SeeMeTeach®

edTPA and Science

edTPA and Science
Using SeeMeTeach to Generate Responses for Science edTPA Rubrics 6-10

Introduction

What is edTPA?
edTPA is a high-stakes assessment used as a summative evaluation for future teachers. Consisting of three major sections, each with five sub-sections, the edTPA candidate prepares materials for an outside assessor to use the fifteen rubrics to evaluate the candidate's submission. Used in over 30 states, in some, the candidate must meet or exceed the passing score to continue into the teaching profession.

What Is SeeMeTeach?
SMT is a teacher observation tool that contains the following:

- Qualitative mode for comments, analysis, and feedback
- Quantitative mode for data collection, analysis, and feedback
- Data displayed using tables, graphs, charts, heat maps
- Data and comments linked to video segments
- Seating chart heat maps showing student engagement and misbehaviors
- Teacher-student interaction data, patterns, and specific wait-times
- Feedback forms, standard or your own
- A collaboration of up to four team members for observation and feedback

Why Use SMT and the Guiding Documents When Preparing an edTPA Submission?

1. Registered SMT users have automatic access to the *SMT and edTPA* supporting documents.
2. SMT is a powerful mechanism for observing video and collecting comments, data, evidence, and indicators that will significantly enrich the written reflection of the teacher candidate's teaching when responding to the edTPA rubric 6-10 prompts that focus on analyzing how the lesson was taught and the impact on student engagement. This added value for rubrics 6-10 is especially true for rubric 10, where the lowest scores surface.
3. Knowing what evidence and indicators are needed when analyzing a lesson, guides teacher candidates when planning and delivering lessons that contain the desired and critical indicators of teaching effectiveness that edTPA assessors look for in a teacher candidate's submission.

The SMT and edTPA documents provide the following:

- Guidance in planning for and teaching a lesson containing robust supporting evidence and indicators of teaching effectiveness.
- Guidance regarding specific supporting use of data and indicators to analyze the lesson and evidence that can be infused when writing the written reflection.

Included for each rubric in the document are the following:

- The guiding question for each rubric.
- The essence of each rubric.
- Concrete examples of evidence and indicators that help meet the expectations of each rubric.

Using SMT During Clinical Experiences and/or the edTPA Semester

Prior to the edTPA Semester - Ideally, the edTPA supporting documents and SMT should be introduced and used when teacher candidates are in the clinical experience phase of their preparation and before the edTPA submission phase, so the teacher-candidate has the opportunity and time to develop solid and positive teaching skills before teaching the edTPA lesson. The desired indicators of effective teaching should be well entrenched, with analysis, reflection, and feedback a normal part of future teachers' expectations. Therefore, candidates become accustomed to using data to analyze their teaching and seeing data embedded in feedback. Learning to make teaching decisions based on data positively affects planning for teaching and classroom instruction and elevates their ability to analyze their teaching – the core of the edTPA challenge. Teaching and analyzing instruction work hand in hand, and knowing how to use SMT as a tool for observation and reflection becomes second nature to the teacher candidate when it comes time to complete, submit, and, therefore, pass and achieve robust scores on the edTPA.

During the edTPA Semester - If a teacher-candidate has not used SMT and the supporting documentation before the edTPA semester, then using these documents will help the teacher-candidate to carefully plan and purposefully embed these score-raising indicators into their lesson plan. Doing so will, in turn, help seed their teaching with actions that reflect the indicators for each rubric 6-10. As a result, the video of their teaching captures critical indicators and evidence that help fulfill the intent of the rubric, which now allows for data and evidence collected by SMT to be embedded in their edTPA narrative. Using SMT and the supporting documents will foster a much more evidence-based and richer description, potentially a more robust score on the edTPA.

Rubric 6: Learning Environment

Rubric 6: Learning Environment - How does the candidate <u>demonstrate a safe and respectful learning environment that supports students' engagement in learning</u>?

The guiding question – "The Guiding Question for Rubric 6 addresses the type of learning environment that the candidate establishes and the degree to which it fosters respectful interactions between the candidate and students, and among students." 1

The essence of rubric 6 is setting the tone for the class – developing a safe learning environment for everyone. The teacher has a great rapport with their students amidst a respectful climate. The teacher acknowledges student responses positively and encourages feedback when students contribute, thereby setting a welcoming tone and a clear invite for more students to respond. The teacher uses student names and fosters interactions between students that are positive. In this positive learning, environment students respect each other and communicate with each other using student names during the lesson. Criteria for achieving an advanced performance rating include teaching in a manner that challenges students to think at higher levels or apply what they learned somehow.

Tips For Evidence or Indicators for Rubric 6:

1. Developing respect and rapport and creating a great learning environment between teachers and students and among students is a crucial aspect of Rubric 6. How does this type of relationship and learning environment develop? Not by chance. It takes specific and intentional actions on the teacher's part to create this type of learning environment. These actions are modeled by the teacher and practiced by the students in the context of lessons until it becomes second nature. Develop the following skills and teaching habits with your classes and plan for these things to happen in the lesson captured on video for edTPA:

- **Use names when interacting** - In general, interact with students to set a positive tone and foster an encouraging learning environment. The teacher uses the students' names when calling on them or referring to their ideas. The teacher encourages students to use each other's names when commenting or asking questions.

- **Teach students how to be active listeners** - For example, model active listening for students that, after listening to a student's idea, start comment or response by saying:
    - "Kylie, that is an interesting idea. Let's think about that for a bit. I wonder how it might work if…?" or,
    - "Kylie, I'm not sure I understand what you are saying. Could you tell us more about your thinking please?" or,

- "Kylie, it sounds interesting, but let me first see if I understood what you are saying. Did you suggest that…?"

For change to occur, be consistent, be overt, and practice - Students will not adopt these behaviors simply after one practice session or automatically know your expectations. Therefore, be overt when giving students directions for the activity – say to your students, "Remember to use names when addressing each other as you talk today. In your small groups, remind each other to use names." You might hold a class discussion where the main goal is to model the desired behaviors and practice attentive listening skills to get them comfortable using the desired student behaviors. Some teachers list these attentive listening phrases as a reminder for students and place them big and bold on the wall where they can easily see them. Teachers then ask students to practice active listening in the lesson, especially in small groups during an activity where more students will get a chance to practice. Then the teacher monitors and reminds students and provides post-activity feedback on using these skills. Doing this on multiple occasions will help embed this into their manner of interacting with each other.

- **Lower the risk of answering questions and interacting with others helps create rapport** The goal is to get all students to feel comfortable contributing in class. The reality is that there is a risk when answering questions and being wrong in front of peers. The teacher can ask questions in many ways, phrased to lower a student's risk of answering questions. In many classes, it is the classroom norm for the teacher to ask questions, and students respond to the teacher. Rarely do students react to each other. Teachers can change that pattern if they do some of the following.

    - Phrasing questions to lower the risk of responding results in students being more willing to venture a response that might be "correct," which helps the teacher uncover the student's thinking. For example:
        - Asking "<u>What</u> <u>is</u> going to happen if …?" is a question phrased in a manner that seems to have a specific answer, and therefore fewer students are likely to respond.

          Slight changes to the wording of the question and phrased in a manner that lowers the risk of answering questions and usually sparks more student responses. For example, if you ask:
            - "<u>What might</u> happen if …" instead of "<u>What</u> <u>is</u> going to happen if …?" or,
            - "W<u>hat might be</u> a reason for …?" instead of "<u>What is</u> the reason for …?" or,
            - "If you had to <u>make a guess</u>, <u>what might be an answer to</u> …?" instead of "<u>What is</u> the answer to …?"

        - Of course, when asking questions, give students a chance to think and respond to your question; you want to pair questions with ample

wait-time one and wait-time two, resulting in students responding more and more to each other's ideas.

- Acknowledge student answers with positive and encouraging comments, lowering students' risk of answering questions and making them more likely to generate multiple responses.
  - After a student responds, accept the student's ideas and responses. If teachers use encouraging or non-judgmental comments, it lowers the risk of answering questions and looking "wrong" in front of their peers, especially when posing higher-order questions.
    - That is an interesting idea, Sue. Tell me more about your thinking.
    - Juan, thank you for contributing a suggestion. I think I understand what you are saying. Who can add to Juan's idea? What are some other ideas?

    When you ask students to explain or clarify their answers, you hear their reasons and justification for their answers. When you accept responses and open the question up for more responses, you may get various responses that tell you what other students are thinking. When creative speculative thinking is accepted (versus judged) by the teacher, more students respond, and the teacher is often pleasantly surprised by what they hear.

- The student-to-student interaction - The teacher should use research and evidence-based methods that get students interacting with each other during the lesson
  - Uses student ideas – using a student's idea adds value to their contribution and encourages future contributions.
    - For example (talking to the whole class), "Emily has an interesting idea. Thank you for sharing that with us. So, the idea is that…." Then, to the rest of the class, "How are your ideas similar, or different from, that suggestion?" Note the encouraging response to Emily, followed by pushing the question back to the whole class again. Note that when doing this, it helps to teach your students how to disagree in a friendly manner so they can disagree without being pessimistic regarding another student's response.
    - Devon has shared an idea. Take two minutes and talk to your table partner about Devon's idea.

2. Facilitating Higher Order Thinking and Application of Knowledge - Teacher candidates can score higher for Rubric 6 if they offer learning opportunities that challenge students to think at a higher level and apply what they learned to show evidence of learning or extend learning. The teacher candidate should realize that they are key initiators for this to be present in a lesson.

Incorporating higher-order thinking into a lesson will not happen by chance – it is purposefully planned and executed by intention. How teachers set up the activity and interact with their students shapes the learning environment and can optimally foster science practices or short-circuit what might have been a very positive and powerful learning experience. How teachers promote thinking and facilitate mental and physical engagement positively relates to how they interact with their students.

- **First, choose a powerful teaching strategy** – Also, as a suggestion for Rubrics 7 and 9, there are some ways to structure activities that offer more opportunities for higher-order thinking that challenge students in different ways and accounts for the variety of level of learners in the classroom. For example, the Learning Cycle or 5 E's instruction model offers multiple points for students to engage in the activity. The learner feels challenged at lower or higher levels of thinking that correspond to what the teacher has diagnosed is needed for a learner(s). The teacher identifies student thinking and presents and fosters a challenge that requires thinking at a higher or deeper level or asking students to justify their responses. The *5 E*'s or *Learning Cycle* models are designed to produce these rich opportunities for thinking and wrestling with ideas that challenge their understanding. These instruction models provide fertile ground for the seeds of thinking to emerge, which then can be tended to and nurtured to grow by teacher interactions that probe student thinking, foster, and elevate student thinking, and help students connect ideas and build bridges of thought.

