Abstract
Aspects of learning, including attention, memory and decision-making, are inextricably integrated with emotion networks (Immordino-Yang, 2007; Meyer, Rose, & Gordon, 2014). Emotion is central to cognition. In addition, there is variability in engagement; what motivates and encourages one student to persist through challenges will differ from that of another student, and will even differ within the same individual at different times. Knowing how essential emotion is for learning, how can educators use the UDL framework to design lessons that support variability in engagement? How can they measure engagement to reflect on progress towards the deeper learning goals that are desired at a classroom, school, and district level? This article presents initial reflections from a Massachusetts school district implementing the UDL framework in order to achieve improvement in student engagement.

Keywords
Engagement, UDL, design, implementation, guidelines

Introduction
Growing research on the central role of emotion in cognition influenced the most recent version of the UDL Guidelines (Meyer, Rose, & Gordon, 2014). The UDL Engagement principle envisions learners who are purposeful and motivated towards their learning goals and offers strategies for educators to design lessons that support engagement through offering options for self-regulation, for sustaining effort and persistence, and for recruiting interest (CAST, 2014). Integration of the UDL Engagement guidelines can be achieved across content areas and grade levels, although there will be a range in which the strategies, methods, and materials are implemented.

There is predictable variability among teachers implementing UDL strategies to improve student engagement. For example, how one teacher offers options for students to self-regulate will differ from another teacher’s strategies, just as the same teacher may vary the methods used to support student self-regulation for different lessons. Given the vast range for potential strategies for implementation of the UDL Engagement principle, it can be a challenge to determine the efficacy of the UDL Engagement guidelines on student outcomes.

Figure 1. UDL Engagement Principle and Guidelines

UDL Implementation Model
The Universal Design for Learning Implementation model combines a number of research-based, highly effective professional learning practices and educational frameworks including improvement science, data inquiry, and communities of practice. Through UDL Implementation, teachers are aided in making informed decisions about their students’ needs and determining how to apply effective interventions in ways that address the variability of all learners in their classrooms. UDL Implementation follows the model of improvement science whereby rapid tests of change are used to guide the development, revision and continued fine-tuning of processes in classrooms. This approach
moves away from “quick fixes” for individual learners toward a systemic solution for creating and sustaining a flexible classroom environment that addresses the diversity of academic and emotional needs of all students (Black and William, 1998; Fuchs & Fuchs, 1986). UDL Implementation focuses teachers on a data inquiry; a process in which teachers and administrators engage in ongoing cycles of data analysis from multiple sources to make educational decisions (Feldman & Tung, 2001; Lachat, 2002; Protheroe, 2001; Symonds, 2003), improve teaching practice (Bissex, 1994; Cochran-Smith & Lytle, 1993) and impact student performance (e.g., Stringfield, 1994; Teddlie & Reynolds, 2000).

UDL Implementation: Pre-phase
Pre-phase protocols of UDL implementation include building a team that agrees to the UDL Implementation assumptions and processes. As there is no one tool or strategy that can be given to a school to implement UDL, it is necessary to establish a team of educators: (1) who possess a strong UDL background understanding (or who are willing to build this background), (2) who are able to access and reflect on student data through existing tools within their school to make informed decisions, and (3) who are committed to the UDL implementation process. This team serves as the proactive, data-driven, UDL leadership working towards an identified focal area. In Revere middle schools, the UDL teams established a team leader, regular times to meet, and reviewed initial surveys from teachers about potential areas of focus. They were committed to learning more about UDL either through book discussion groups or through the CAST UDL online learning modules, and all attended UDL implementation workshop sessions. Through surveys of students and teachers, their UDL teams determined this year’s focus area to be improvement of student persistence through challenges (UDL Guideline 8). They recognized student variability in persistence and that all students could improve or become more reflective about their persistence towards challenges, even students who initially showed a high level of tenacity. In addition, they recognized the educator variability; each teacher and administrator on the UDL team could work in their own capacity to build strategies that support and gather data relevant to student persistence.

