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Mapping, Clarifying, and Communicating Key Ideas about
Collaborative Learning to STEM Audiences

Classroom Discourse

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This primer addresses the following questions:

- What are the benefits and challenges of student-centered classroom discussion?
- What are ways to incorporate questions and other classroom talk formats into the classroom?
- What strategies help students engage in productive and accountable discussion?
- What are strategies to manage participation dynamics?

This document culminates with strategies, tips, and resources to help you apply the ideas to making your classroom collaborations more successful.

Key Takeaways

- Classroom discourse includes multiple approaches that allow a teacher to shift towards a more interactive classroom and away from traditional "Initiation-Response-Evaluation" patterns of interaction.
- Classroom discourse approaches give social and cognitive benefits, including engagement through discussion, deeper processing of information, improved reasoning skills, and the development of active listening and respectful responses.
- Teachers can motivate all students to participate by creating a safe space where all students feel valued and empowered to contribute.
- For both teachers and students, developing effective discourse takes time and effort; make an investment and provide ample opportunities to practice and refine skills.

Background

Tapping into students' desires to socialize while building their capacity for productive discourse can lead to both social and intellectual development. The ICAP framework (Chi & Wylie, 2014; Chi & Boucher, 2023) categorizes how students engage in learning activities based on their observable behaviors and suggests that these behaviors can be classified into four modes, from highest to lowest engagement: Interactive, Constructive, Active, and Passive. The goal of instruction is to move students beyond passive and active engagement towards more constructive and interactive modes of learning, where they are actively making sense of information and building on each other's ideas (Chi & Boucher, 2023). Listening is an example of a passive behavior (Chi & Boucher, 2023). Listening to explanations and arguments can

help students accrue knowledge, which is important, but it does not yield the same benefits of more active participation. Participation in talk is critical for students to change their thinking and develop deeper understanding of concepts (Clarke, 2015). Discourse takes students from a passive absorption of facts to interactive engagement, which can lead to differentiating concepts and making deep conceptual shifts. Learning and cognitive development are improved in classrooms where students are engaged in interactive discussion in which students take turns, listen carefully to each other, ask follow-up questions, and elaborate their thinking.

Specific methods used to promote meaningful discussions include "accountable talk" (Resnick et al., 2018), "powerful talk" (Nichols, 2006), and "exploratory talk" (Gillies, 2019). All methods focus on providing students with the tools to engage in reasoned arguments, support claims with evidence, and critically analyze each other's ideas. Collaborative argumentation is a specialized type of dialogue that focuses on constructing and critiquing arguments with others, often based on claims, evidence, and reasoning. But even seemingly simple "talk moves" — norms and patterns around talk, such as "Wait Time" and asking students to rephrase each other's ideas — increase student engagement and support comprehension. Productive norms and patterns around talk need to be developed over time and require practice. They can be practiced in a variety of formats, including whole-class, small groups, and in pairs. And practice must include everyone, including the teacher. Active structured turn-taking allows students to gain skills that will support future collective discourse, knowledge building, and reasoning. When students support one another using productive norms and skills, the results can be self-reinforcing and self-sustaining: students will internalize the skills and support one another even when the teacher is not around (Resnick et al., 2018).

Teachers play a crucial role in shifting classroom discourse from teacher-centered to student-centered. Teachers need to model effective talk moves, establish clear expectations for participation, and cultivate a culture of respect and intellectual curiosity (see Teacher's Roles in Supporting Collaborative Learning and "Creating Classroom Culture for Collaborative Learning" in the Collaborative Learning Toolkit). Teacher preparation is essential because the initial environment established in a classroom can have a cascading effect, influencing subsequent interactions and learning either positively or negatively.

Research shows that productive approaches include:
- Setting norms and expectations
- Establishing the goals of the discussion
- Providing sentence openers for learner-led inquiry
- Modeling what productive moves look like
- Allowing students to practice through "low-risk" scenarios with non-academic and/or with academic content

Challenges or pitfalls to implementing classroom discussions include:
- Students not prepared to engage in the discourse
- Issues around power dynamics
- The potential for unequal participation

- Limited teacher classroom management skills
- Limited teacher pedagogical knowledge

There are strategies to help mitigate these challenges (see the Collaborative Learning Toolkit for more examples). Establishing norms around discussion as a way to increase understanding rather than as a way to display knowledge is critical (Clarke, 2015). Creating a positive classroom culture (with norms, goals, structure, practice, and recognition) that supports student participation and motivation helps students feel prepared to participate and engage in discourse.