- **The activity generates opportunities to question** - If the activity is structured for such. If teachers interact with students using effective questioning and responding techniques, then student thinking begins to emerge. Teachers start to identify levels of thinking, misconceptions, or correct notions about the concepts. Once this occurs, teachers can ask challenging questions to stimulate student thinking to a higher level of challenge. If students give one-word answers, asking students to clarify uncovers more of their thinking, and in the process of speaking, it helps them organize their thoughts. As students talk, a more concrete idea develops and emerges due to them talking and thinking it through.

- **Use predictable ways of teacher-student interactions that foster student thinking** – Once the teacher candidate has structured a lesson where the activity has possibilities and opportunities where thought can be challenged at a higher level, it becomes ripe for the teacher candidate to have interactions with students in situations that require students to clarify their ideas and answers and provide justification and show the reasoning for their answers. Questions posed by the teacher also allow students to show how they can link ideas together and use the evidence at hand to justify their thinking. Questions are posed so students can react to what-if scenarios using their knowledge and understanding. Questions are also posed to cause students to react to each other's ideas and to clarify differing perspectives.

- **Stimulate higher-order thinking** – if you ask only yes/no, short answer, or fill-in-the-blank questions, then you are only scratching the surface and not digging deep into student thinking. Plan for and ask students:
    - More open-ended questions.
    - To speculate – ask what-if questions.
    - To use evidence to explain concepts.
    - To think beyond the evidence at hand, "What if this was the case? What might happen?"
    - To consider alternatives to conclusions or interpretations of results. "What other ways might we think about …?"

Data and Indicators Captured by A SMT Observation

For a summary of which parts of the quantitative data analysis provide evidence of specific indicators, see the *Users and Training Manual – Specific Features of the Quantitative Data Collection Mode.*

For data on student engagement and how many students are involved in interacting during class, look at whether students are interacting with each other, how the teacher's tendency to respond to students encourages or discourages further responses, which are indicators of rapport, and whether students feel safe to volunteer answers) see:

- For data on which specific students respond and how often they contribute, look at the *Student Engagement* data and the corresponding *Student Seating Chart Heat Map.*
- *For* data on any behavior issues, look at the *Classroom Management* data and the corresponding *Student Seating Chart Heat Map*. Note that you might have some students who typically exhibit behavior issues. The observation data may shed light on the lack of student engagement and lack of contributions from students, or you might be able to write about the differentiation of the lesson and how the data shows it created more of an inclusive environment for students who engaged in the lesson you are videotaping.

For data on higher level questioning and how you interact with students, the level and number of questions you use in class, and the interaction pattern(S) that predominate teacher-student interactions, see:

- For data on how you asked questions and tend to respond to students, look at the *Code Summary* and counts/percentages of using T codes. Also, comparing the time for T counts versus S counts indicates how much of the class was dominated by the teacher versus student talk. Also, include the use of S6-S8 time as that was all the students involved in responding in some manner, either via dry-erase boards, digital devices, or think-pair-share moments, which can add up in terms of student-engaged time. Student-engaged time is a pretty good indicator of a learning environment with rapport.

- For your predominant patterns of interacting (questioning and responding) with students, look at *Interaction Patterns* and the most prevalent patterns. A pattern that encourages sharing ideas would have more open-ended questions. Following student responses, the teacher acknowledges, then asks students to clarify and use their ideas for further consideration by other students.
- Also, look at S-S counts, which show how often students interact with other students by commenting or answering a question instead of the regular T-S-T pattern. Any S-S could be a student responding to another student by asking another student a question or answering a question, or commenting on another student, another sign of a classroom that feels safe enough to contribute ideas without judgment from others.

Documenting Evidence and Indicators from Your Video and SMT For Writing Rubric 6: Learning Environment

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In the space below, using data from SMT observations, document how the candidate demonstrates a safe and respectful learning environment that supports students' engagement in learning in the following ways:

Rubric 7: Engaging Students in Learning

Rubric 7: Engaging Students in Learning - How does the candidate actively engage students in analyzing and interpreting scientific data to construct evidence-based explanations of or predictions about a real-world phenomenon?

The guiding question – "The Guiding Question for Rubric 7 addresses how the candidate provides video evidence of engaging students in meaningful tasks and discussions to develop their abilities to construct scientific explanations or make predictions based on science concepts and data."

The essence of Rubric 7 is students need to be involved in gathering, analyzing, and interpreting data during the lesson to construct an accurate conceptual understanding and evidence-based explanations or to generate evidence-based predictions of a real-world phenomenon. The type of activity that generates this evidence is not a teacher-directed activity that is cookbook in nature. But, when there is an active exploration of a topic through collecting data, and analyzing data using various tools, students coming to conclusions and back up their conclusions with justifying statements that show how the data support and are the foundation of the conclusion.

Tips For Evidence or Indicators for Rubric 7:

1. Strategies - Some strategies for teaching science offer numerous opportunities to produce evidence that fulfills the intent of Rubric 7. The strategy you choose to use is vital, as some strategies or models of instruction have a great capacity to offer opportunities to experience science practices. For example:

- Use the *Learning Cycle* or *5 E's* strategy to design a lesson so that student engagement is integral to most of the lesson. Either of these two strategies for instruction offers starting points where the teacher sets up an inquiry into the concept being studied, and there are multiple points in the lesson where students interact with the phenomenon and offer their ideas about what they are observing or interacting with. Each has a phase in which teachers and students compile the data and their thinking and interact to tease out meaning and understanding. And each strategy has a phase in which students attempt to apply what they learned to a new setting or situation to see how their learning holds up.

- Use the *Claims, Evidence, and Reason* strategy for incorporating evidence-based explanations into your lesson. Plan for and locate examples where you used effective questioning and responding and wait-time, to elicit student claims and ask students what evidence they are using to make those claims and their reasoning behind it. To

accomplish this goal, it also means using more open-ended questions that get students to tell you what they think and believe and why. This is followed by encouraging more responses from other students, then by asking students to tell you more about their thinking, specifically, what evidence they use for their explanation. The goal is to get students to consider if the evidence supports or refutes their claims and meshes with their reasoning.

- Real-world phenomena – Plan to incorporate personal, local, community, or cultural connections of the science concept into your lesson that are real-world phenomenon components, linking real-world examples to the studied science topic. When interacting with students, ask questions that delve into their understanding and interact in a manner that has students build bridges from the data or evidence to the core of that phenomenon. When designing a lesson, consider using an Issues Analysis or a Structured Controversy model. These two strategies can offer this kind of Refer to examples of your interactions with students that support this target. *"So, you seem to be able to explain the science behind this topic – what might happen in this scenario if you apply what you know about the concept to this situation."*

2. Teacher-Student Interactions - How teachers foster thinking, and facilitate mental and physical engagement, is positively linked to how they interact with their students.

- How teachers interact with students can amplify the potential impact of the strategy being used or completely reduce the potential effectiveness. The best way to describe how the teacher interacts is that they are curious about what students are attempting to do and how that decision came about. They are curious about:
    - What students discovered in the exploration phase when collecting data and what that means.
    - Whether the student is on target or floundering and curious about what students have concluded or not.
    - What students think they should do next to be more certain about their ideas or conclusions. Curious if the students can transfer what they know to a new scenario.

- Curious teachers ask more open-ended questions, use wait-time, listen to students' answers, and ask students to tell them more to clarify their answers and advance their thinking.
- Teachers who are not curious simply overpower student thinking by dumping the correct answer over the top of the student's emerging thinking and swamp the learning boat that was still floating and moving toward a more solid, but perhaps not quite accurate, notion of the concept. Teachers ask questions like:
    - If you collected more data, what would the data look like that would support your current idea to be more confident about your conclusions?

The teacher interacts to place students' focus on the evidence and the conclusion and explain or justify the relevant science concepts. Doing so fosters differing viewpoints and perspectives while encouraging open debate and respectfully exchanging ideas.

- I think your group might want to compare your data or the method you used with group C as they might have different data, and I wonder if your two groups can talk and figure out why?
- Let's examine group A's data or method and compare it to groups B and C's. What did you notice that is similar or what is different?
- Now speculate as to what might have happened to result in these two groups collecting data that looks different.

The learning and task leverage and connects student background and interests to help develop new learning. For example, weaving phenomenon into the activity that all students have observed, something students have witnessed like fireworks exploding before hearing the explosion's sound.

Data and Indicators Captured by a SMT Observation

For a summary of which parts of the quantitative data analysis provide evidence of specific indicators, see the *Users and Training Manual – Specific Features of the Quantitative Data Collection Mode.* Focus on the following:

- Code Summary – a comparison of the time used in the lesson on T code activity vs. S code activity, the more significant the S code activity, the greater the student engagement
- Code Summary - for the number of open-ended questions, teacher responses asking students for clarification (T11), teacher responses that ask students to react to other student responses or compare-contrast their answer with one given by another student.
- Seating Chart Heat Map – how student engagement is distributed across many of the students vs. only a few students
- Interaction Patterns – the number of S-S present in the lesson

Documenting Evidence and Indicators from Your Video and SMT For Writing Rubric 7: Engaging Students in Learning

In the space below, using data from SMT observations, document how the candidate actively engages students in developing conceptual understanding, procedural fluency, AND mathematical reasoning/problem-solving:

Rubric 8: Deepening Student Learning

Rubric 8: Deepening Student Learning - How does the candidate elicit responses to promote thinking and understanding of science concepts and apply scientific practices during scientific inquiry?

The guiding question – The Guiding Question for Rubric 8 addresses how, in the video clips, the candidate brings forth and builds on students' responses to guide learning; this can occur during a whole-class discussion, small group discussions, or consultations with individual students.

The essence of Rubric 8 is all about the teacher candidate's use of questioning and deepening student's understanding - how or if the teacher candidate interacts with students, or fosters student-student interaction, or sets up situations, in a manner that promotes students thinking at a more in-depth and higher level of understanding. While it is ok to start with surface-level questions, the teacher candidate needs to demonstrate higher-level questions and engage students in thinking about the concept at higher levels of thought and understanding. Since individual students differ, a higher level for one student may be different than another, and your narrative would shed light on your video evidence that shows differentiation between students.

