

Emerging Technologies for Effective Teaching & Learning

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Transforming Education



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Primer on Learning Sciences Research

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Activity 1



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What is Learning Sciences?

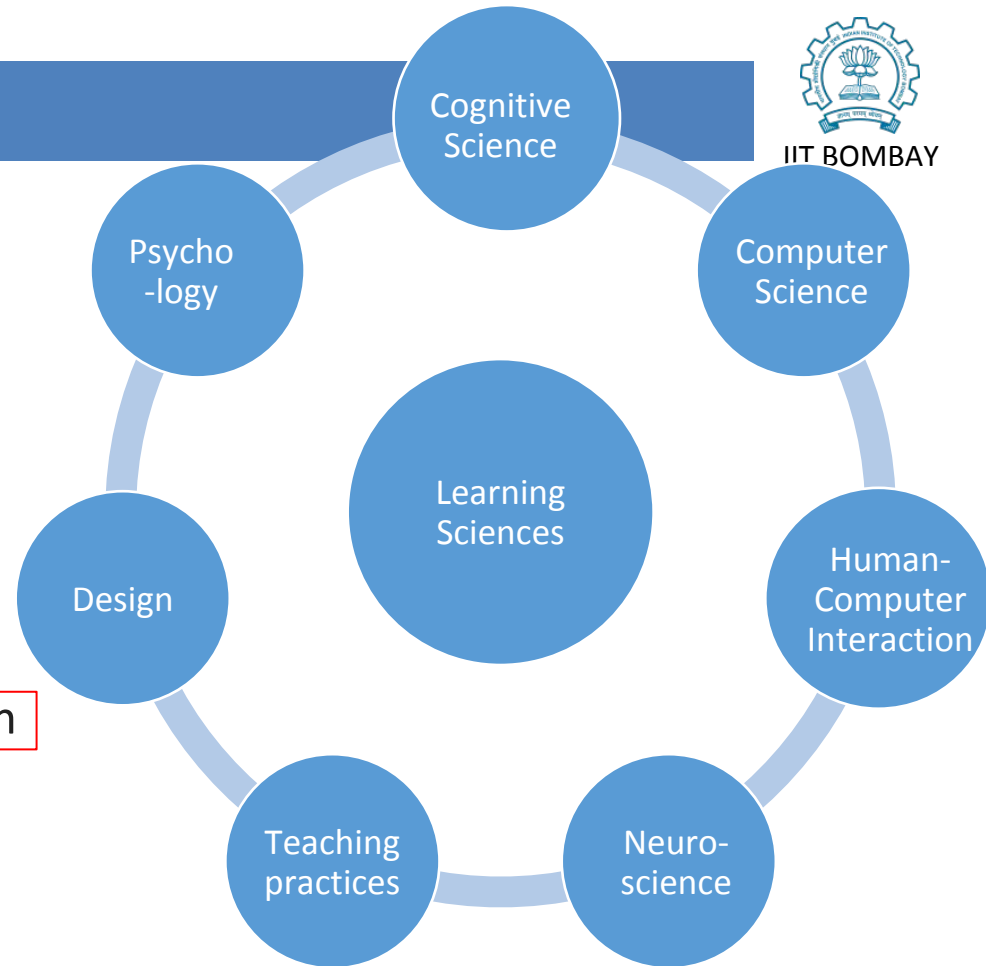
1. Think: How do students learn?
2. Pair: Discuss with your neighbour and come up with ONE WORD that summarizes your idea about how students learn
3. Share: Share your response

Learning Sciences



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- Began in the 1970s
- Science of learning that focuses on advancing understanding of the learning processes and the design of innovative learning environments.
 - Prior knowledge
 - Importance of reflection
 - Deep conceptual understanding
 - Collaboration & social interaction
 - Integrate technology, pedagogy, content, learning theories to design learning environments





Collaborative learning in classrooms

- Learning is not an isolated process that occurs solely in the individual learner's mind
- Not easy for teachers to orchestrate effectively and also for students to engage in productively

