Measuring Student Growth:
A Practical Guide to Educator Evaluation

WAYNE RESA
Leading... Learning for All

SERVICE
LEADERSHIP
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EXCELLENCE

SECTION 5:
Student Learning Objectives:
A Measure of Educator Effectiveness

Table of Contents

Participants

The development of this ***Student Growth Guidance Document*** has been a collaborative effort involving many educators from across Wayne County, Michigan. These educators have been dedicated to identifying fair, transparent and appropriate methods for measuring student growth throughout the educator evaluation process. Teachers, administrators, central office leaders and ISD staff worked together to understand the research related to student growth models and the best ways with which to implement those models in today's educational environment.

The guidance suggested in this document is based upon a year and a half of study, analysis, debate and thoughtful reflection. This guidance document was not designed with the intention of being read cover to cover. Rather, each section could be read as a stand-alone to further your understanding of student growth. Targeted professional learning will be an important component as you implement this process. The intent of this guidance is to provide several methods whereby a district may be able to measure student growth for purposes of conducting evaluations. The list of participants below reflects the dedicated educators that contributed to this work:

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July, 2016

Dear Educator:

Measuring student growth for purposes of educator evaluation is, in my summation, the most challenging aspect of assigning effectiveness labels to educators. Our country has grappled with the following question for several years: How does student growth align with an educator's effectiveness?

Wayne County educators decided that continuing to wait for an answer to this question was fruitless and potentially damaging to the education profession. Yes, damaging is a strong word, and I feel appropriate given the current climate of the education community. The focus of using student growth should be upon the improvement of teaching and learning and thus, logical, fair measures must be implemented. Selecting random cuts based upon proficiency or guesswork is not only inappropriate but also harmful. Harmful because until we solve the student growth quandary, people from many walks of life will not be focused upon teaching and learning, which is the single most important consideration for helping children achieve at high levels. Thus, as a Wayne County, we decided to be proactive and create an approach that determines effectiveness in a fair, thoughtful and transparent way.

This project began during the Winter of 2015 with a small group of dedicated educators grappling with the research, orchestrating a plan, and making a commitment to developing solutions rather than waiting for answers.

We read…

As an internal Wayne RESA team, a group of seven people began by delving into the research. We studied works by Stiggins, Popham and Darling Hammond. We studied the recommendations of Michigan Council for Educator Effectiveness along with works like the Widget Effect and Standard Setting by Cizek and Bunch. We explored the work of other states related to Student Learning Objectives, Formative Assessment, Assessment Choice and overall systems of high quality student growth.

THE WAYNE COUNTY REGIONAL EDUCATIONAL SERVICE AGENCY

We developed a team…

After some internal study amongst the Wayne RESA group, we invited fourteen school districts and Public School Academies from across Wayne County to come together around a common purpose—developing guidance regarding student growth. Our goal was to challenge the paradigms of the research, continue the learning and foster the voices of teachers, principals and central office administrators toward a common end—fair, transparent methods for measuring student growth. We also met with a subcommittee of Superintendents in order to help facilitate the thinking and development of this process.

After learning…

The team divided into sub-groups with a focus upon key areas related to student growth. As a result of continued debate, thinking and dialogue, a comprehensive Guidance Document designed to provide districts with choice was created. The Guidance Document that follows is designed to give districts options related to Student Growth.

In order to do this work well, districts must commit to intentional implementation, which includes growing capacity and understanding. The Guidance Document in and of itself is not the final answer. Rather, the thoughtful reflection and implementation that occurs after the fact will be essential to any district's success.

I want to thank each and every person that participated in this work. I truly valued the journey we embarked upon and am hopeful that the education community will benefit.

Sincerely,

Dr. Paul Salah
Associate Superintendent, Educational Services
Wayne RESA

List of Tables

Table #	Table Title	Page
Table 5.1	*Checklist for Selecting Assessments to Measure Student Growth through the SLO Process*	79
Table 5.2	*Growth Target Types*	81
Table 5.3	*Current Research Results on Implementation*	86

List of Figures

Figure #	Figure Title	Page
Figure 5.1	*The SLO Development Process*	77
Figure 5.2	*SLO Assessment Approaches*	80
Figure 5.3	*The SLO Evaluation Cycle*	81
Figure 5.4	*The Sequence of Events in the SLO Evaluation Cycle*	82
Figure 5.5	*Other Challenges of the SLO Process*	85

As states and districts develop or adopt approaches to measuring student growth, they face many challenges, including subject matter or grade levels not being tested on the state summative assessment. To compound these challenges, when student growth measures are utilized to assign effectiveness labels, fairness and comparability become critical to employment decisions. The use of Student Learning Objectives (SLO) has proven to be a promising approach to measuring student achievement for purposes of conducting educator evaluation. As of 2016, over half of the states in the US have either required, recommended, or identified student learning objectives as a measure of student growth for use in educator evaluation. The SLO practice began in Denver Public Schools in 1999 and continues to be expanded, studied, and used successfully by many districts. The purpose of this section of the guidance document is to provide relevant information designed to assist the reader with the decision-making process, as well as understand concepts related to basic implementation strategies.