Figure 2. UDL Guideline 8: Provide options for sustaining effort and persistence

UDL Implementation: Phase 1
Phase 1 of UDL Implementation includes building team capacity, background understanding of UDL, and data literacy needed to monitor student progress towards an identified area of focus. In Revere, the UDL teams met regularly to discuss UDL theory through book readings, media, and articles. They began to survey teachers and students about engagement and reflected on data and student work to think about how to narrow their focus area using the UDL framework. From these, they determined their concentration to be on improving student persistence and they wanted to ensure this focus area could include a shift in all students.

Next, the UDL team determined a common working definition and data tool that could be used to track and recognize the range of student persistence. A few highlights of identified indicators around student persistence included:

- Observation and measurement of what students were saying, such as clarifying questions: “I tried this and here is what I am wondering now.”
- Observation and measurement of how students were progressing, such as “this didn’t work, so now I’ll try this.”
- Observation and measurement of how students were utilizing resources, such as referring back to text or their notes.

In addition, the UDL team discussed and highlighted specific ways to observe and measure teacher actions that supported student persistence, which included:

- Prompting students with questions, instead of answers.
- Offering students to make choices, informed by the lesson goal.
- Offering additional challenge for all students to extend their learning through rigorous challenges.
**UDL Implementation: Phase 2**

Phase 2 of UDL Implementation includes gathering initial baseline data tied to the focus area in order to establish both the current state of the students and the learning environment. At the same time, the UDL team is able to try out and confirm the measurement tools that were developed around their focus area. All UDL team members start a series of trials, or rapid tests of change, that allow for data collection as part of the action based research process.

The teachers on the Revere UDL team represented different content areas and used the UDL Guidelines to make decisions about lesson design adjustments that would enhance student persistence. Generally, they were encouraged to start their lesson alterations by referencing the UDL access guidelines (UDL Guidelines 1, 4, and 7) and all teachers were encouraged to try the same kind of strategy and use the same reflection observation rubric. For example, one trial included enhancing the lesson by offering options for perception, such as providing digital access to worksheets. Another trial included offering options for physical action, such as making available use of keyboards and recording devices. Infusing options to recruit interest included finding opportunities to highlight additional relevant examples into the lesson. All lesson design modifications were informed by the UDL framework and were purposefully and consistently infused in order to support the goal of enhancing student persistence.

For all Revere UDL classrooms, lesson design options were incorporated from the beginning of the lesson so all students could access them. The strategies were proactive, informed by the UDL guidelines, and designed to support variability of student persistence. The data driven UDL team encouraged observations from other team members in order to share how strategies worked or did not work. Each teacher tried the new strategy for their own content area and measured student change using the rubrics and measurement tools.

**Discussion**

UDL implementation is a process that can take years to fully build, prototype, and scale within a school and/or district. The Revere district UDL teams are in the first year, doing rapid tests of their lesson design with the focus area of student persistence. They will continue their UDL implementation and data measurement throughout this spring (2016) and then look to share and scale the UDL work through UDL implementation phases 3-4 in subsequent years. The UDL teams will continue to build and improve tools and protocols that support their focus area so it will be ready for scale.

The cycle used to identify areas of focus related to student outcomes, needs that can be addressed through UDL framework modifications to the learning environment, can become sustainable practice if done within a community of educators. Connecting student outcomes to purposeful teacher practice, as informed by the UDL framework, is a viable method for improving student engagement and learning.

© 2015, CAST Inc.

**Figure 3: Phases of UDL Implementation**

**ACKNOWLEDGMENTS**

Allison Posey is a professional learning associate at CAST. Rachel Currie-Rubin is research scientist and instructional designer at CAST. They would like to thank the MA UDL teams, specifically those from Revere, and their UDL team leaders. This work is possible from the collaboration from their colleagues at CAST, the support of the Professional Learning Team, and insights from CAST cadre.

**REFERENCES**


Symonds, K. W. (2003). *After the test: How schools are using data to close the achievement gap*.