Engaging students in the eight practices of science and engineering that the Framework identifies as essential for all students to learn to reach the higher levels of Rubric 8:
1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking.
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information.

Tips For Evidence or Indicators for Rubric 8:

Strategies Set the Stage for Opportunities to Uncover Student Thinking
How teachers choose to set up the activity and interact with their students can shape the learning environment and foster optimal science practices or short-circuit what might have been a very positive and powerful learning experience. The strategy you choose is essential as some methods or models of instruction have a great capacity to offer opportunities to experience science practices, which was covered previously in Rubric 7 notes.

1. To get students to begin thinking and then to share their thoughts that help uncover their thinking and level of understanding

How teachers foster thinking and facilitate mental and physical engagement positively relates to how they interact with their students. How do teachers, first of all, get their students to think, think at a higher level, and facilitate much more student-student interactions that are lesson-based and targeted to the phenomenon being studied.

- Begin by lowering the risk of answering questions - phrasing questions to lower the risk results in students who are more willing to venture a response that might be "correct," which helps the teacher to uncover the student's thinking. For example:
    - Questions that encourage the student to observe and notice offer a low-risk opportunity for students to enter a task. Asking "what do you notice about…?" rarely has "wrong" answers and offers the teacher the opportunity to assess current student understandings.
    - While covered in Rubric 6, asking "what might be a (instead of "the") reason for …?" or "if you had to make a guess, what might be …?" are questions phrased in a manner that lowers the risk of answering, and therefore generally sparks more student responses. The opposite is asking, "What is going to happen if …?" which is a question phrased in a manner that seems to have a specific answer, and therefore fewer students are likely to respond.
    - Also covered in Rubric 6, but especially true if you are asking higher-level questions, you want to pair questions with ample wait-time one and two and then give students a chance to think, respond to your question, and respond to each other's ideas. After assessing students thinking you might pose a question to a small group, then tell them you will be back in a few minutes and that they should wrestle with that question among the group members – simply wait-time in another form.

2. To help students build and expand on their ideas and infuse higher-level questions designed to elicit higher-level thinking

- Teachers who ask good questions (often more open-ended than yes/no or factual questions) promote thinking and elicit student responses that uncover more about student thinking. They also ask questions about what students are observing vs. not, what the experiment or data collected tells them vs. not, what they think they need to do next and why, or what the data collected for that action might tell them. The teacher then extends the student's thinking by asking questions that bridge what the student seems to know to a slightly new situation to determine if their thinking is solid, can transfer, and can apply it to the new situation. Questions allow students to build on other responses as they work through a task.

- Approach an interaction with a student with great curiosity as your guide for how to interact. You are on the right track for facilitating science practices and developing students understanding of concepts, procedures, reasoning, and problem-solving skills if you ask questions and interact in a manner that seems like you are curious and wonder what your students are thinking. You are curious about what they are doing, why they are doing it that way, what the data and results mean, or how they can move their existing thinking forward versus merely trying to herd them toward a correct answer.

- In your video and when writing your narrative locate examples where you stimulated student thinking and asked questions that required them to speculate about what might happen or asked questions that fostered student thinking concerning describing what they see taking place in the experiment. Look for examples of interactions that tell you what the data they collected means to them, what patterns or trends they see, or ask them for clarification on answers they give.

- The teacher-candidate can determine how they meet this expectation by examining the teacher's quantity and types of various questions and responses. Using SMT as a tool for shedding light on this, a teacher-candidate can uncover what they tend to do when interacting with students - when examining the quantitative results and the *Patterns of Interaction*, the significant patterns of interaction are displayed. Or, just by watching the video, they might pick up on patterns of interactions that reflect congruency with structuring the type of intended learning environment. For example, suppose the goal is to get students to think deeply and develop robust science ideas. In that case, a pattern of asking yes/no questions, followed by a student response, followed by clarifying the student's answer (instead of asking the student to explain and tell you more about their thinking) is not a productive pattern to exhibit. Also, the wait-time data and averages are critical factors with potentially huge effects on student engagement if the amount of wait-time utilized is congruent with the goal of giving students the thinking time needed to wrestle with the content mentally.

3. To get students to interact with each other

- Ask students to converse with each other and share what they are thinking, either as individuals, in small groups, or as a whole group, as they work toward generating a consensus response. The book referred to below provides superb guidance on using 3' x 2' small group boards to show data, graphs, conclusions, explanations that can then be used with a whole group when comparing outcomes of data collection and when attempting to foster student-student interactions centered around the processes of science. The process and interaction help students verbalize and clarify their thinking and hear another perspective or explanation that might differ slightly or significantly from their idea. Then they compose and wrestle with competing ideas, sorting them out further with the teacher asking them to examine the strength of their understanding in terms of supporting evidence.

- Use teacher actions that foster more student-to-student interactions, such as T12s (asking students to compare their idea with that just voiced by another student).
- Look at *Interaction Patterns* for the S-S count indicating how many times another student's action followed a student's action. Check specifically for the pattern S5, T12, and S5, which show the teacher asking other students to react to a student's answer.

4. How do we broaden our understanding of what students think or know from just a few samples here and there versus the entire group of students?

- **Using classroom response tools to get ALL students responding -** A safe and respectful learning environment can also be created by using classroom response tools for gathering student responses that provide the teacher with a look at all student responses, yet those responses remain somewhat private. Knowing what all students know or are thinking or have learned is the ultimate feedback for how to proceed in the lesson. For example:
    - Dry-erase response boards - When individual students write responses on dry-erase boards, the teacher can easily see all the students' responses. As such, the teacher receives feedback on all students' thinking. For a great resource on using response boards for individual students, pairs, or small groups, check out *Maximizing Student Engagement in the Classroom* [1].
    - Digital responses - Another way to see all students' responses and keep those private (lower risk of responding) is to have students use digital devices to enter answers, such as Pear Deck. Student responses can be seen by the teacher, who might anonymously share some of those ideas with the class to spark a reaction, comparison, or conversation, or stimulate or expand thinking on the topic.

Note: For a resource specific to increasing student engagement in the classroom, check out Maximizing Student Engagement in the Classroom from www.moosemosspress.com.

Data and Indicators Captured by A SMT Observation

For a summary of which parts of the quantitative data analysis provide evidence of specific indicators, see the *Users and Training Manual – Specific Features of the Quantitative Data Collection Mode.*

- *Code Summary, Teacher Actions Plus* – Look at the levels of questions posed in the lesson; how many and when questions requiring deeper thinking were used in the lesson.
- Examine the phrasing of questions within the question type.
- *Code Summary, Interaction Patterns, Teacher Actions Plus* - Look closely at how you tend to follow up after hearing a student's response.

- *Wait-Time Summary* – Look at both average WTs and WTs per specific question (WT-1) and response type (WT-2).

Documenting Evidence and Indicators from Your Video and SMT For Writing Rubric 8: Deepening Student Learning

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In the space below, using data from SMT observations, document how the candidate elicits responses to promote thinking and to develop conceptual understanding, procedural fluency, AND mathematical reasoning/problem-solving:

Rubric 9: Subject Specific Pedagogy

Rubric 9: Subject-Specific Pedagogy: Analyzing Evidence and/or Data - How does the candidate facilitate students' analysis of the evidence and/or data based on scientific inquiry?

The guiding question – The Guiding Question for Rubric 9 addresses how the candidate guides students in examining and drawing conclusions about the evidence and/or data collected?

The essence of Rubric 9 is having students examine data, looking for trends and patterns in the data, as well as inconsistencies, that aid in drawing conclusions. Having students use data tables, graphs, scatterplots, and other means of analyzing data to make sense of the data.

Tips For Evidence or Indicators for Rubric 9:

1. Planning a lesson using a lesson structure that will offer plenty of opportunities to examine data concerning conclusions.

- Using the *Claims, Evidence, and Reasoning* teaching strategy, or a *Learning Cycle* or *5 E's* strategy, are great ways to facilitate a lesson that would provide evidence and data to be analyzed and, therefore, indicators and edTPA - evidence for fulfilling Rubric 9.

2. Interacting in a manner that has STUDENTS doing the thinking and wrestling with the data

- Like Rubric 7, you need to teach a lesson to look for examples on the videotape where you use a manner of interacting that opens windows into the student's thinking about data and evidence and hear their reasons and justifications for such thinking. Doing so will help determine how their conclusions and reasons compare with the evidence.

- Please don't assume they draw the same conclusions as you when viewing the data. Ask students, "What do you think the data might indicate?" Note again that phrasing the question as "might be" lowers the level of risk in responding, and you will get more authentic answers from students. Or ask, "What might be your conclusion about the data you just gathered." Or "How might you organize the data to present a clearer picture?" Or "How does the data support or not support what you thought might happen?"

- Ask students to defend the data or to reconsider the strength of the data. For example, ask: "What is your best evidence for …" or "What does the evidence suggest to you? Or "So you seem to be suggesting that … happened. What is your best evidence that led you to conclude such?"

- Ask students how and what they might change (even if it was a small change) that would affect the evidence.

3. To get students to interact with each other and wrestle with the data

- Ask students to converse with each other and share what they are thinking, either as individuals, in small groups, or as a whole group, as they work toward generating a consensus response. The book referred to below provides superb guidance on using 3' x 2' small group boards to show data, graphs, conclusions, and explanations that can then be used with a whole group when comparing outcomes of data collection and attempting to foster student-student interactions centered around the processes of science. The process and interaction help students verbalize and clarify their thinking and hear another perspective or explanation that might differ slightly or significantly from their idea. Then they compose and wrestle with competing ideas, sorting them out further with the teacher asking them to examine the strength of the concept in terms of supporting evidence.
- Ask students to compare data and conclusions with each other and to share reasons.

4. Help students learn about limitations to the data – ask students to consider how confidence in collecting the evidence or analyzing the data might have limitations that, in turn, affect the conclusions. Ask questions like:

- What outliers or inconsistent data do you see that you should not use?
- How are you confident that the sample size didn't affect our data, analysis, or conclusions?