WHAT TO CONSIDER

When considering the use of Student Learning Objectives, it is important for district decision makers to explore the:

- **purpose** of SLOs,

- **steps** in the SLO development process,

- **function** within the evaluation cycle,

- **current research findings, as well as benefits and challenges** associated with the SLO process

PURPOSE

The Purpose and Use of Student Learning Objectives: What is a SLO?

A Student Learning Objective (SLO) is a measure of a teacher's impact on student learning within a given interval of instruction. **An SLO is a measurable, long-term academic goal informed by available data that a teacher or teacher team sets at the beginning of an instructional interval for all students or subgroups of students.** The teacher and students work toward the SLO growth targets throughout the instructional interval and use interim, benchmark, and formative assessments to measure progress toward the goal. At the end of the interval of instruction, the teacher meets with a principal or building team to discuss attainment of the SLO and determine the teacher's impact upon student learning.

WHAT ARE THE NECESSARY COMPONENTS OF A SLO?

The development and use of Student Learning Objectives is part of an overall process that exists within the context of a larger teacher evaluation system. Though the actual SLO can take a variety of forms, they typically contain the following components:

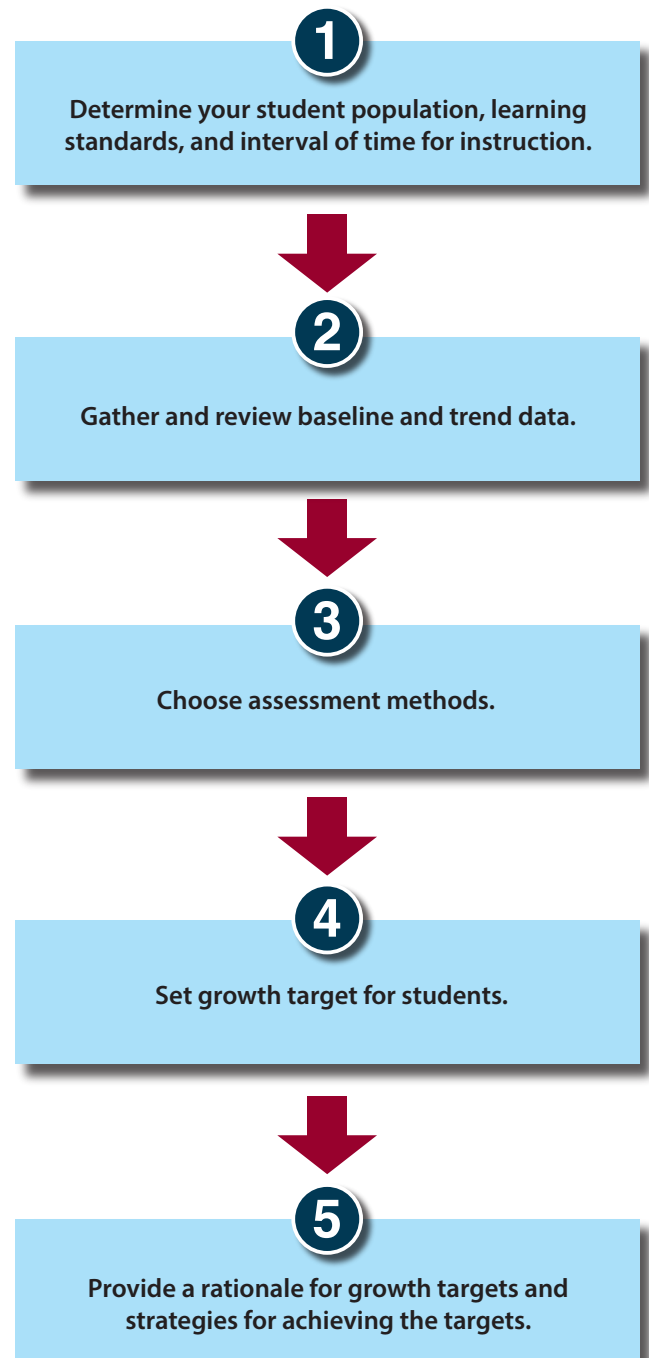| Components of a SLO	
Student Population	Characteristics that describe the student population served by the SLO, including the number of students that have special needs relevant to the SLO
Learning Standards	A list of key standards that are connected to the learning content
Interval of Time	The interval of instruction based on the course structure that includes the start and end dates
Baseline Data	A description of the data reviewed in the creation of the SLO and an explanation of how the data supports the SLO
Assessment Choice	The assessment instrument that will be used to measure the outcome of the SLO
SLO Growth Targets	The quantitative targets that will demonstrate achievement of the SLO— targets should be rigorous yet attainable and can be tiered for specific students
Rationale	Precise statements that describe student needs and explain in detail how the baseline and trend data informed the development of growth target(s)