Collaborative learning: Challenges

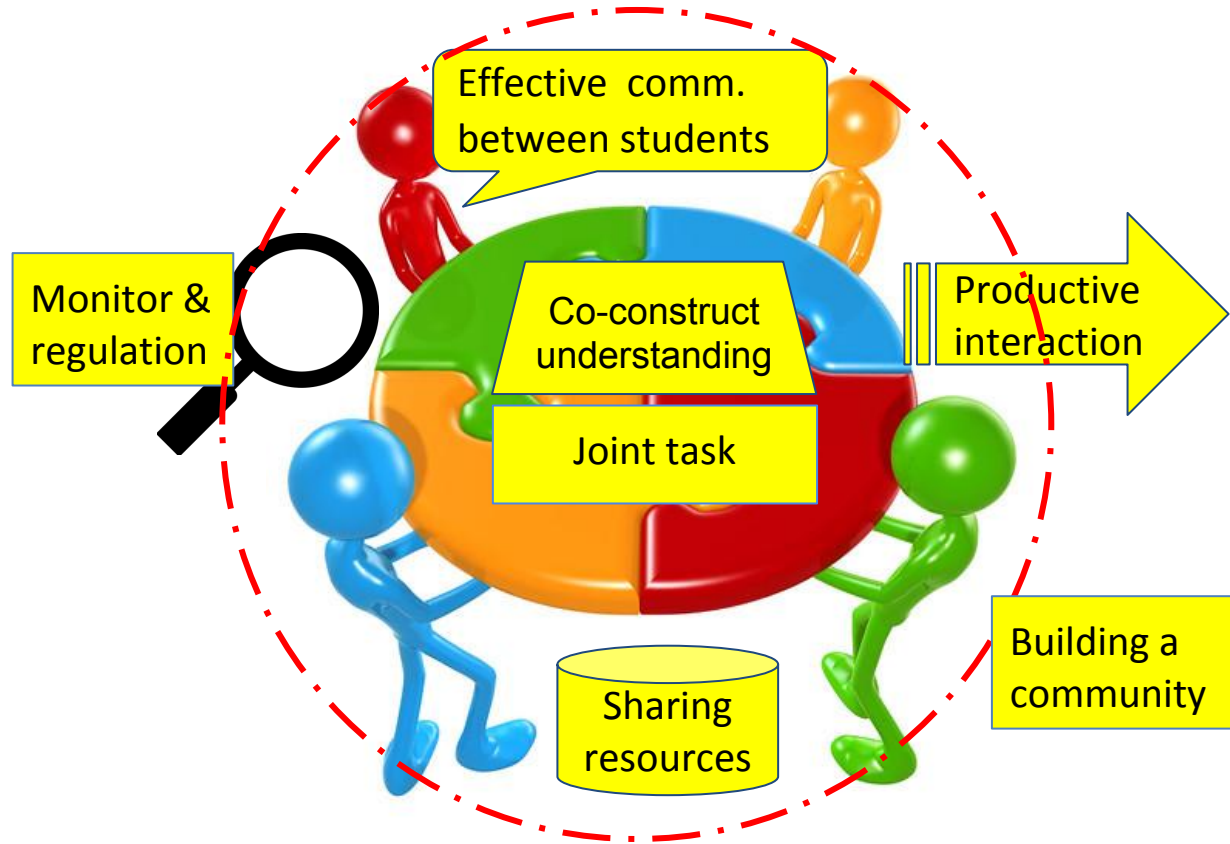
Can you share a few challenges that students might face in a collaborative learning classroom?

- Students **may not consistently engage** in collaborative practices like ask and answer questions, criticize or provide feedback, agree or disagree with other members of the group
- Discuss **tangential topics** or engage in off-task behaviours
- Have **superficial discussions** rather than deep reflection
- **Hesitate in initiating** discussions or participate in constructive criticisms
- **Unable to reach consensus** or resolve conflicts

Collaborative learning: Dimensions



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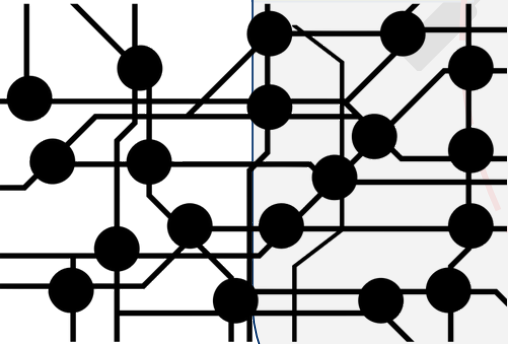
Collaborative learning: Dimensions