Data and Indicators Captured by A SMT Observation

For a summary of which parts of the quantitative data analysis provide evidence of specific indicators, see the *Users and Training Manual – Specific Features of the Quantitative Data Collection Mode.*

- *Lesson Summary* – Look for how much time students were engaged in various phases of the lesson and what type of interactions students had within that phase. As students work in pairs or small groups during activity-based science, a sample of student talk might be a good indicator and representation of student-student exchanges during the lesson.
- *Code Summary* – Look at the levels of questions posed in the lesson that are open-ended (T4a and T4b) regarding how many and when questions requiring deeper thinking were used in the lesson.

- *Teacher Actions Plus* – How did the teacher pose a question and let students interact and analyze the data, or did the teacher remain the center of the discussion? Look for a question posed by the teacher, then many or at least a few S-type actions in a row, indicating students are engaged with each other.
- *Video Evidence* - Examine the phrasing of questions within question type that lower the risk of responding; questions that begin with "what might," "if you had to make a guess," or "what data supports your claim for."
- *Code Summary, Interaction Patterns, Teacher Actions Plus* - Look closely at how you follow up after hearing a student's response; how does your response encourage more students to think or talk about the content or process?
- *Wait-Time Summary* – Look at both average WTs and the summary below showing WTs per specific question (WT-1) and response type (WT-2).

Documenting Evidence and Indicators for Writing Rubric 9: Subject-Specific Pedagogy: Analyzing Evidence and/or Data

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In the space below, using data gathered from SMT observations, document how the candidate uses the representation to develop students' understanding of mathematical concepts and procedures:

Rubric 10: Analyzing Teaching Effectiveness

Rubric 10: Analyzing Teaching Effectiveness - How does the candidate use evidence to evaluate and change teaching practice to meet students' varied learning needs?

The guiding question – The Guiding Question addresses how the candidate examines the teaching and learning in the video clips and proposes what s/he could have done differently to better support diverse students' needs. The candidate justifies the changes based on student needs and references to research and/or theory.

The essence of Rubric 10 is all about analyzing teaching concerning the varied learners in a classroom and concerning the whole class. The teacher-candidate demonstrates through video of their teaching and the written reflective analysis that the candidate can examine their teaching through the lens of differentiating instruction and according to the variety of learners in the classroom. There are many things to look for when answering this question. Here is also where the SMT tool can help provide data and evidence when constructing the narrative regarding what the teacher-candidate does and what they might do differently to positively affect more learners. In the teacher-candidates narrative, they analyze their practice and propose the next steps based on varied groups of learners. The teacher-candidate proposes to be backed by research and educational theories, referenced to specific authors and specific research. The narrative should address how you teach and comment, based on the evidence from the videotape, drawing conclusions and suggesting what you might do to have an even more significant impact on student learning. Comments might include what the teacher-candidate would change and how if they taught the lesson again.

Tips For Evidence or Indicators for Rubric 10:

- First, students are individual learners and often have unique thoughts about what they observe or conclusions they have drawn regarding the data or activity they have just completed. So, know that if you ask a question to the whole class. One student responds with the correct answer; it does not mean that all students have the same answer. They can correct their thinking to now hold the right answer - the research suggests the opposite (unless you are merely teaching low-level factual material). This is also the case with students in small groups as you interact. Asking a question and getting one response is an Ok starting point, but better if followed by asking others in the group the same question or asking others to reflect on the first answer and compare their response – do they agree or disagree and why? So, it is critical that we use strategies and a pattern of interacting that fosters individual student thinking and uncovers and allows us to see or hear each student's thinking. Mentioned earlier was a resource for using dry-erase response boards - *Maximizing Student Engagement in the Classroom.* [1]

Why? In short, using dry-erase boards becomes a superior and constant formative assessment tool, and when used during a lesson, teachers can draw from student answers to guide their next steps for teaching.

- Second, you can only help students learn if you know what they know or don't know. Therefore, constant formative assessment is a must – the more feedback you can get about your teaching's effectiveness, the more you can alter instruction to benefit the learner. The better off you are in knowing what action to take to have the most impact on learning. You can increase your knowledge of all student responses by using a tool that helps us learn about all students' answers, such as dry-erase response boards for every student or a pair of students, with answers written and then held up for teachers to see. There are also technology-facilitated responses, such as when students use digital devices and software such as *Pear Deck*, allowing the teacher to see all student-generated responses and share some of those responses with the whole group for discussion comparison.

Data and Indicators Captured by A SMT Observation

For a summary of which parts of the quantitative data analysis provide evidence of specific indicators, see the *Users and Training Manual – Specific Features of the Quantitative Data Collection Mode.*

- Examining the teacher's quantity and types of various questions and responses allows a teacher to see what they tend to do when interacting with students. They might pick up on patterns of interactions that reflect congruency with structuring the type of intended learning environment. Significant interaction patterns are displayed when examining the quantitative results and the *Patterns of Interaction*. For example, suppose the goal is to get students to think deeply and develop robust science ideas. In that case, a pattern of asking yes/no questions, followed by a student response, followed by clarifying the student's answer (instead of asking the student to clarify and tell you more about their thinking) is not a productive pattern to exhibit. Also, the wait-time data and averages are critical factors with potentially huge effects on student engagement if the amount of wait-time utilized is congruent to give students the thinking time needed to mentally wrestle with the content.

- SMT has a plethora of data connected to an observation; data is analyzed and displayed via data tables, graphs, and seating chart heat maps. What you analyze and how you conclude are, in part, dependent upon your goals for the lesson you videotaped and are now writing about in your narrative. As a suggestion, build a narrative bridge between your goals and what students should have done during the lesson to reach those goals. It is not rocket science, but to be clear – if you want students to develop more robust

and higher levels of understanding of a science concept, then students must be doing that in the activity – students need to wrestle with answering questions designed to promote higher levels of thinking. But once again, higher for one student might be lower for another due to individual differences.

- Examples of where to locate data in SMT analysis that might prove fruitful when writing the narrative for Rubric 10 reside in *Summative Form 3,* which walks the teacher candidate through the various quantitative analyses that SMT provides. In addition, the *SMT Quantitative Analyses of Teaching* (at the end of this document) provides a complete guide for all the data that arises from a teacher observation using SMT.

Documenting Evidence and Indicators for Writing Rubric 10: Analyzing Teaching Effectiveness

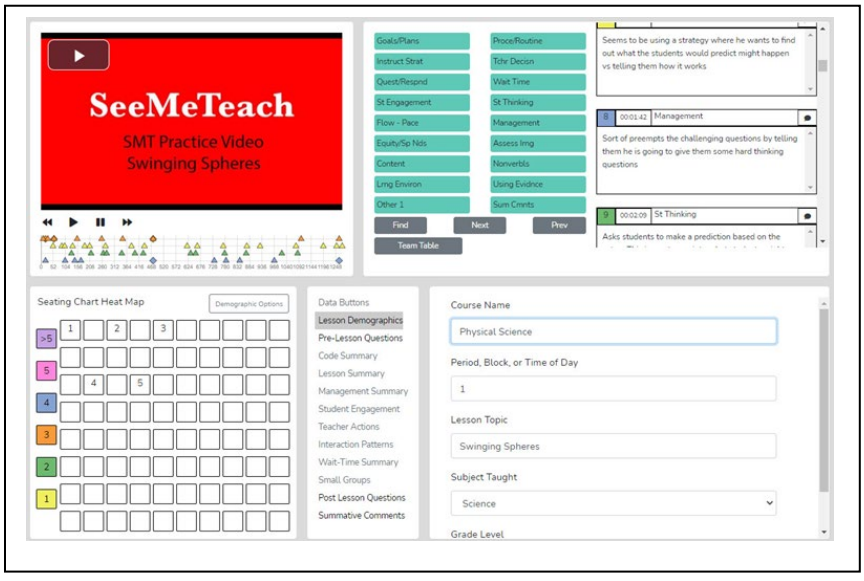
In the space below, using data gathered from SMT observations, document how the candidate uses evidence to evaluate and change their teaching practice to meet students' varied learning needs:

Key Features of SeeMeTeach®

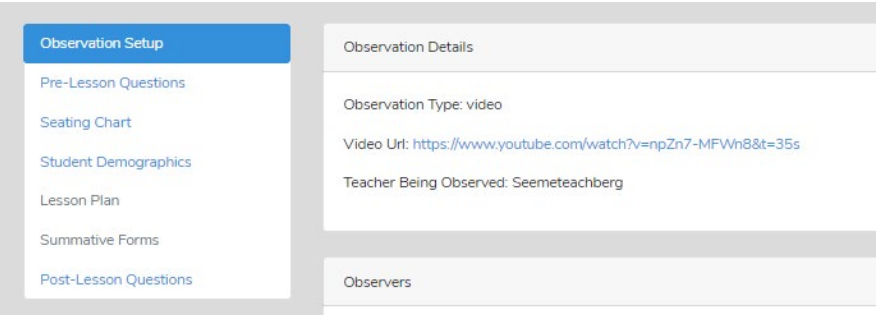
The Qualitative Mode

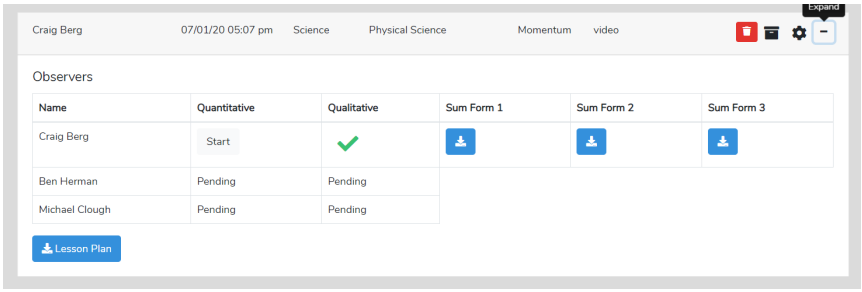
Qualitative Mode - Highlights and Important Features

- Observations can be completed live in the classroom or by using a pre-recorded video or audio.
- The user generates a time-stamped set of observation notes that can include comments and suggestions, color-coded to the specific team member that is making a comment, labeled, and organized by category.
- The user(s) can search and find comments by category.
- Comments are also noted via symbols on the timeline below the video so the user can see who left comments and how many comments are attached to the lesson, then click to read the comment and play the video segment.
- The user can create and tag comments to a student seating chart, thereby noting events and actions by individuals or groups of students.
- When using video, comments are linked to video segments, so the teacher or observer can provide feedback with video examples of the teacher or student actions.
- Summative commentary forms can be filled out, attached, and viewable by any team member. SMT provides some standard forms, or users can also upload and use their own personalized forms as well.
- Provides a platform for the observation team (of up to four people) to collaborate and communicate, and a team member can react to and respond to another team member's comments.