What Does the Research Say?

Though widely used, the traditional "Initiation-Response-Evaluation" (IRE) pattern, where the teacher leads question-and-answer sessions with students, does not lead to deep understanding because it primarily focuses on recalling information rather than analyzing, evaluating, or creating new knowledge (Windschitl & Calabrese Barton, 2016). Evidence suggests that a shift away from IRE towards student participation in classroom discussion — where students are thinking, talking, and listening to each other — significantly improves student learning (Clarke et al., 2015; Dragnic-Cindric et al., 2024, Gillies, 2019; Windschitl & Calabrese Barton, 2016). Productive discourse practices correlate with improved performance on standardized tests of reasoning (Tao & Chen, 2024). In discourse-intensive classrooms, students view intelligence as malleable and effort as a path to greater understanding. Research has shown that certain forms of classroom talk produce more learning than other forms (Resnick et al., 2015), even beyond the subject under discussion. That is, through the use of discourse, students also become better learners and thinkers in other subject areas. For example, when students discuss world water availability, use data, and argue their way toward understanding in a social studies class, they become better in mathematics, science, social studies, and English language arts (ELA) (Vahey et al, 2010).

Encourage productive and accountable discussions. The concept of accountable talk (Resnick et al., 2018) emphasizes that productive dialogue holds students:

- Accountable to **knowledge** (getting the facts right even if it is a struggle)
- Accountable to **reasoning** (engaging students in developing, refining, and comparing alternative explanations)
- Accountable to **community** (showing respect for all students and their ideas and feelings)

With productive dialogue, students ground their claims in evidence and justify their reasoning based on available information (evidence); contributions are thoughtful and go beyond simple agreement or disagreement to explore alternatives; and all students are positioned as valuable contributors, fostering a respectful environment where ideas, not individuals, are challenged. Studies show that such competencies are best developed through social dialogue where students think out loud with each other. To reap the benefits of classroom discourse using accountable talk moves, students must be accountable to achieving the positive outcomes that result from such discourse and, ideally and

eventually, hold each other responsible for getting the facts right and thinking through challenges together.

Use talk moves as tools. Talk moves are specific, adaptable prompts and actions (like wait time and hand signaling) that teachers can use to guide the flow of discussion, encourage student participation, and promote deeper reasoning. For example, Michaels and O'Connor (2015) identify nine talk moves that address four key goals to help students:

1. Clarify and share their thinking ("time to think", "say more," "so, you are saying…?")
2. Listen carefully to each other ("who can rephrase or repeat?")
3. Deepen their reasoning ("asking for evidence or reasoning," "challenge or counterexample"),
4. Think with others ("agree/disagree and why," "add on," "explaining what someone else means").

Research shows that these moves encourage elaboration and clarification of ideas, promote active listening and engagement with their peers' contributions, deepen reasoning by prompting students to provide evidence and justifications, and foster critical thinking by encouraging respectful agreement/disagreement and building on each other's ideas.

There are important social and cognitive benefits of dialogue. Effective dialogic talk or discourse in the classroom supports both social and cognitive development (Clarke et al., 2015). Cognitively, discourse encourages deeper processing of information, connects new knowledge to existing understanding, and helps students develop reasoning skills. Students who engage in elaborative explanations demonstrate greater learning gains. Socially, dialogue requires students to listen actively, respect diverse viewpoints, and respond constructively to others' ideas, all crucial for collaborative learning. Social dynamics, such as friendship and ability grouping, influence the effectiveness of dialogic interactions. Trust plays a critical role, allowing students to feel safe enough to share their thoughts, listen actively to each other, and build collective understanding. For example, students who identify as trusted friends build on and engage more with each others' reasoning, and this engagement strongly predicts problem solving accuracy (Clarke et al., 2015). Groups that show more openness in their talk display deeper reasoning. Rudeness has immediate negative effects, spawning reciprocal rudeness and the breakdown of collaboration. Thus, positive rapport and signals of trust and respect play an important facilitative role in both the social discourse and cognitive outcomes.

Practitioner Perspectives

It takes time and effort to learn to facilitate student-centered discussion, for a culture to develop among students that supports such discussions, and for these shifts to feel comfortable. Over time, these skills and comfort levels will improve for both teachers and students, and continue to grow in effectiveness.