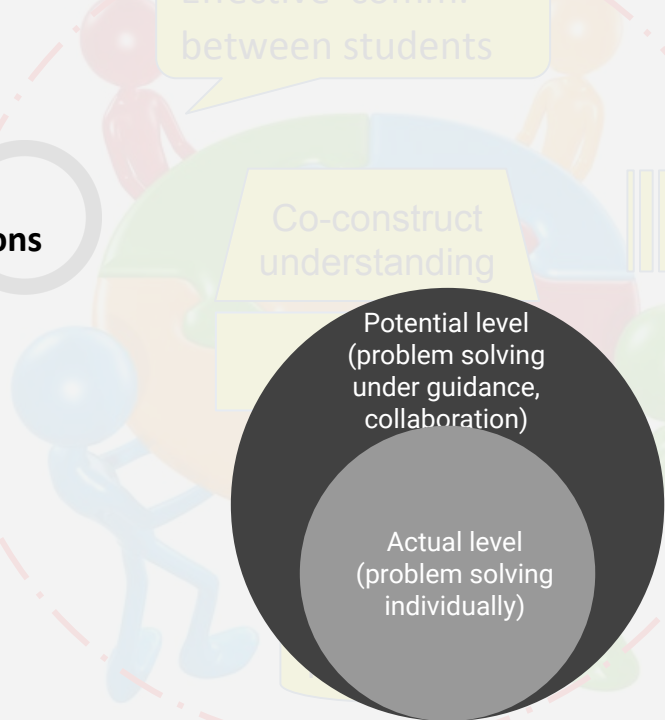
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Underlying key perspectives & theories of learning

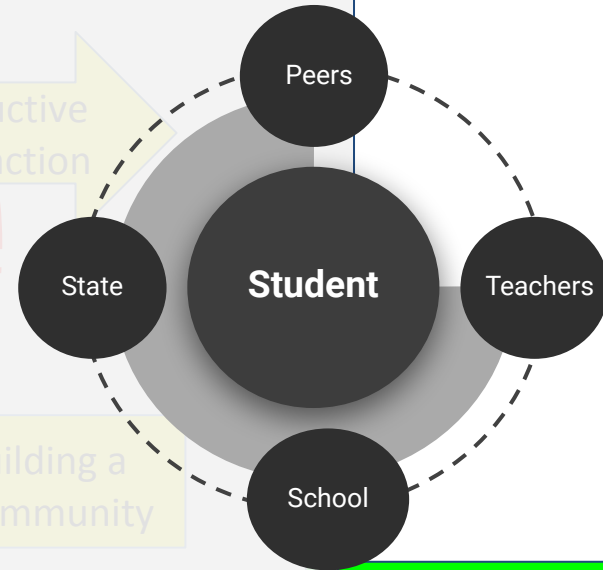
Learning involves the **active construction of mental connections**



Constructivism



Zone of Proximal Development



Sociocultural theory

Activity 2



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Collaboratively figure out collaborative learning

All of you have received a handout with one dimension listed on it. Imagine that you are an expert in implementing that dimension. Now fill the two columns in your pairs.

Now, I'll have one pair per dimension share what they have written.



S No	Key dimensions of collaborative learning	Implement the dimension effectively in the classroom	Tools, technology or resources that can help with the implementation
1	Joint task or learning activity		
2	Effective communication		
3	Share/access resources (ed tech products, reference materials, expert knowledge, best practices)		



4	Productive interactions (on-task, deep, reflective, solution oriented)		
5	Co-construction (common ground, build on each other, keep track, shared meaning)		



6	Monitoring & regulating each others learning (Self & peer assessment)		
7	Nurturing learning groups or communities of learners		



S No	Key dimensions of collaborative learning	Implement the dimension effectively in the classroom	Tools, technology or resources that can help with the implementation
1	Joint task or learning activity	Authentic problem contexts, Task within students' Zone of Proximal Development	Multimedia, simulation/modelling tool, games, Wikipedia pages
2	Effective communication	Synchronous, asynchronous comm., direct vs indirect comm. (via artifacts)	Chat, threaded discussion, e-mails, peer assessment
3	Share/access resources (ed tech products, reference materials, expert knowledge, best practices)	Incentive/reward for sharing, sharing strategy (e.g., what to share, when), uptake of shared resources	Data repository, websites
4	Productive interactions (on-task, deep, reflective, solution oriented)	Task structuring (e.g., division of labor, role assignments), Activity scripts (e.g., asking questions, argumentation sequences)	Scripts, Online interface (pre-organised input areas), message starters, sentence prompts, question stems