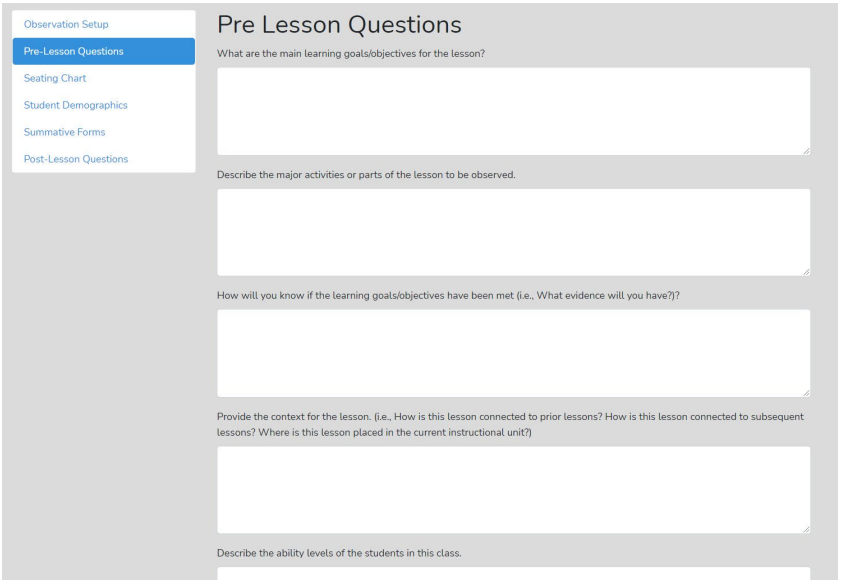


Lesson Plans - Before, during, or after the observation, the observer can quickly access the teacher's Lesson Plans via the Dashboard or the *Team Table*.

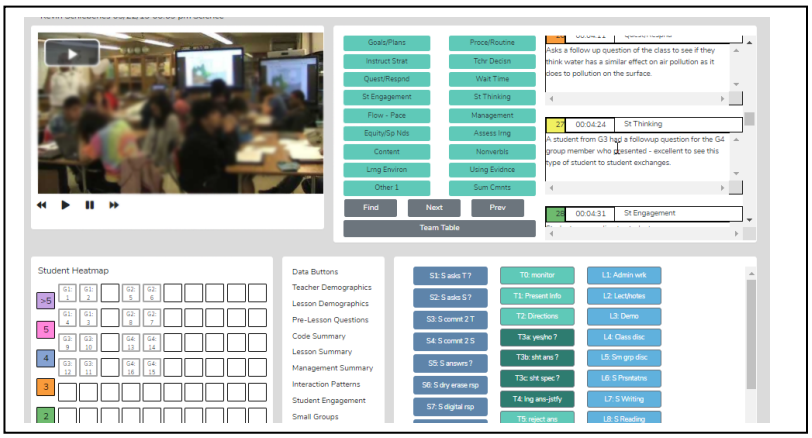




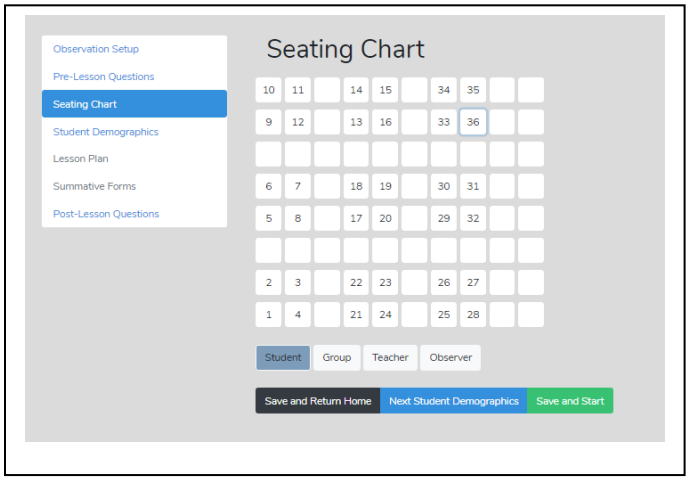
Pre-lesson Questions - To provide the observer with some context and information about the upcoming observation, the teacher can respond to the *Pre-lesson Questions,* which the observer can see via the *Dashboard* or the observation pages.

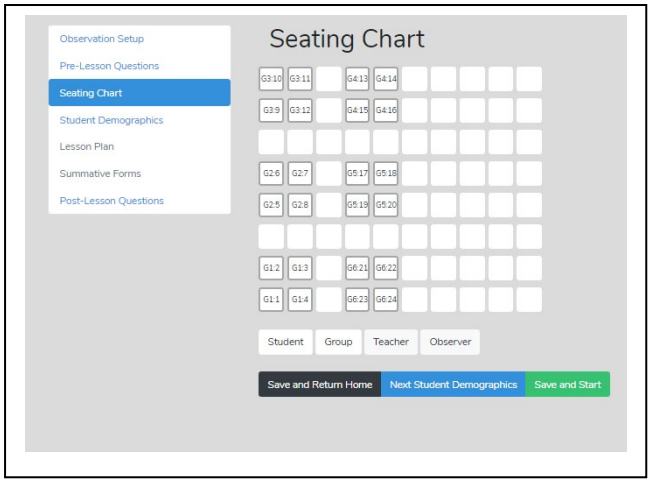


Qualitative Observation Categories and Comments - The observer, or multiple team members, provides comments labeled by categories. There are many comment categories to choose from.

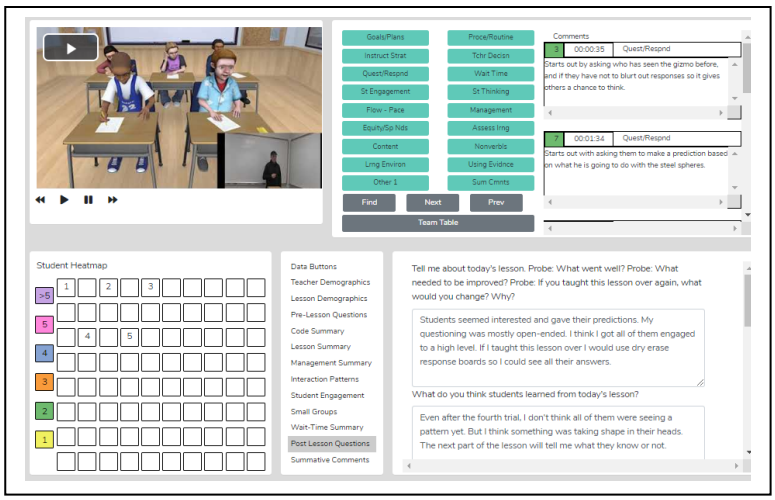


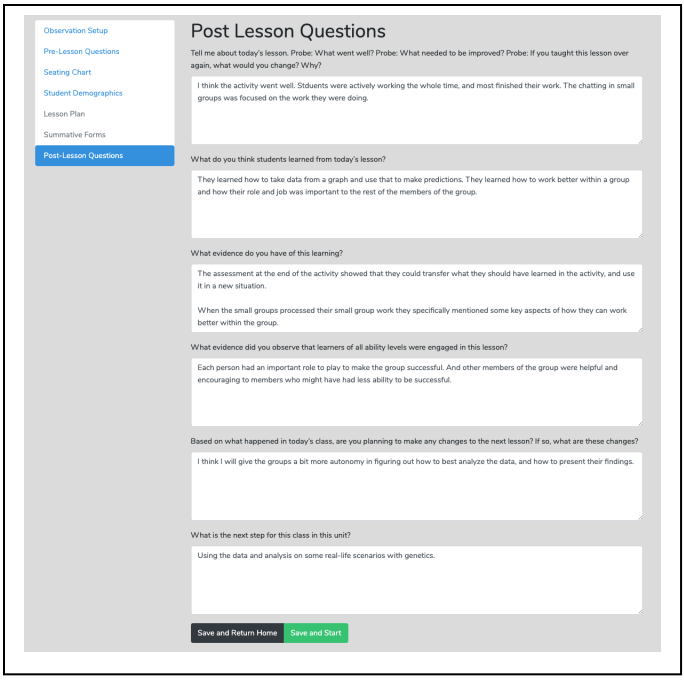
Seating Chart - The teacher or observer can create a *Seating Chart* and refer to this when making comments - showing each student and showing small group designations if desired.



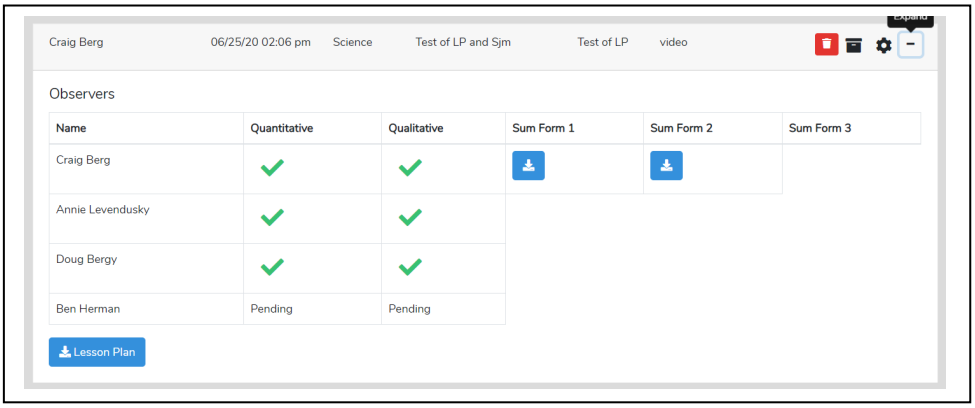


Post-Lesson Questions - To stimulate reflection, post-lesson questions can be filled out or accessed via the settings or the observation/analysis page.