The SLO Development Process

The writing of effective Student Learning Objectives involves a process that requires and supports assessment literacy and instructional practices. In order for the SLO process to be meaningful, educators should be well-trained regarding development, execution, implementation, and measurement. They should be given models, samples, clear instructions, and supported practice with feedback. The SLO development process can provide a structure to promote collaboration and reflective practice among teachers. Allowing and structuring Professional Learning Community (PLC) time during the school day for these conversations to take place shows the value and commitment to intentional and purposeful planning and data-based goal setting (See Appendix D for template.)

FIGURE 5.1   THE SLO DEVELOPMENT PROCESS

1 Determine your student population, learning standards, and interval of time for instruction.

2 Gather and review baseline and trend data.

3 Choose assessment methods.

4 Set growth target for students.

5 Provide a rationale for growth targets and strategies for achieving the targets.

Assessment Choice in the SLO Process

At the core of the SLO process we must consider the following questions:

- **Is the assessment appropriate to be used when measuring student growth?**

- **Have I selected assessments that accurately reflect the standards I will teach throughout an appropriate interval of time?**

Identifying rigorous assessments that are aligned to the content is a critical and often unanticipated challenge encountered when developing an SLO. It is important to note that SLOs are only as good as the baseline, trend, and assessment data upon which they are built. Most states strongly recommend that districts not use assessments created by individual educators who may lack expertise in assessment writing and alignment. If districts choose to use locally developed assessments, those assessments should be carefully developed by teacher teams and then reviewed at the district level by content experts or staff with training in assessment literacy.

Assessment options may include:

- Performance-based assessments, such as presentations, projects, and tasks graded with an approved rubric

- Portfolios of student work, with samples throughout the year that illustrate knowledge and skills before and after a learning experience. A rubric is also needed for this type of assessment.

- Nationally normed tests created by vendors

- Educator, school-created, or district-created tests

Educators should identify assessments that are:

- **Aligned to state standards and the SLO growth target** (meaning that they measure the skills or content addressed by the SLO)

- **Reliable**, meaning that they produce accurate and consistent results

- **Valid**, meaning that they measure what they are designed to measure

- **Realistic** in terms of the time required for administration

(See the ***Developing and Selecting Assessments of Student Growth for Use in Teacher Evaluation Systems*** section of this guidance document for more detailed information.)
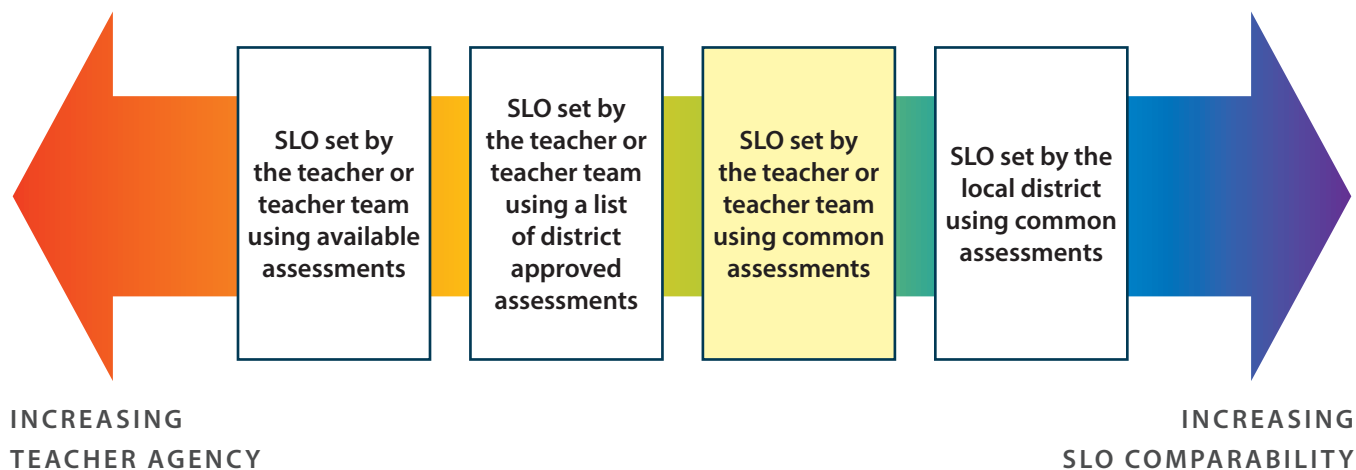
TABLE 5.1   CHECKLIST FOR SELECTING ASSESSMENTS TO MEASURE STUDENT GROWTH THROUGH THE SLO PROCESS