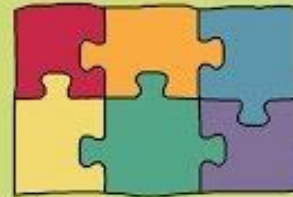
5	Co-construction (common ground, build on each other, keep track, shared meaning)	Persistent records and summary of what is discussed/agreed, Space for shared work, Referencing & grounding	Tangible tech, shared interfaces, knowledge forums, joint workspaces
6	Monitoring & regulating each others learning (Self & peer assessment)	Developing students' agency, How to use monitoring outcome for regulatory control (e.g., interpretation guidelines?)	Mirroring tools, visualisation tools, learning analytics
7	Nurturing learning groups or communities of learners	Group formation (e.g., interests, competence level, expertise), Learning about collaborators, account for diverse ways of interacting, Socio-cultural norms and expectations	Peer review, feedback system, networking service

One way of facilitating collaborative learning



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THE JIGSAW METHOD



Activity 3



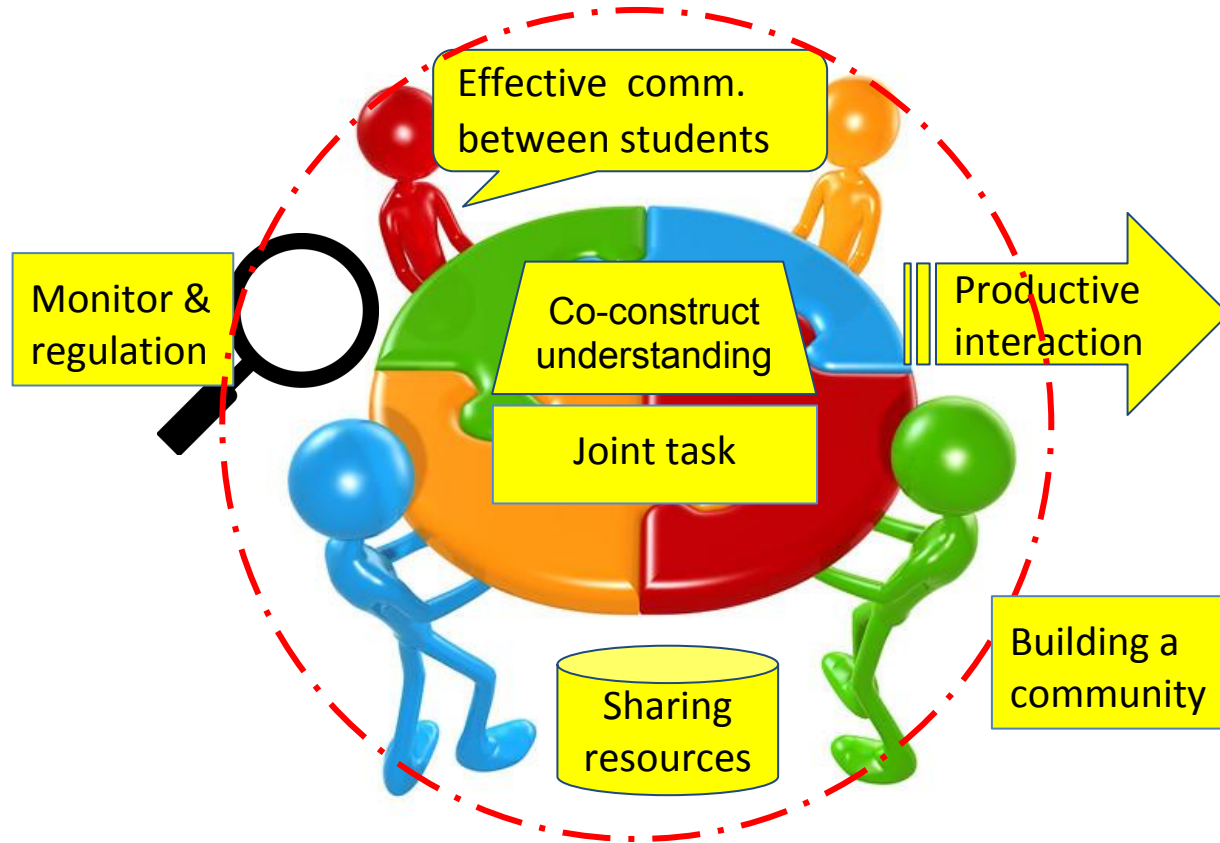
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What aspect of Jigsaw method can be useful for your dimension?