Shifting from a culture of recitation to a culture of discussion. The dominant form of classroom talk is the traditional IRE pattern where the teacher asks a question with a known answer, students respond, and the teacher evaluates the response. While such "recitation" might be effective for reviewing

material or checking for recall, it does not promote deep thinking or help students change their understanding. Even with professional development, teachers find it challenging to consistently implement practices that promote richer discussion, such as asking open-ended questions, encouraging students to elaborate on their thinking, and facilitating student-to-student interaction. Importantly, these practices involve the teacher guiding rather than telling, learning to release control, and sometimes allowing discussions to go on unplanned but valuable tangents (see Teacher's Roles in Supporting Collaborative Learning).

Managing participation dynamics. Teachers often encounter challenges when managing student participation in classroom discussions. For example, the same few students might raise their hands, and even with wait time, only a few more students will respond because they don't feel safe to contribute; many students repeat back what they think the teacher wants to hear because they don't feel safe to share new ideas; or some students view other students' comments as "dumb" because there is a lack of respect for other ideas. Momentum can be lost from "off-hand" classroom contributions, impulse control issues, or some students not wanting to work with other students.

- **Student silence and unequal participation**. Some students may dominate discussions while others may disengage and not participate at all due to fear of being wrong or that their ideas will not be valued. Students from privileged backgrounds, where discussion is more common at home, may have an advantage in classroom discussions. Factors such as language proficiency, disability, gender, socioeconomic status, and prior experiences with discussion can influence students' willingness to participate. Teachers may struggle to create a space where all students, regardless of their background or comfort level with speaking up, feel safe and empowered to contribute.

- **Supporting students with diverse needs**. Teachers must be prepared to support students who require additional assistance to participate fully in discussion. This might include students who are English language learners, have disabilities, or are not accustomed to the social and academic expectations of discussion-based classrooms. Teachers may need to provide differentiated support, such as teaching vocabulary, offering visual aids, and providing opportunities for students to practice their ideas in pairs and smaller groups before sharing with the whole class (see Teacher's Roles in Supporting Collaborative Learning and the Collaborative Learning Toolkit).

Aligning student perceptions with the purpose and value of discussion. Students often enter classrooms with preconceived notions about the purpose of classroom discussions. Instead of viewing discussions as opportunities to co-construct knowledge and understanding, they may see discussion as high-stakes events where the goal is to display pre-existing knowledge and provide "correct" answers. This can lead to a reluctance to share tentative ideas, make mistakes, or engage in the kind of intellectual risk-taking which are essential for deep learning. Teachers who successfully cultivate productive discourse create a classroom culture where students understand that they have the right to speak, feel safe sharing their developing thinking, and recognize the value of listening to and building on the ideas of others.

Classroom Discourse in Practice

To support productive discussions, teachers need to build in time to gain familiarity with the discussion dynamics, lay out expectations, build rapport, and practice with the students to help students develop their skills. Teachers may also need to build their own understanding of the subject matter and misconceptions that students may have, and ask questions to understand how students perceive the content and discussion dynamics. The following specific strategies have been found to support productive classroom discussion.

Establish and reinforce ground rules. Teachers should work with students to establish a shared understanding of norms for communication and engagement in the classroom and for discussion. These norms should foster a respectful and equitable learning environment where all students feel comfortable sharing their thoughts and ideas. When students feel safe to share their ideas and challenge others' ideas without fear of ridicule, disagreements and resolution of disputes can be productive for learning. Some key ground rules include: listening attentively to classmates, speaking respectfully, using evidence to support claims, and taking turns to speak. Once established, these norms should be consistently reinforced to become ingrained in the classroom culture. Some teachers hang posters in their classrooms of the agreed upon norms. Building rapport and practice with students initially takes time as expectations are laid out and students develop their skills.

Plan for academically productive discussions with clear learning objectives in mind. Productive discussions require advanced planning. Teachers should identify the specific academic goals they hope to achieve through the discussion. For example, science instruction often provides an opportunity to present students with a phenomenon that demonstrates a specific concept. A teacher may ask, "What are the key science concepts I want students to understand by the end of this discussion? What are some common misconceptions and alternative ideas and how can they be evaluated through evidence and counterexamples?" With clearly defined objectives, teachers can strategically select appropriate tasks, scaffolds, or questions that will help students achieve these goals.

Prepare open-ended, thought-provoking questions. Open-ended questions are essential for sparking lively discussions and prompting students to think critically. Instead of asking questions with a single right answer, teachers should design questions that encourage multiple perspectives, interpretations, and solutions. By planning a few follow-up questions in advance, teachers can help keep the discussion focused and encourage deeper exploration of the topic. In this way, discussion can be seen as a means of formative assessment during the classroom period. Engaging in discourse informs the teacher's move in the moment to shape or redirect the learning outcomes and provides insight as to how students are processing content.