Course/Subject:			
Assessment Name:			
Alignment to Standards: *Is the Learning Objective clearly reflected in the assessment measure?*			
YES	SOMEWHAT	NO	
			Test items align to the standard(s) addressed in the SLO.
			The assessment measure addresses the full range of topics and skills included in the SLO.
			The focus of the assessment reflects the focus of the curriculum and standards.
			The items or task represent the range of cognitive thinking (Depth of Knowledge) required during the course.
Range: *Will students be able to demonstrate growth on this assessment?*			
YES	SOMEWHAT	NO	
			The test includes items that cover requisite knowledge and skills from prior years and appropriate content-relevant items that will challenge all students.
			Appropriate accommodations are available to make the assessment accessible to all students.
			Test items cover knowledge and skills that will be of value beyond the school year.
Validity and Reliability: *Is the assessment a valid and reliable tool for the intended purpose?*			
YES	SOMEWHAT	NO	
			The assessment uses grade-level appropriate vocabulary.
			Items or tasks are written clearly and concisely.
			Clear scoring rubrics, guidance, and/or student exemplars exist for open-ended questions or performance-based assessments.
			Assessment administration is standardized across all classes.
			Assessment provides information to help improve teaching and learning.
Comments:			

Adapted from the *Ohio Department of Education Guidance on Selecting Assessments*

There is a spectrum of approaches that districts can take when creating their guidelines regarding assessment selection within the SLO process. District leaders must consider the balance between teacher agency and comparability when deciding the approach that best fits their philosophy and need. **Teacher agency refers to the amount of autonomy teachers have in creating SLOs, specifically in terms of assessment choice and setting growth targets. Comparability refers to how similar SLOs are among teachers who teach the same grade or subject across classrooms, buildings, or the district.**

FIGURE 5.2   SLO ASSESSMENT APPROACHES

| SLO set by the teacher or teacher team using available assessments | SLO set by the teacher or teacher team using a list of district approved assessments | SLO set by the teacher or teacher team using common assessments | SLO set by the local district using common assessments |

INCREASING TEACHER AGENCY

INCREASING SLO COMPARABILITY

Adapted from: Lachlan-Hache,L. Matlach, L, Reese, K., Cushing, E., and Mean, M. *Student Learning Objectives: Early Lessons*. Teacher Incentive Fund Technical Assistance Network, 2011.

On the left side of the above spectrum, teachers decide what baseline data to use. They select their own growth targets and decide or create the assessment to measure that growth. This approach allows for a great deal of autonomy. At the right side of the spectrum, the district decides what baseline data will be utilized, what growth targets should be set, and how they will be measured. This approach decreases teacher agency, but allows for more comparability. When creating guidance, **most states—including the state of Michigan—opt for an approach that encompasses both teacher agency and comparability**, such as the approach highlighted above, whereby teacher teams are encouraged to work together to set growth targets using district created or vendor purchased common assessments.

Considerations for Setting Growth Targets

Educators must understand assessment data and identify student achievement trends to set rigorous yet realistic student growth targets that align with state standards, district priorities, and course objectives. These growth targets should include specific indicators of growth that demonstrate learning between two points in time. (See the *Standard Setting for Student Growth* section of this guidance document for a more detailed and robust explanation of this process)

TABLE 5.2   GROWTH TARGET TYPES

GROWTH TARGET TYPES	
Course-level SLOs	Growth targets that encompass all students in a class or course.
Tiered targets within a course-level SLO	Growth targets that reflect a range in skill and ability within a class or course. A teacher should consider tiered targets if a handful of students have already demonstrated mastery of the standards being assessed. This group may have a separate growth target than the rest of the class.
Targeted SLOs	Growth targets that are adapted to subgroups of students based on need. Writing separate SLOs can focus on specific content or specific groups of students who need additional attention or more focused attention in particular skill areas.

The Use of SLOs within the Evaluation Cycle

The developing of student learning objectives is part of the SLO evaluation cycle, which is a deliberate process that fits into the larger context of the educator evaluation system. The cycle outlines a sequence of five events that start with the SLO development and end with a final review, scoring and conversation with the teacher and the evaluator. Ultimately, all of the steps in the SLO evaluation cycle can lead to reflection, collaboration, and the improvement of educator practice.

FIGURE 5.3   THE SLO EVALUATION CYCLE

FIGURE 5.4   THE SEQUENCE OF EVENTS IN THE SLO EVALUATION CYCLE

SLO Development Process

Educator or educator teams work together to establish learning targets for groups of students based on available data using SLO development templates and process.