Collaborative learning: Dimensions



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Uncertainty

Feedback seeking

Each of these dimensions are important areas for research in Learning Sciences



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Thank you

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the learning sciences

10 KEY PRINCIPLES

Students are more motivated to learn when they are interested, have a sense of autonomy, and understand the purpose behind what they are learning.



Thinking deeply about the to-be-learned material helps students pay attention, build memories, and make meaning out of what they are learning.



Learning is a process that involves effort, mistakes, reflection, and refinement of strategies.



encoding



retrieval

storage

Retrieval practice strengthens memory and helps students flexibly apply what they learn.



Spacing out learning, and interweaving different content, strengthens learning.



Communicating high expectations and keeping learners at the edge of their mastery helps each student reach their potential.



Students learn well when they feel safe and connected.



Collaboration and social interaction can be powerful learning experiences because they encourage deeper processing and engage the 'social brain.'



Students' physical well-being, including nutrition, sleep, and exercise, impacts learning.

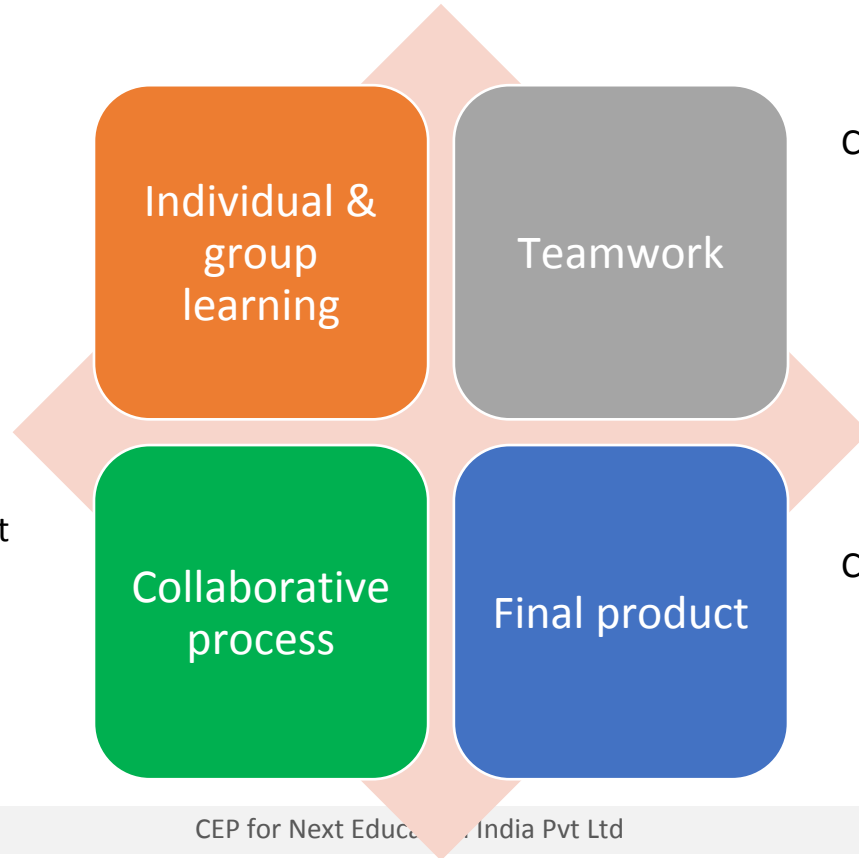


The entire environment, from space to temperature to lighting, can affect learning.



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Assessing collaborative learning



Criteria:

- 1. Conceptual knowledge
- 2. Metacognitive
- 3. Disciplinary practices

Criteria:

- 1. Accountability
- 2. Ownership
- 3. Verbal & non-verbal comm.
- 4. Reflection
- 5. Tolerance
- 6. Respect

Criteria:

- 1. Collaborative engagement
- 2. Disciplinary engagement
- 3. Progress
- 4. Positive interdependence
- 5. Collective responsibility
- 6. Performance of roles

Criteria:

- 1. Usability
- 2. Suitability
- 3. Adaptability
- 4. Innovative



Collaborative learning: Dimensions

- Help students establish a joint task
- Provide opportunities for unrestricted communication between students during the collaborative activity
- Make it possible for learners to share and access resources easily
- Help students have productive interactions
- Help students co-construct a shared understanding and build on each other's contributions
- Enable monitoring and regulation
- Provide students with a sense of belonging to the community