the educator and his or her students strive to reach. SLOs are set at the beginning of a course, after a teacher has reviewed historical student data and administered a baseline assessment. This specific, measureable objective is tracked through formative assessments throughout the year, as the educator engages in aligned professional development and implements strategies designed to improve student learning. At the end of the instructional interval, the student is assessed through summative assessment.

The number of students who meet or exceed the stated objective is used to calculate an effectiveness rating for the educator. This rating is then used in many districts and states as one of several measures for educator performance evaluation. Performance evaluation results are used to make decisions regarding pay, placement, tenure, employment and professional development.

SLOs are currently being implemented or are in the planning stages of implementation in numerous states. They have been proposed in many Race to the Top applications and NCLB flexibility requests as a way to measure student growth for all teachers, including those in grades and subjects that are not associated with standardized tests.

SLOs were first implemented in Denver Public Schools almost 15 years ago. Findings of a study of the first four years of SLO implementation in Denver indicate that students of teachers with high-quality SLOs showed greater increases in academic achievement than students of teachers with lower-quality SLOs.[1] In Denver, SLOs are still a cornerstone of the performance-based compensation system, ProComp.

In February 2013, the Community Training and Assistance Center (CTAC) released a study of SLOs in the Charlotte-Mecklenburg (NC) Schools from 2007 to 2012. This study analyzed over 4,000 SLOs and found significant multi-year differences in reading and mathematics growth rates between students in schools using SLOs and students in comparison schools.[2]

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[1] Community Training and Assistance Center. (January 2004). Catalyst for change: Pay for performance in Denver final report. Boston, MA: Author.

[2] Community Training and Assistance Center. (February 2013). It's more than money: Teacher Incentive Fund - Leadership for educators' advanced performance Charlotte-Mecklenburg Schools. Boston, MA: Author.

*SLOs are a common industry acronym or Student Learning Objectives. However, there are derivative names including GLO (Growth Learning Objectives) and SGO (Student Growth Objectives) as examples of other acronyms that reference the same topic.

Properly managed, SLOs can energize a focus on learning through measurable objectives and can lead to productive, motivating dialogues between the educator and his or her individual students. SLOs also provide a way for educators to participate in their own evaluation. Through SLOs, a district can integrate initiatives related to data-driven instruction, professional development and accountability into one professional growth system.

INFRASTRUCTURE

Little emphasis is typically given to building the technology infrastructure to support SLO implementation and to managing the crucial tasks that must be accomplished for thousands or tens of thousands of SLOs to be implemented with fidelity.

Most states and districts implementing SLOs place a great deal of emphasis on the development of the SLO, with specific training for educators focusing on the analysis of baseline data; selection of targeted learning content, student population and strategies that will be implemented; and the development or selection of measures of evidence with targets for attainment.

However, little emphasis is typically given to building the infrastructure to support SLO implementation and to managing SLOs, crucial tasks that must be accomplished for thousands or tens of thousands of SLOs to be implemented with fidelity.

At minimum, infrastructure requirements include the following:

1. The ability to properly align items within baseline assessments with items of summative assessments
2. The ability to justify the growth targets set for individual students or groups of students based on baseline data
3. The ability to set student targets using a mathematical algorithm for student growth
4. The ability to update and verify student rosters during the instructional interval
5. The ability to track student progress through formative assessment
6. The ability to easily calculate whether the target is met for each student or subgroup of students and to aggregate these results into a score that feeds the educator evaluation system
7. The ability to produce compliance reports and meet other reporting requirements

Implementing an SLO initiative across a school system is a complex endeavor that requires a robust technology platform and data infrastructure in order to (a) accurately manage the volume of assessments and data associations, (b) facilitate required administration, while maximizing personnel time and resources, and (c) provide the district with necessary information for compliance reporting and SLO auditing.

Implementation

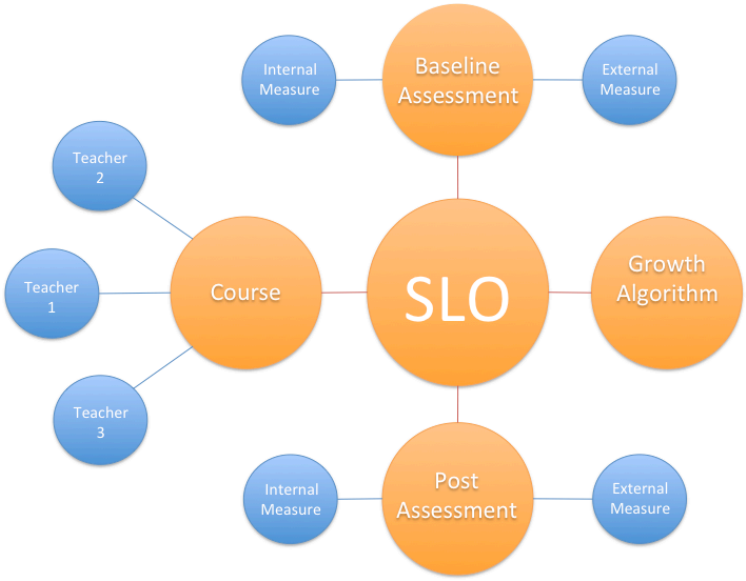
In order to prepare for full scale SLO implementation, the following recommendations are suggested to state and district leaders:

1. DEVELOP A SOLUTION FOR TRACKING ASSESSMENTS AND DATA

In some districts, baseline and summative assessments are selected for each course by a central vetting committee. In other locations, district officials produce a list of acceptable assessments for SLOs, and educators select which they will use. Still other districts leave the selection of pre- and post-assessments completely in the hands of educators.