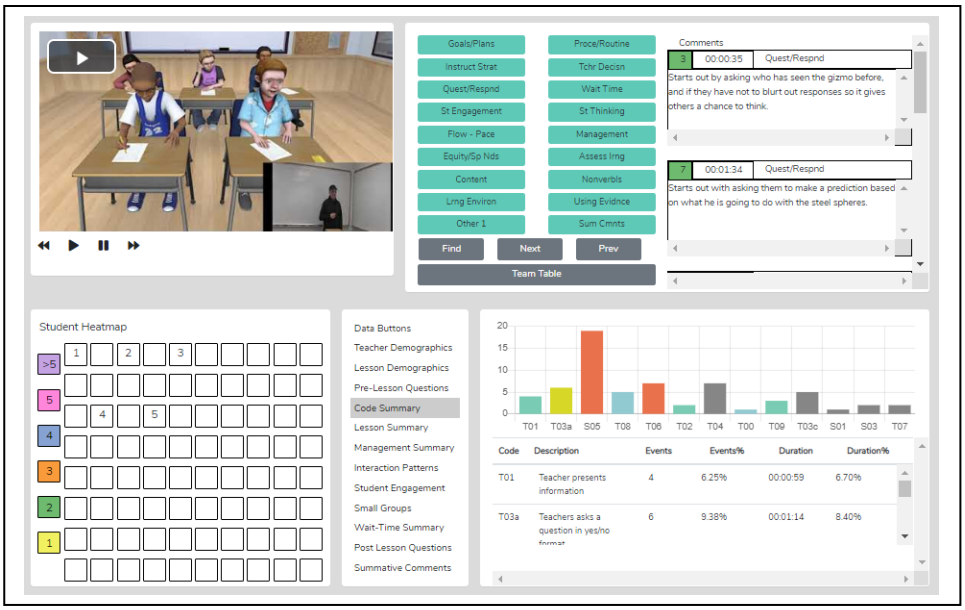




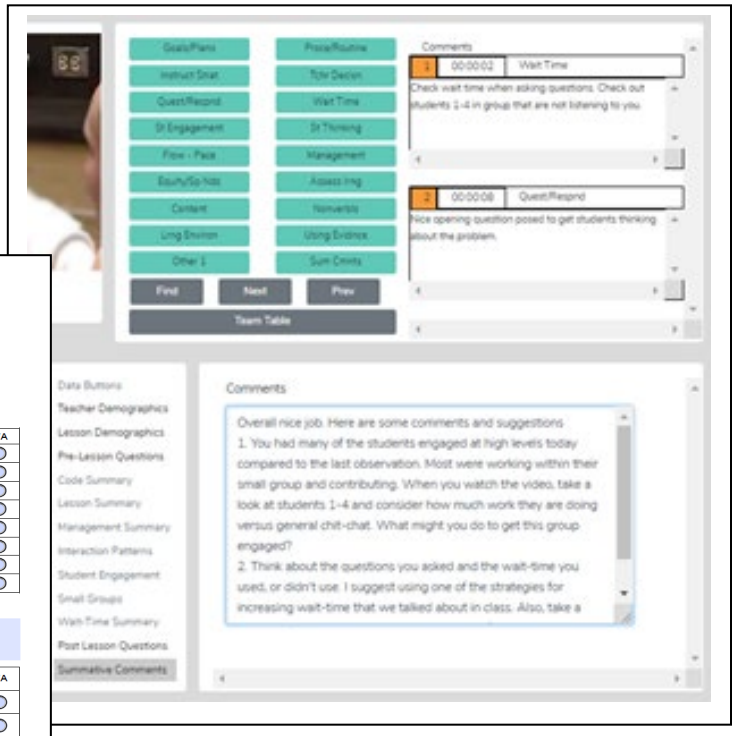
Team Table - A user can choose whose comments (or data/analysis) to view using this feature.

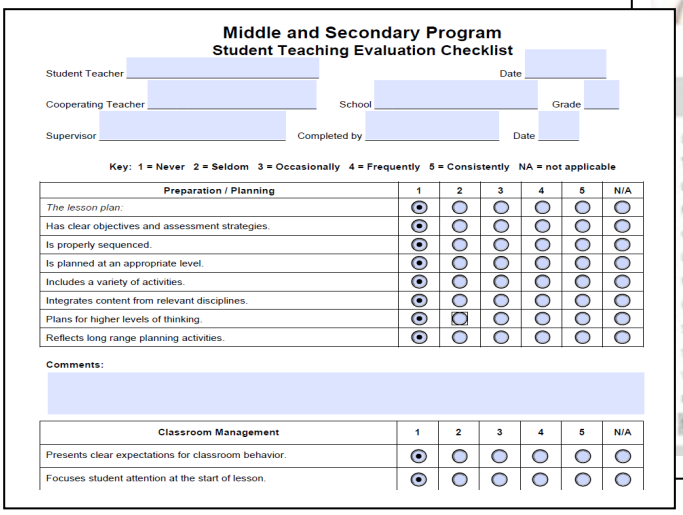


Using Data and Evidence - The observer can use data from the quantitative analysis to bolster comments made during the qualitative comments mode, thereby providing evidence-based feedback, recommendations, and evidence-based coaching.



Summative Comments and Summative Forms - When the observation is over, the observer can add *Summative Comments* and/or fill in up to three *Summative Forms* to share with the observation team.





Middle and Secondary Program
Student Teaching Evaluation Checklist

Student Teacher _____ Date _____

Cooperating Teacher _____ School _____ Grade _____

Supervisor _____ Completed by _____ Date _____

Key: 1 = Never 2 = Seldom 3 = Occasionally 4 = Frequently 5 = Consistently NA = not applicable

Preparation / Planning	1	2	3	4	5	N/A
The lesson plan:						
Has clear objectives and assessment strategies.						
Is properly sequenced.						
Is planned at an appropriate level.						
Includes a variety of activities.						
Integrates content from relevant disciplines.						
Plans for higher levels of thinking.						
Reflects long range planning activities.						

Comments:

Classroom Management	1	2	3	4	5	N/A
Presents clear expectations for classroom behavior.						
Focuses student attention at the start of lesson.						

Suggested Uses - The team member's qualitative analysis might be useful regarding:

- The teaching observation of a fieldwork student or student-teacher by the teacher preparation program supervisor - After the observation, the qualitative analysis page is

available to the student-teacher, who can view comments, respond to post-questions, post their reactions and commentary, and fill out the self-reflective *Summative Form*(s).

- When using video for the observation, team interaction and communication can be enhanced as any team member can do a qualitative analysis of that lesson and view any other team member's running commentary and summative comments.
- When using video, all comments are linked to specific video segments so the viewer can see any particular action as it occurred in the classroom.
- Methods of teaching instructors can view the video of pre-service teachers implementing suggested strategies, view pre-service teachers' analyses and reflections, and add their comments or suggestions.
- For a classroom teacher's yearly observation, a teacher can capture a video of their teaching and complete a self-analysis while an administrator completes their own, merging their commentary with that of the teacher. A conversation then follows this whole process. When using video, comments are linked to the video, making it easy to locate any part of the observation and showcase events being discussed, thereby enhancing feedback and coaching sessions.
- Research team members can share data and analysis screens by printing the data and analysis screens or by exporting the raw data to a .xls spreadsheet for more refined and custom analysis.

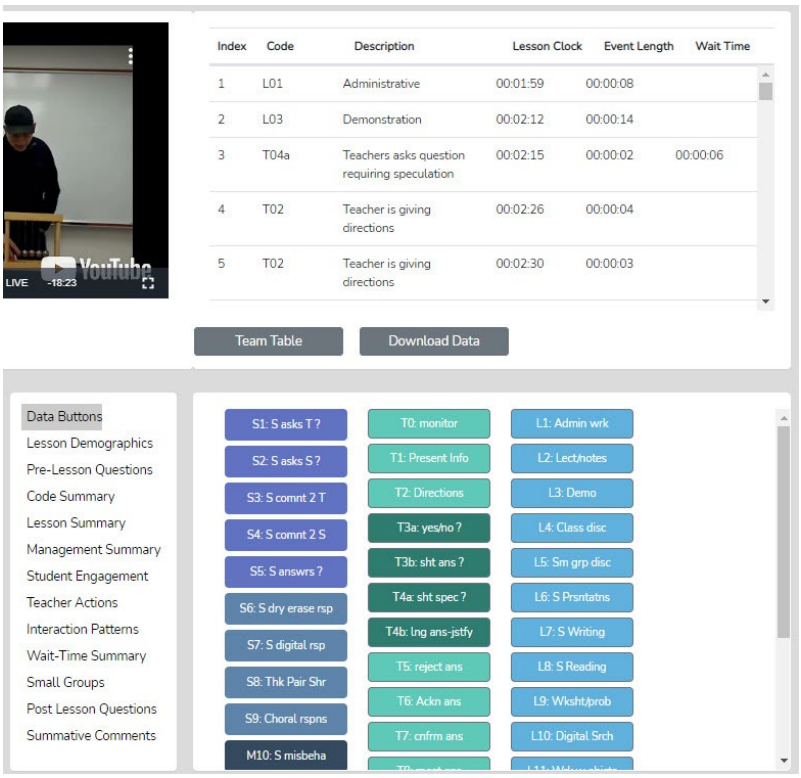
The Quantitative Mode

SMT Quantitative Analyses of Teaching

SMT helps the user collect and then analyze data related to teacher and student actions during a lesson. This data is coupled with the specific lesson type in play to show when and where student and teacher actions occur in lessons. Collecting and analyzing data provides a record of teacher and student actions during the lesson. The raw data is displayed and time-coded, and linked to the events as they took place in the video. The resulting raw data and data analysis offer substantive insights into the activity and events of the lesson. The analysis and feedback options described below will highlight how beneficial it is to use quantitative data during the feedback process.

Power of Video-linked Data - When using video, much of the data collected is linked to the specific video segments representative of that data and the type of action or event by both teacher and students. When looking at the analysis screens, the observer, teacher, or team member can go directly to the video linked to specific data points and see examples in action.

Running Record - The *Running Record* lists all the events in sequence from start to finish. The user can scroll through the events and click on any event to see the related video. While *SeeMeTeach ®* has significant data analysis built-in for instant viewing, also note that the data can be exported to a .csv file to be used with powerful statistical packages.