Use a variety of talk formats strategically to encourage participation and engagement. Teachers can choose from several effective talk formats such as whole-group discussions, small group work, and pair work to achieve different learning goals and encourage participation from all students. Whole class practice allows the teacher to model and set norms for classroom discussions and allows students

additional "think" time before contributing to the discussion. Pair practice can help students to build their "active listening" skills as they share ideas with each other, and then with the whole class if called upon. Small group work can provide a space for students to share ideas and practice using academic language before participating in a whole-class setting. However, small group and pair work can still feel intimidating to students, particularly if students perceive a mismatch of knowledge or skills. Explain the purpose of each format, change up members in pairs and small groups, and remind students of the larger goals of turn taking and knowledge building.

Incorporate templates and talk moves to facilitate discussion. Before discussing in pairs or small or large groups, students benefit from time to think and write down responses. Students work well when they have a template or prompt sheet to scaffold their thinking before moving into conversation. A set of goals and prompts could be posted on the wall and also made available on paper or online for students to use individually (see poster of classroom norms in the [Collaborative Learning Toolkit](#)). Making talk moves visually and publicly accessible to students can help them develop stronger responses and engage more effectively in discussions. This helps them lower their cognitive load in these often challenging environments of dialogue with their peers. By providing templates and a repertoire of talk moves, teachers can effectively guide students to engage in more meaningful discussions and promote deeper reasoning. For examples of talk moves, see [Checklist: Goals for Productive Discussions and Nine Talk Moves | The Inquiry Project](#).

Whether facilitating academic conversations in math, science, ELA, or social studies, talk moves are a powerful tool to transition students away from simply answering teacher questions in a one-way monologue to engaging with peers in a dialogue. Some teacher-provided tips for successful use of talk moves include:
1. Introduce talk moves slowly, one at a time, to help students see the different ways the same move can be used or interpreted.
2. Consider the use of the [hand signals](#) to call out associated talk moves.
3. Provide students the questions the day before a class discussion to give them time to write down thoughts and evidence so that they feel more prepared to contribute.
4. The day of the whole class discussion, have students spend time beforehand in pairs or small groups to discuss their individual answers. Encourage them to listen for new ideas or answers — things they might want to make note of and share, while attributing it to the peer who said it. Teachers may also ask the classroom for thoughts that haven't been voiced yet, or even read from notes that students submit to broaden the discussion.

Summary

Teachers play a crucial role in creating a classroom environment in which students evaluate evidence, share new ideas, and build on each others' ideas. Often, this type of discourse requires teachers to establish norms around talk that help students support each other and progressively refine their ideas. This type of classroom discourse is also referred to by terms such as dialogic instruction, dialogic interaction, dialogic pedagogy, academically productive discussion, classroom talk, and accountable talk (Rapanta & Macagno, 2023). No matter the name, discourse is a powerful process for deepening learning, fostering critical thinking, and building knowledge through social interaction and engagement with ideas. By embracing structured discussion centered on learning, educators can create classrooms where, over time, students move beyond seeking a single "right answer" to instead valuing the process of reasoning, exploring different perspectives, engaging deeply with content, and collaboratively constructing knowledge.

Getting Started

Review the resources below, including the instructional primer on Classroom Discourse for more detailed examples. A sample high-level instruction plan:

- Watch the videos from the The Inquiry Project: Video Resources and review resources below
- Develop one-day and multi-week schedules to mix up student groupings, prepare students for classroom discourse, and expose students to what this looks like. (The First Six Weeks of School by Anderson, 2015, offers nice examples of this.)
- Create vocabulary in the room for students to reference while in classroom discourse.
- Use the PDF resources that highlight four strategies and nine talk moves.

Other Primers in This Series:

- Assessment
- Collaborative Argumentation
- Social Regulation of Learning
- Teacher's Roles in Supporting Collaborative Learning

Related Resources

- Collaborative Learning Toolkit
- The Inquiry Project: Video Resources
- Checklist: Goals for Productive Discussions and Nine Talk Moves | The Inquiry Project
- Talk Moves | Edutopia (good example for a classroom poster)
- Getting Students to Talk About Math Helps Solve Problems
- Maximizing Math Talk in the Classroom
- Foundations of Collaboration

Videos:

- [Classroom Videos of Collaborative Learning](#)

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