SLO Approval

Educators submit their SLOs to their evaluator or SLO review team for approval and feedback. The evaluator or review team use a criteria checklist to consider all of the components of the SLO. An initial conference is conducted. This conversation can take place as part of the regular initial evaluation meeting.

Midcourse Check-in

Follow up conversations between the educator and the evaluator can be useful throughout the year. **During these meetings, educators should meet with the evaluator and discuss progress toward achievement of the SLOs.** This also supports the evaluator in the role of instructional leader mentoring and giving feedback to educators. This meeting can be held in conjunction with other meetings or as part of a PLC structure.

Final Review of SLO Attainment and Scoring
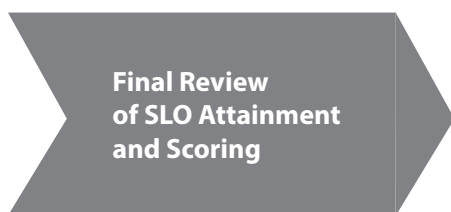
Educators should collect relevant information and compile data in a useful way in preparation for the final meeting with their evaluator. Student work and other documentation and evidence should be clearly organized. Educators may be asked to complete an end of the year reflection that addresses the attainment of student targets.

Discussion of Summative Rating and Impact on Practice

Evaluators should come to this meeting having reviewed the educator's materials. Educators should receive a rating based on the attainment of their SLOs. **This discussion should center upon aspects of the educator's performance that were valuable for improving student learning as well as those aspects that could be improved.** Conversation templates, prompts, and other resources can support productive and consistent high-quality conversations with educators to help them improve their practice.

The Benefits of Using a SLO Process

WHY USE SLOS?

The use of Student Learning Objectives has many benefits. The SLO process promotes learning; reflective teaching practices, the retention of teachers, and it aligns with many quality administrative and school improvement high impact initiatives.

The SLO process promotes learning by:
• providing a system for educators to measure and monitor student learning and the academic growth of their students
• adapting to changes in curriculum, changes in student population, and student needs
• allowing for the use of multiple assessment measures
• maximizing the use of assessment data to target learning needs

The SLO process promotes quality instruction by:
• encouraging educators to set goals for students, using data to determine student progress and making important decisions regarding instructional practice
• guiding educators through the steps of using the data to impact instruction
• allowing all educators, including non-tested grades and subjects, to demonstrate their impact on student learning
• allowing educators to focus on objectives that are most relevant for their specific student population and content areas
• encouraging educators to use more evidence-based practices and providing clear and measurable connections to instruction.
• providing the opportunity for the creation of realistic goals based on student population and educators' specific course loads
• promoting collaboration and opportunities for educators to reflect on instructional practices

The SLO process promotes administrative initiatives and aligns to School Improvement Goals by:
• being versatile, which make them appropriate for measuring student growth for all educators, including those in non-tested subjects and grades
• being highly adaptable, making it possible to quickly respond to changes in curriculum and/or standards
• encouraging evaluators to offer feedback and suggestions regarding the individual SLOs; thus establishing administrators as educational leaders
• providing a concrete process for data analysis, goal setting, goal refinement, and evaluation—similar to the School Improvement Process which focuses on an entire school's goal attainment, the SLO process narrows the focus by teacher and/or course (Michigan Department of Education, 2015)
• expanding the scope and application of the School Improvement Process
• providing flexibility in terms of deciding which educators will utilize SLOs for the student growth measure
• reinforcing the credibility of the evaluation process by fostering ownership of student results
• providing another measure to be used for teacher evaluation, meeting the state's expectation for the employment of multiple measures
• creating opportunities for meaningful dialogue between administration and teachers for the purpose of cultivating student growth and measuring success
The SLO process promotes the retention of teachers by:
• providing teachers the opportunity to have a voice in setting their achievement standards; thus the teachers play a critical role in determining how they will be evaluated.
• allowing administrators to have data that accurately measures teachers' impact on student learning; thus allowing recognition for positive results.
• allowing teachers to have a voice in how learning will be measured and how teachers will be evaluated.
• creating opportunities for purposeful dialogue between administration and teachers, which will allow for improving student growth and measuring success.
• allowing teachers to be more engaged in and feel more connected to their own evaluation process.

Limitations and Challenges of the SLO Process

Though the use of Student Learning Objectives is a promising practice, it is not without its challenges. SLOs can be a powerful solution if implemented with care and purpose, but they are not an easy solution. There can be a misconception that SLOs are the quick and easy fix to the challenge of assessing student growth, but in reality, much time and effort is required to execute the SLO process in a credible manner. Time and effort are necessary for planning, communicating, training, and monitoring SLO implementation to make the hoped for improvement in teacher effectiveness and student learning.