In its most constrained format, with one baseline assessment and one summative assessment being selected by the district for each course, most K-12 school systems will require a data system that can handle a minimum of 500 unique assessments.

Variables from multiple systems contribute to an appropriate SLO.



Districts that require multiple measures or that allow for a wider range of assessments have an exponentially larger management challenge. Once assessments are determined for each course, each assessment must be analyzed to determine the content alignment to standards and the level of cognitive complexity required by assessment items. This assessment blueprint is necessary to determine whether the assessment is a fit for a particular SLO's content focus.

Each course has multiple teachers across a district who each may select a slightly different content focus for their SLO, resulting in thousands of assessment configurations that must

be managed, analyzed and reported. Student results for each of these assessments and item groupings must also be maintained. A data system that can house this information in a relational database and provide an intuitive user interface is necessary for this volume of information management.

2. DEVISE A METHOD FOR MANAGING DATA ASSOCIATIONS AT SCALE

As stated above, each SLO developed by an educator is associated with a baseline that is measured by at least one pre-assessment and a student growth target that is measured by at least one post-assessment. A growth algorithm connects these two assessments and provides the logic for the SLO. A growth algorithm identifies the *percent change* or *static change* required to meet the SLO.

For example, if a student scores 60% on a pre-assessment, an algorithm for growth may specify a *percent change* of 50%. The formula would be as follows:

(1 – baseline score) * percent change + baseline score

(1 – .60) * .50 + .60 = .80

This student's target score would be 80%.

A student with a baseline of 90% would have a target of 95% using the same algorithm.

An algorithm requiring a *static change* would be based on a static percentage point increase for all students. A static increase of 10 percentage points would mean that the student with a baseline score of 60% would need to earn a 70% to meet target, and a student with a baseline of 90% would need to earn 100% to meet target.

Typically, associations between pre- and post-assessments do not exist within district data systems, and rarely have growth algorithms been available to teachers. Each of these associations must be established, however, to ensure that SLOs are sufficiently ambitious to meet the requirements of the state and/or district.

To ensure that a SLO has practical use, content of the baseline assessment and the post-assessment should be aligned. As an example, a baseline assessment that assesses all of the grade 1 standards for mathematics would not automatically be a valid baseline for measuring student growth centered on place value. Likewise, using a norm-referenced test as a baseline assessment and a criterion-referenced exam as a post-assessment makes defining a valid growth algorithm extremely difficult.

To ensure the baseline assessment and post-assessment are aligned for growth, the SLO technology platform should support the ability to easily view assessments and their attributes side by side. For example, through a dashboard editor, a content specialist should be able to view assessment blueprints and select the item groupings between the assessments that are suitable for measuring growth. The SLO growth algorithm would then apply the results from those items only. In the example above, the grade 1 end-of-year exam could, in fact, be used as a valid pre-assessment for an SLO focused on place value, but only selected items from that pre-assessment would be utilized in the calculation of the baseline score.

The technology should support the ability to specify items from assessments used for SLO. As illustrated below, only a subset of the items between these tests would be correlated for measuring growth.

Baseline Test				Post Test			
Item	Standard	Type	Difficulty	Item	Standard	Type	Difficulty
1	LA.123	SR	Level 1	1	LA.321	SR	Level 3
2	LA.135	SR	Level 3	2	LA.231	SR	Level 1
3	LA.321	SR	Level 4	3	LA.123	SR	Level 2
4	LA.231	SR	Level 2	4	LA.135	SR	Level 4
5	LA.123	SR	Level 3	5	LA.231	SR	Level 3
6	LA.135	SR	Level 1	6	LA.123	SR	Level 2
7	LA.321	CR	Level 2	7	LA.135	CR	Level 2
8	LA.231	CR	Level 4	8	LA.321	CR	Level 4
9	LA.123	SR	Level 3	9	LA.231	SR	Level 3
10	LA.135	SR	Level 2	10	LA.123	SR	Level 2
11	LA.321	SR	Level 3	11	LA.135	SR	Level 3
12	LA.231	SR	Level 4	12	LA.321	SR	Level 4
13	LA.123	CR	Level 1	13	LA.231	CR	Level 1
14	LA.135	CR	Level 2	14	LA.135	CR	Level 2
15	LA.321	SR	Level 2	15	LA.321	SR	Level 2
16	LA.231	SR	Level 1	16	LA.123	SR	Level 2
17	LA.321	CR	Level 2	17	LA.135	SR	Level 3
18	LA.231	CR	Level 4	18	LA.321	SR	Level 4
19	LA.123	SR	Level 3				
20	LA.135	SR	Level 2				
21	LA.321	SR	Level 3				

To facilitate this work, a district needs a technology solution that provides an intuitive user interface that allows for selection of compatible pre- and post-assessments, matching of items from pre- to post-assessment based on content and rigor, and simple use and customization of growth algorithms. Without this technology, districts will have a difficult time justifying the alignment of pre- to post-assessments and evaluating the rigor of the targets.