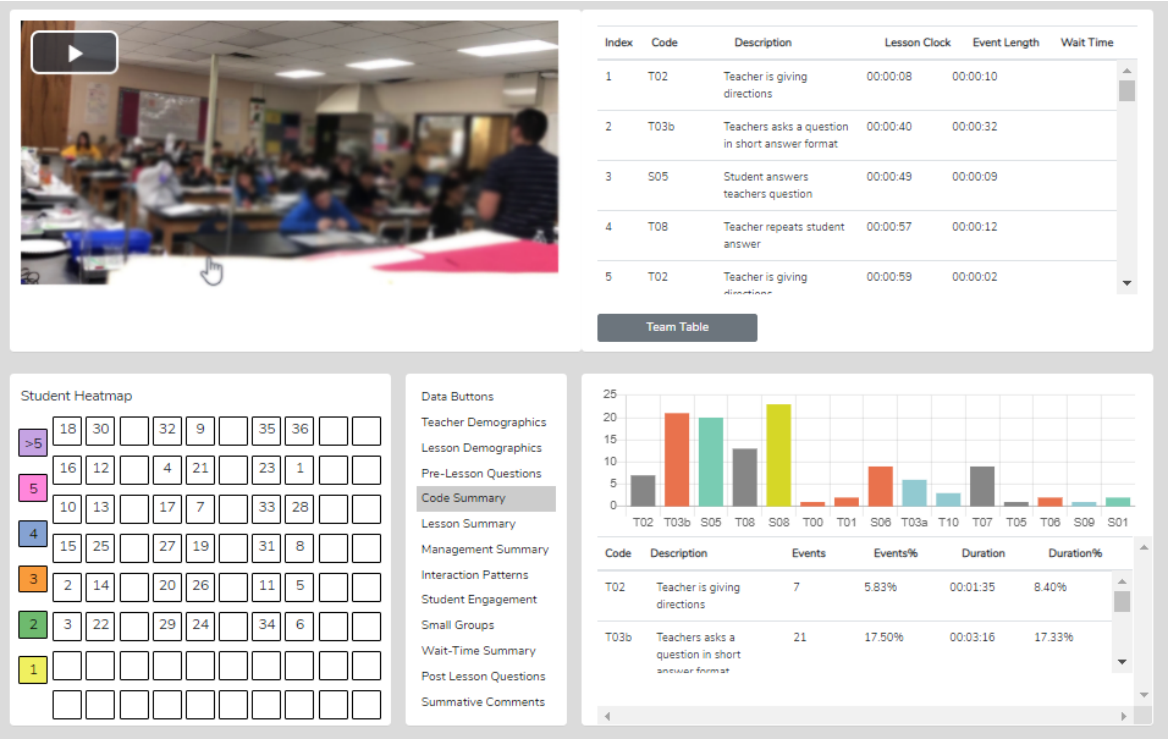


Data Buttons - The *Data Buttons* feature serves as a *Search and Find* function and allows the user to quickly locate linked video examples of specific T, S, M, or U events. Clicking on a button finds the first of that specific code/event in the *Running Record* window, and the linked video begins to play. And at the bottom of the *Running Record* window, there is a note indicating how many events of that type were located. This feature is particularly helpful for identifying the habits and tendencies

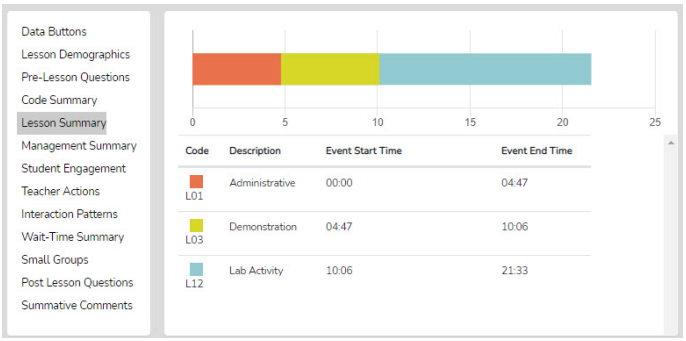
of the teacher. For example, perhaps the observer noticed the teacher has a habit of asking yes/no questions, followed by clarifying the answer for the student. In this case, we know that having the teacher change how they interact and react would be beneficial for finding out more about the student's thinking. For example, the teacher could have asked the student to clarify their answer. As such, the observer might choose to use that data or video, all or some, to make a point of how a teacher's choice affects student engagement and their ability to uncover student thinking.

Lesson Demographics – This contains information about the lesson that was entered during *New Observation* lesson setup or can be edited (course name, period, lesson topic, subject, and grade level).

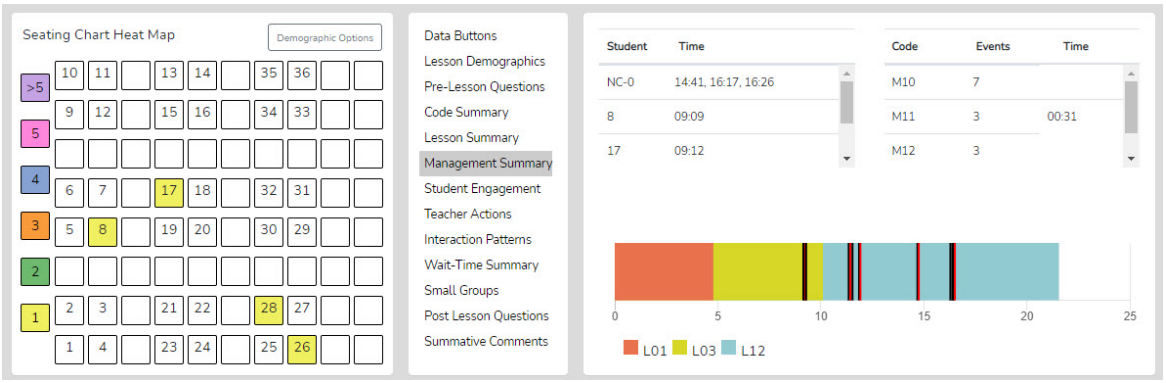
Code Summary – This feature provides a graph of the number of events of each code used during data collection and shows the relative and specific use of T, S, M, and U codes. Underneath the graph is a data table that displays data for each of the specific codes by frequency of an event, frequency of an event compared to the total number of events, amount of time coded by the specific event, and time accrued for that event compared to the total time of all the events. The T code data is tallied underneath this data table, as are the S code, M code, and U code data. This data is also recorded as a percentage of total events and percent of total time.



Lesson Summary – When coding a lesson, the observer notes the type of lesson in play by clicking an L button at the very start of the observation and a different L code each time the lesson type changes within the observation. As such, types of lesson segments are noted and displayed in the quantitative analysis mode in the *Lesson Summary* data window as a timeline showing the order and length of each lesson segment. This lesson segment display is used as a time-context reference when looking at other data, such as *Student Engagement or Management Summary,* so the user can see where misbehaviors or students' responses were present in the lesson.

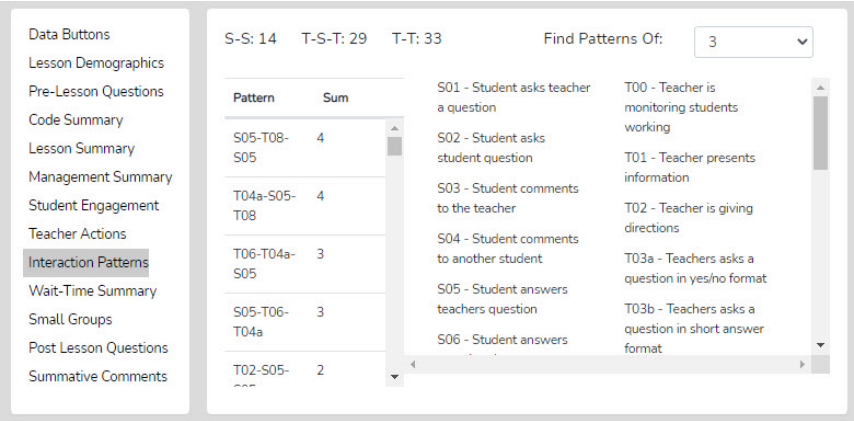


Management Summary – Displays the misbehavior events (M codes), noted specifically by student seating number, or generically if seating chart numbers were not used, and when the events occurred. Also displayed is when and how long the teacher reacted to and addressed misbehaviors. The specific time of occurrence of student and teacher data is displayed on the lesson-type timeline by black bars for student events and red bars for teacher reactions. Clicking on a bar causes the video linked to that event to begin playing. In addition, the seating chart heat map shows by color code how many events are linked to specific students.

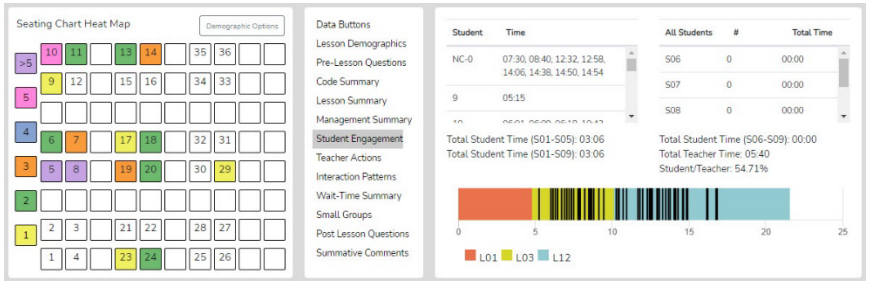


Demographic Highlighting in the Seating Chart Heat Map - In addition, if data is collected for specific students by using the student seat number before entering the M code, then the data can be displayed and toggled on or off by clicking on the Gender, ELL, SPED, or Minority buttons. If the observer should wonder how the students with special needs are disengaged during the lesson, toggle this information to find out. If the observer or teacher is concerned about equity of participation regarding gender, minority, ELL, or students with special needs, then this data is available.

Interaction Patterns – Using all the teacher actions (T codes) and student engagement actions (S codes), the user can view the predominant patterns of interaction between the teacher and students. In addition, numbers are provided that show how often students interact with each other (S-S) versus how often the traditional teacher-student-teacher pattern (T-S-T) is used or how often another teacher action follows a teacher action (T-T).