FIGURE 5.5   OTHER CHALLENGES OF THE SLO PROCESS

Other challenges include:
• identifying or developing high-quality assessments for all grades and students
• creating appropriate growth targets for classrooms that include students who are starting at different achievement levels
• setting ambitious yet attainable targets including identifying the proper gain size of an objective
• addressing the school and district culture change that will result from implementing SLOs
• advancing educator practice and the continuous improvement of the SLO process

Research on the Use of Using Student Learning Objectives

Student Learning Objective research is limited. The following chart synthesizes key findings from 20 studies of SLO measures. Though there are few definitive conclusions about the efficacy and implementation of SLOs as measures of student learning and there is the need for more research, there are some lessons learned to date that can assist states and districts in making decisions about their use and implementation.

TABLE 5.3   CURRENT RESEARCH RESULTS ON IMPLEMENTATION

Lessons Learned from Early Research on the Implementation of Student Learning Objectives		
Research Questions	**Initial Findings**	**Implications for Practice and Implementation**
Do teachers perceive SLOs as affecting their practice?	Though findings are mixed, many teachers report that they believe the use of SLOs has improved their teaching, and has caused them to increase their focus on long-term student achievement and data analysis	• Collect data on teacher perceptions about the usefulness of SLOs and use this information to inform continuous improvement of your system
According to teachers, what are the benefits of the SLO process?	In multiple studies, teachers reported how the SLO process lead to an increased use of student data, promoted goal setting, teamwork, and collaboration with colleagues and a focus on quality assessments	• Highlight the value of data-driven instruction within the SLO process. If you already have effective data practices in place, leverage them • Align the SLO process with existing structures that focus on data-driven instruction
What challenges do teachers encounter in analyzing data and setting goals as part of the SLO process?	Teachers frequently cite accessing and analyzing data as the most challenging aspects of writing SLOs, and cite the need for more support	• Make data readily available to teachers and administrators in a timely manner. Make effective use of a data management system that can support data collection • Provide assessment literacy training to develop teacher and administer skill and confidence in data use
What challenges do educators face in working with assessments?	Finding, creating, or updating assessments is a time-consuming and challenging process for teachers. In some cases, teachers lack confidence in their ability to find or develop high-quality assessments and lack the expertise	• Do a district-level inventory to determine gaps in subjects and grades where high quality assessments are not readily available • Select high-quality, standards-aligned assessments upon which to base SLOs. Build capacity with district-level experts to support decisions regarding sound assessments • Provide assessment literacy training and support for teachers and administrators
What challenges in communication and support do educators report in working with SLOs?	Teachers cite ineffective communication regarding the SLO process as a major challenge to successful implementation	• Develop a communication plan and implement feedback loops • Create clear talking points and documents that identify the key messages of SLO implementation. Share how SLOs integrate into the larger system, provide context, and be sure that all stakeholders are receiving the same information about expectations and content
Does SLO quality improve over time?	Findings suggest that SLO quality, as measured by rubrics or lists of quality criteria, generally improve over time. Teachers become more comfortable with SLOs after repeated exposure and use	• Pilot using SLOs without any high stakes decisions involved initially. Allow for experience in a low-stakes environment the first year as you move to effective implementation
Is there a relationship between SLO attainment and achievement?	Limited research finds inconsistent correlations between SLO attainment and student performance on standardized tests. Though one theory of action is that teachers who produce higher quality SLOs will have engaged in thoughtful analysis and reflection and will be able to draw on this to help their students reach greater levels of achievement	• Create an intentional framework to examine overall impact of SLO implementation on multiple outcomes. Collect and compare data to determine the impact on school climate, educator engagement and retention, and the closing of achievement gaps to determine for yourself if the SLO process supports your overall district goals

Adapted from Lachlan, Lisa. *The Art and Science of Student Learning Objectives: A Research Synthesis.* American Institute of Research, 2015.

Important Considerations for Implementation

It is important to note that SLOs will only be useful if they inform educator practice. They "will not change the quality of instruction if they remain inactive documents disconnected from action. Therefore, conversation and thought around how the SLO is enacted are essential" (*The Basics*, Lachlan-Hache p.5.).

When planning for implementation, district leaders should consider the following:

- **Create a plan and start small** with a few subject areas and grades.

- **Provide professional development and use models and guidance documents** to support understanding and consistency.

- **Have early adopters document and share their experiences** and lead the conversation and momentum in the district.

- **Plan for multiple years of implementation.** This practice requires a shift in culture.

- **Provide detailed training** to ensure rigor, fairness, and comparability. These investments take time.

- **Seek results from additional studies and different approaches** which could inform implementation practices.