3. FACILITATE WORKFLOW PROCESSES TO STREAMLINE MANAGEMENT

As SLOs are implemented, the assessments utilized for baseline data or post-assessment will be administered in varied ways, and records of all assessments must be maintained. Results from assessments delivered through plain paper, those in scanned bubble format, and those delivered online must be loaded into the system. District data systems should allow for plain paper scanning, selected response scanning and integrated online testing so appropriate records of the assessments are maintained and scores are automatically available for analysis.

For assessments that are not scored within the district's data platform (such as standardized test scores), the system should have the capacity to load results in multiple formats, including XML, API or a common flat file layout. Otherwise, external results will have to be processed manually, which is time consuming and can compromise data integrity.

Results should be housed in a relational database that provides an administrative interface with access to individual student data points as well as SLO metadata. Metadata are data about data. SLO metadata are the attributes associated with the given SLO, such as the algorithm used to calculate student growth, students included in the SLO population, student baseline scores, and derived target scores.

For ultimate flexibility, the system should allow users with appropriate permissions to access and modify metadata as needed. Administrative areas should provide options for verifying rosters, entering comments, and adjusting targets by individual student or group of students.

Many districts incorporate a mid-interval check-in with educators to determine if their rosters are still valid and to investigate any complexity factors that have emerged. This mid-interval check-in should include a review of metadata so that necessary adjustments may be made. It is also useful if formative assessment results are analyzed at this time to determine which students will require additional intervention in order to meet their SLO target.

Finally, the technology system should have the capability to roll up student results into a final SLO score for each educator and integrate this score into multi-measure evaluations, producing a final evaluation rating for educators.

4. CREATE AN AUDIT TRAIL

When SLOs are used for evaluation purposes, all administrative actions with SLO attributes should be logged to ensure data integrity and to establish an audit trail. When educators design their SLOs and submit them to their evaluator for approval, and again when they meet at mid-interval, there should be a clear audit trail showing that rosters have been validated, and assessments, algorithms and targets have been officially approved. Changes made to any SLO attributes should be logged in the database with a user id and timestamp.

A SLO system utilized in educator evaluation must be legally defensible; accurate recordkeeping and provisions for ensuring data integrity are important elements of risk avoidance. A district's data infrastructure should facilitate this level of accuracy and auditability.

5. REFINE CAPABILITIES FOR ADVANCED REPORTING

The prerequisite for useful SLO reporting is the implementation of a technology platform that supports the management and administrative infrastructure outlined above.

Because SLOs can be used for teacher or leader evaluation purposes, the system must provide options for creation of static SLO-level compliance reports for teachers, principals, district-level administrators or the state. These reports should include:

- The educator's name, school name, course name and evaluator's name
- The date the SLO was approved
- A list of modifications made to the SLO after initial approval
- The names of the baseline test and post-test used in the SLO and administration dates for each; identification of specific subtests or items within each assessment selected for the SLO (if applicable)
- The student roster with the names and demographics of students included in the SLO
- An exemplar of the individual SLO algorithm used, which illustrates how student growth targets were determined
- The SLO results for the student population selected

Compliance reports will allow for spot checking of SLOs across schools and districts to ensure that SLOs are being approved in a timely fashion, are appropriately aligned to targeted content and are rigorous for all populations of students.

In addition, reporting should support other requirements including:

- Access to dashboards and graphical and tabular reports that illustrate SLO performance at every level of the school system – by district, region, school, subgroup, teacher characteristic, individual teacher, and student
- The integration of SLO results into aggregated educator multi-measure evaluations that incorporate other measures such as high stakes test scores, student surveys, professional growth plans, professional practice as measured by classroom observation, and participation in professional development programs
- The ability to export or push SLO results to support state reporting requirements

CONCLUSION

SLOs hold great promise for improving student achievement and focusing educator growth. They provide an opportunity for educators to participate in their own evaluation and for student growth to be incorporated into the evaluations of teachers in non-tested grades and subjects. Developing a coherent infrastructure to manage, administer and report SLOs will be essential to ongoing success as SLOs are brought to scale and integrated into assessment frameworks.

By developing solutions for tracking assessments and data, devising a method for managing data associations at scale, facilitating workflow processes that streamline management, creating an audit trail, and developing capabilities for advanced reporting, districts and states will be prepared with the infrastructure necessary to implement a successful SLO program.

Kimberly Fleming, PhD is President and founder of Core Education, LLC, a consulting firm focused on educator effectiveness.