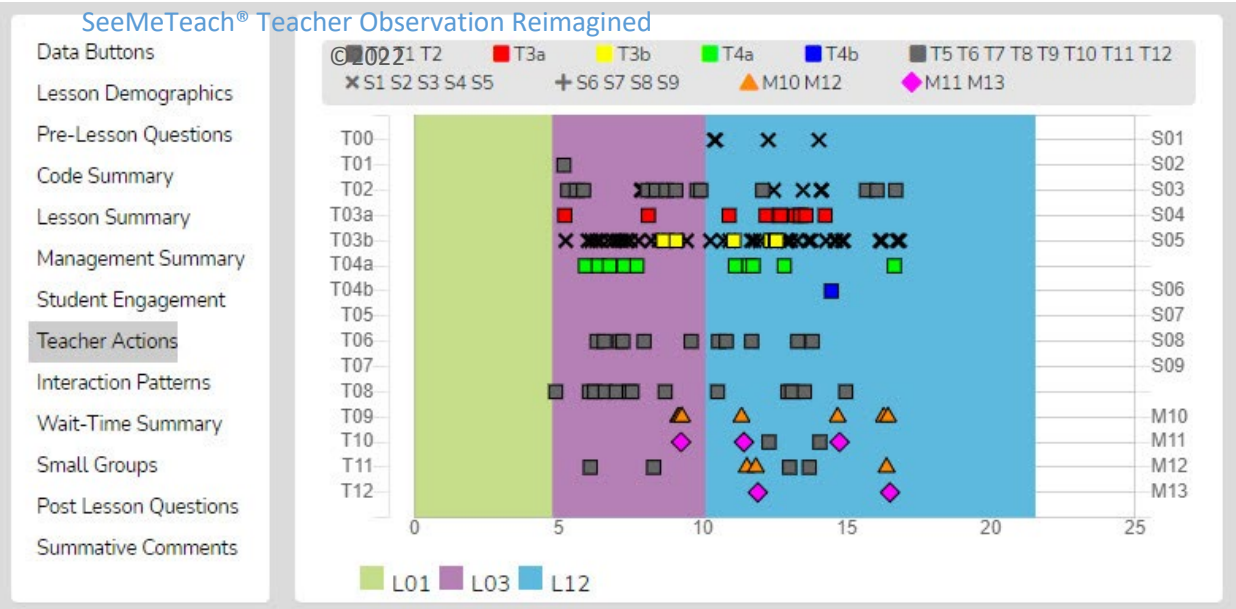


Student Engagement – Displays the student engagement events (S codes), noted specifically by student seating number, or generically if seating chart numbers were not used, and when the events occurred. Also displayed is when and how long the teacher reacted to and addressed the misbehaviors. The specific time of occurrence of student and teacher data is displayed on the lesson-type timeline with black bars for student events and red bars for teacher reactions. Clicking on a bar causes the video linked to that event to begin playing. In addition, the seating chart heat map shows by color code how many events are linked to specific students.

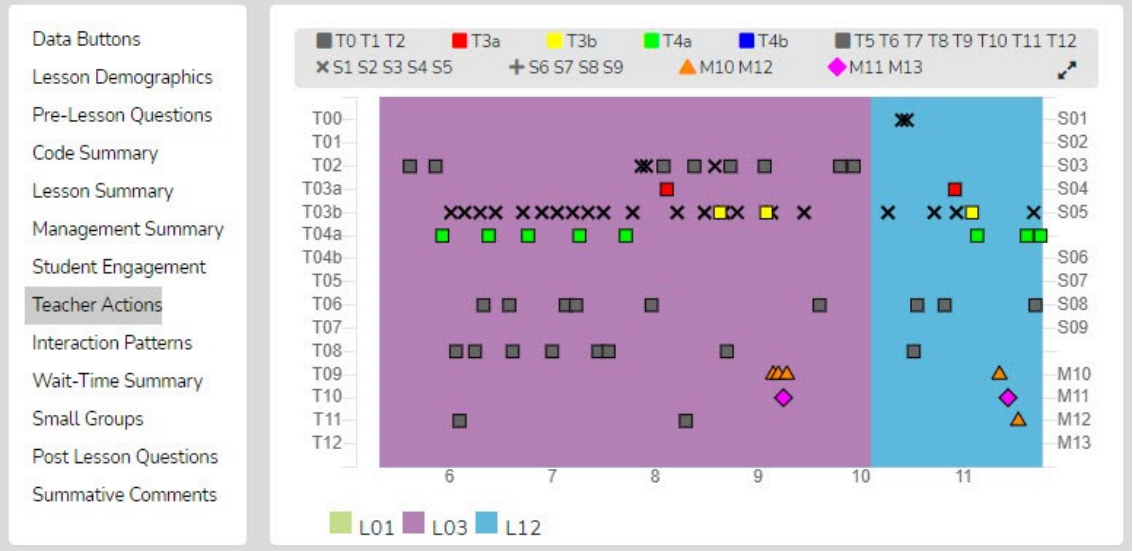


Demographic Highlighting in the Seating Chart Heat Map - In addition, if data is collected for specific students by using the student seat number before entering the S code, then the data can be displayed and toggled on or off by clicking on the Gender, ELL, SPED, or Minority buttons. If the observer should wonder how the students with special needs are engaged during the lesson, toggle this information to find out. If the observer or teacher is concerned about equity of participation regarding gender, minority, ELL, or students with special needs, then this data is available.

Teacher Actions Summary – *Teacher Actions Summary* is a timeline from the beginning to end of the lesson that displays on a backdrop of the lesson type (colors) in play and shows symbols for when the teacher exhibited various T codes actions, so the user can follow the sequence of teacher actions throughout the lesson. Also displayed on this timeline are M and S code data; in truth, almost all data collected are represented on the timeline, which is a robust set of data representing teacher and student actions. The user can easily see when any management issues occur in the context of the rest of the teacher and student actions in the lesson. Since this is a visual display of teacher actions, student actions, and misbehaviors, as well as the teacher's reaction to misbehaviors, it provides the user with a visual of the flow of action from beginning to end of the lesson and visually brings forth sequences, predominate or absence of a teacher or student actions. For example, if the teacher is curious about their use of questioning, it is easy to view when any of the four questioning codes were used and what codes occurred prior to or after. The user may find a complete absence of higher-level questions. The user may readily see what they tend to do following a student's response. The user can target viewing of any codes by toggling on or off the display of any of the T, S, or M codes. Aside from wait-time data, all the data is represented on this summary screen, which is often a large chunk of data and may clutter the screen.

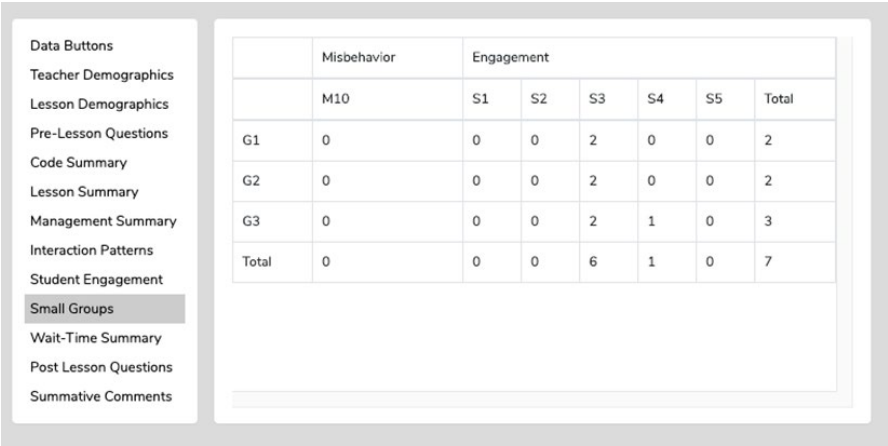


As shown below, the viewer can zoom in or out to enable data points to separate from each other.



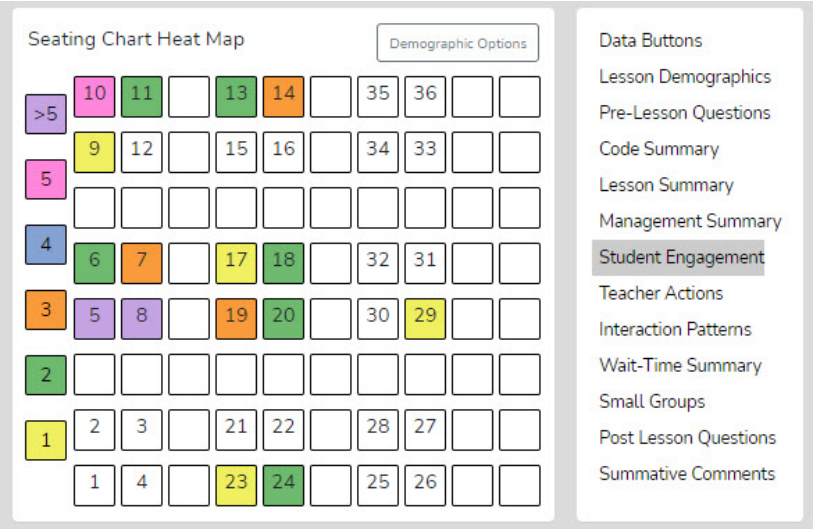
Finally, as with other data points in SMT, the user can click on any data point (symbol), and the linked video will play.

Small Groups – When completing a quantitative observation and student engagement or misbehavior data is collected and tagged by an individual or group number, the observer can then use the *Student Engagement, Management Summary*, *Seating Chart Heat Map,* and *Small Group* analysis displays to examine the results and determine various things about how the lesson impacted small groups.



	Misbehavior	Engagement					
	M10	S1	S2	S3	S4	S5	Total
G1	0	0	0	2	0	0	2
G2	0	0	0	2	0	0	2
G3	0	0	0	2	1	0	3
Total	0	0	0	6	1	0	7

The *Group Summary* data collected in conjunction with the student seating number allows for examining group dynamics and amount and levels of S code type of interactions that reveal the impact of a lesson on student-to-student interactions. The table shows S codes and M10 event responses coming from specific groups. If the teacher and observer wondered how the lesson stimulated student actions (S codes) within the small group, this data would indicate thereof. The *Seating Chart Heat Map* would show how much interaction occurred within that group, color-coding each member's number of contributions.



Wait-Time Summary – The wait-time data is only located within the *Wait-Time Summary.* Within the *Wait-time Summary* are general summaries of wait-time by wait-time type, events, total time, and averages for each wait-time. In addition, the lower half of the summary provides wait-time averages according to a specific teacher or student's actions. For example, the user can determine if more wait-time is allowed with higher-level questions requiring deeper thinking than lower-level questions.