- **Conduct your own internal studies and data collection on the effects of pedagogy, teacher morale, and commitment.**

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Glossary

Terms for Statistics and Measurements	Definition	Answers the Question	Pros in Growth Measurement	Cons in Growth Measurement
Assessment Literacy	Refers to an educator's comprehensive understanding of assessment and its role in learning.	How well do I use assessment to improve the learning of my students?	• Is essential for teachers and administrators to understand the assessment data they have available and are using to define and analyze student growth.	• Requires professional development and opportunities to apply understandings of assessment in a meaningful context. • Requires time. • Requires motivation of educators to participate in, learn and apply assessment literacy to their work.
Confidence Interval	A range represented by a lower limit number and upper limit number.	How confident are you that the true mean falls between the two numbers? We say we are 95% confident.	• Provides a good visual for a measure of central tendency (true mean).	• It is not symmetric around the mean resulting in a possible low normal and a high normal.
Criterion Referenced Data	Tests and assessments are designed to measure student performance against a fixed set of predetermined criteria or learning standards.	What are students expected to know and be able to do at this point in their education?	• Criterion referenced assessments are preferable in comparing student performance to previous learning or rating performance aligned to a learning expectation.	• Criterion assessments can be time-consuming and complex, expensive to implement, and do not readily allow comparisons among students.
Interim Assessments	Assessments that are administered between annual assessments. For example, an interim assessment might occur in the fall, winter, and spring to be compared to annual spring assessments.	Is student learning on track toward annual performance expectations? Is sufficient curriculum being covered for students to meet annual assessment expectations?	• Interim assessments provide the ability to gather and compare data within a single year and over the course of multiple years. • The data provide longitudinal information for making comparisons over time. • Administrators often use the data to track student growth.	• There is concern with the amount of time that students spend taking tests with interim assessments. • Time for teachers to review the data and to understand how to use the data to adjust curriculum and instruction can be a problem. • The method assumes that growth is linear when that may not be the best trajectory for the student's developmental level or the skills being assessed.

Terms for Statistics and Measurements	Definition	Answers the Question	Pros in Growth Measurement	Cons in Growth Measurement
Mean	Represents the arithmetic average of scores. It is a measure of central tendency.	What is the average gain for the data on hand?	• Easy to calculate. • Can be used when identifying growth based on average number of students or averages of norm referenced data.	• Masks trends in the distribution of student gains from high to low. • Does not describe range of data. It is affected by extreme scores (outliers).
Median	Represents the mid-point in a distribution of scores. One-half of the scores fall below it and above it. It is a measure of central tendency.	What is the mid-point within the data set? Or what is the 50th percentile score?	• Requires the ranking of the data (or scores) from lowest to highest. It is a stable measure because it is not impacted by extreme scores (outliers). • It permits one to determine at which point a child is represented in terms of percentiles. • Can be more "fair" in representing data trends within the distribution of scores than a solitary mean score. • Most useful with student growth percentile data.	• Represents aggregate data. One should conduct quality assurance checks to ensure that the data entry was correct prior to calculating. • Should use a software with large data sets (Excel).
Mode	The mode is the value that appears most often in the data set.	What is the most common gain observed within the data set?	• Identifies the gain that is most commonly demonstrated across students.	• Time to organize the data for analysis and interpretation. • Does not represent the range of gains in student growth. It may take on a bi-modal shape or two modes. • Requires a context to be meaningful, e.g., a specific teacher's data set with additional explanation of factors.

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Norm Referenced Data	Norm-referenced data compares the individual's performance to that of others, usually of the same age or grade level.	How does this individual's performance compare to others?	• Data can be compared across individuals. • Data can be represented in equal interval units, such as standard scores or percentiles. • There is control for central tendency.	• Norm-referenced data may be too far removed from classroom instruction to be appropriate in teacher evaluation. • The representativeness of the sample may not match the local norms in performance or sampling. It makes no mention of content mastery, rather, it asks how a student did compared to her norm.
Percentile	A score that represents the ranking of scores from highest to lowest. For example, a score at the 75th percentile means that the score is greater than or equal to 75% of the persons taking the test.	How does this individual's score rank in comparison to others?	• The percentile provides a ranking or comparison that describes the relative standing of the individual in terms of the percent who performed equal and less well on the task. • Can be simple to calculate. It is misleading if examining scores from a highly gifted student population.	• Is often confused with a percentage score. • The percentile does not communicate the spread of scores from one another but the placement of the individual's score from high to low. • Calculation tools may vary in regard to central tendency in score dispersion.
Percentage	A ratio or number that expresses a fraction of 100.	What is the ratio of success on this task?	• The percent is simple to calculate. • The percent can be used to represent the ratio of students meeting certain criteria or levels of performance. Is often used by teachers when grading students. • Can be helpful to monitor growth and to summarize performance.	• Can be misused as a target for educator evaluation purposes, especially when used without a context of past performance, years of trend data, and analysis of what is reasonable within growth measurement timeframes.
Performance Level Descriptor	The performance level descriptor is the written criterion for the categories of a rubric.	What is the criterion that distinguishes each category?	• Is customized to the context of data, content, and categories. • Provides a standard against which raters classify data into categories.	• Requires clearly written descriptors.

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Predicted Score	A method of growth measurement in which past scores are used as a basis for projecting future scores.	Given the student's past scores or patterns of scores in the past, what is the predicted score for the future?	• Requires the setting of a future standard of performance and a time frame to meet the standard.	• Predicted scores can be confused with "trajectory". • Emphasis on predicted scores can diminish incentive to work with low achieving students.
Progress Monitoring	A method of assessing a student's academic performance, to quantify a student's rate of improvement or responsiveness to instruction, and to evaluate the effectiveness of instruction. Can be implemented with individual students or a class.	Is the student making progress with instruction and/or intervention?	• Repeated brief and targeted assessments are used that are aligned directly to the instruction of skill(s). • Can be easily represented in graphs. • Can be used with targets or goals.	• Identifying a method of progress monitoring that aligns with instruction. • The focus of the progress monitoring may be too narrow for educator evaluation purposes. • Requires training and monitoring of how the data are used to adjust instruction. • There is no gold standard in the number of observations needed to witness growth (e.g., 3 or 10 observations?)
Reliability	Reliability refers to the consistency of scores over time or the ability of a measure to be repeated with the same or similar results. It is inappropriate to say that a test is reliable because reliability is a function of data or scores on hand.	Are the data from this assessment consistent? If I did this again, would I get the same results?	• Relatively easy to calculate. • Strong reliability indicates that the method is stable.	• Requires some statistical calculation skill or access to calculation tools. • Tests or assessments that are highly reliable may not be sensitive to changes that are age/grade appropriate and meaningful to the individual. • Tests or assessments that have low reliability cannot be trusted to yield consistent information. It is a paradox when attempting to measure change. • High stakes testing requires reliability coefficients $\geq .90$.

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Standard Deviation	A statistical method of analyzing the amount of variance around a score.	How much might the score vary due to factors other than ability?	• The standard deviation is an important statistic for describing the amount of error surrounding a score. • It is useful in understanding change in test scores between administrations. For example, if two scores are within the same standard deviation that would indicate that there was little change and the difference in scores may be due to normal fluctuations in the test scores/data.	• The standard deviation is often not used, not available, or not referenced when analyzing test score data. • Requires some understanding of test scores and statistics to analyze and reference in the context of student growth measurement.
Standard Setting	Process for defining gains that requires judgment about adequate gain or adequate average gain. Requires understanding of the measurement scale or can be norm-referenced.	What are the cut points for differentiating teacher effectiveness categories using student growth data?	• A cut score is established based on performance level criteria. • Involves stakeholders. • Can be revised based on new information. • Provides a context for understanding data and making meaning of growth data categories.	• Can be a time-consuming process. • Requires training and understanding of data, measurement, and performance criteria. • Requires attention to business rules and clarity of terms.
Student Learning Objective (SLO)	A specific learning goal and a specific measure of student learning used to track progress toward the goal.	What is the expectation of learning and method of tracking progress toward that goal?	• The SLO in the context of educator evaluation reinforces best teaching practice, encourages collaboration, relies on teacher skill, and is considered to be helpful in connecting teacher practice to student skill.	• It can be difficult to identify and develop high quality assessments across all grades and subjects. • There are challenges to creating appropriate growth targets for classrooms in which students are starting at different achievement levels. • There are challenges to setting attainable yet rigorous targets with the proper "gain" size.

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Trajectory	A trajectory extends gains or average gains in a predictable, usually linear fashion into the future. Trajectories may be used when using growth-to-benchmark models or gain-score models.	If this student continues on this trajectory, where is she likely to be in the future?	• The trajectory is set by defining a future standard and a time horizon to meet the standard.	• The prediction is descriptive and aspirational. • Requires defensible vertical scaling over many years. • Can be inflated by dropping initial scores.
Validity	Validity is the extent to which a concept, conclusion or measurement is well-founded and corresponds accurately to the real world.	Does the assessment measure the skill, construct, or content it purports to measure?	• Validity is important to ensure the test is measuring the intended content.	• Sometimes persons mistake face validity as sufficient to determine the quality of the content.
Vertical Scaling	Vertical Scaling is the method based on Item Response Theory for assuring the items of a test are aligned to show growth.	Does the vertical scaling represent the developmental appropriateness of performance standards progression over grade levels?	• Vertical scaling provides consistent scores across grade levels and is advantageous for measuring growth.	• The procedure requires sophisticated statistical methods.

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