Active Strategies

SNOWBALLING

Snowballing is a group problem solving technique. It works by having students tackle a series of problems, each one more complex/challenging than the last. This technique is most effective for complex problems, where smaller sub-problems must be solved sequentially in order to solve the larger problem. By starting out with very small groups, or even individuals, and then amalgamating groups as the sub-problems become more complex, students benefit from working with each other and they learn how to approach difficult problems by breaking them into manageable parts.

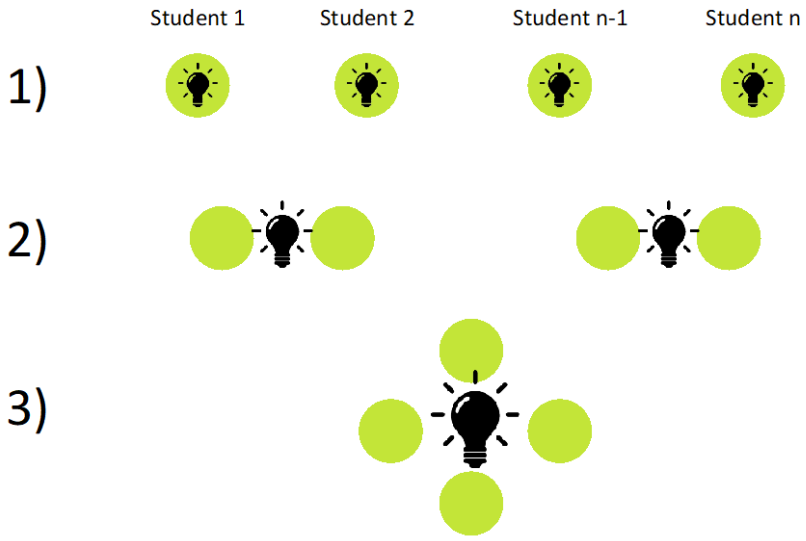
Benefits:

- Multiple modes of learning and interacting (individual, small group, large group) provide diversity for diverse learning styles.
- At each level of the snowballing process, students' solutions are vetted in the amalgamated group.
- Students are often more willing to participate when they don't feel the peer pressure involved in responding in front of the whole class – snowballing allows them time to become invested in the work as the stakes get higher.
- The class constructs the knowledge by working through a challenging problem, rather than having the teacher explain it in a way that may not suit all learning styles.

How it might be done:

1. Pose a complex, or difficult problem, and tell the class that they are going to solve it.
2. Have students tackle the first sub-problem on their own.
3. Have students pair up, check their solutions and issue the next challenge, which requires the solution to the first problem to complete.
4. Have pairs join up into groups of four and repeat #3.
5. Continue in this manner until two large groups are completing the final component of the problem
6. Discuss the solution as a class

SNOWBALLING



THINK-PAIR-SHARE

Think-Pair-Share is an in-class strategy designed to provide students with the opportunity to share or compare their ideas, solutions or questions with another student before sharing with the larger group. Rather than using a basic recitation method in which a teacher poses a question and one student offers a response, Think-Pair-Share can elicit a higher participation rate by lowering the stakes during the 'think' and 'pair' phases. The collaborative approach also enables students to solve more difficult questions than they might be able to on their own.

Benefits:

- Providing "think time" increases quality of student responses.
- Students' misunderstandings about the topic are often revealed (and resolved) during the discussion stage.
- Students are often more willing to participate when they don't feel the peer pressure involved in responding in front of the whole class.
- Think-Pair-Share is easy to use in the spur of the moment.
- Easy to use in large and small classes.

How it might be done:

1. Announce a discussion topic or problem to solve. (Example: What are the functional differences between plant and animal cells?)
2. Give students at least 10 seconds of think time to THINK of their own answer. (Research shows that the quality of student responses goes up significantly when you allow "think time.")
3. Ask students to PAIR with the person sitting next to them to discuss the topic or solution.
4. Finally, randomly call on a few students to SHARE their ideas with the class.
5. Give students time cues for each step to keep them on task.
6. You can promote discussion by using slightly different tasks.

THINK, PAIR, SHARE

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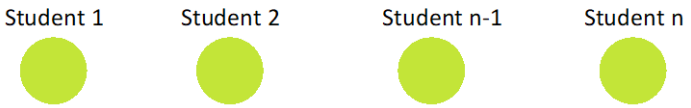

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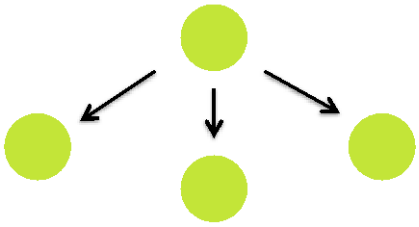


THE LEARNING CELL

The learning cell is a system that helps pairs or threes of students learn more effectively. Students work together in pairs, or in threes, and work cooperatively by asking each other questions about, or explaining the subject material. This can be very effective for ongoing assignments, such as assigned readings, where members of a learning cell take turns being responsible for writing up a summary of that week's reading and sharing it with their learning cell.

Benefits:

- Promotes team work
- Students reflect upon previously taught material by helping peers to learn
- Asking students to generate and answer questions for their partner requires them to develop a deeper understanding of the material and possibly identify misconceptions
- Can be used to model effective studying and test preparation

How it might be done:

1. Students prepare for the learning cell by reading an assignment or an academic unit and generating a list of questions dealing with the major points, important concepts or methodological procedures.
2. During class time, students are randomly paired up, and partner A begins by asking the first question.
3. After the question is answered (and possibly corrected), the second student, B, poses a question to student A. If the nature of the questions asked is more comprehensive, it may work better to allow a minute for the answering students to write down their answers.
4. While the question asking and answering period is occurring, the TA or professor goes from team to team monitoring student progress and providing clarification as needed.

LEARNING CELL

1)

2)

JIGSAW

Jigsaw is a cooperative learning strategy that enables each student to specialize in one aspect of a learning unit and present it to his/her small group. Students meet with members from other groups who are assigned to the same aspect in 'expert' groups, and after mastering the material, return to their 'home' groups to teach the material to their group members.
Just as in a jigsaw puzzle, each piece is essential for the completion and full understanding of the final product. If each student's part is essential, then each student is essential. This is what makes the Jigsaw instructional strategy so effective.

Benefits:

- Encourages peer learning with a high level of personal responsibility
- Helps develop teamwork and cooperative learning skills
- Enables a greater depth of knowledge than if the students were to learn all of the material independently
- Because students are required to present their findings to the home group, Jigsaw learning will often disclose students' misunderstandings.

How it might be done:

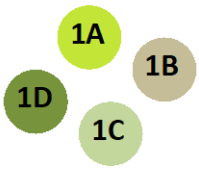
In its simplest form, the Jigsaw is an in-class instructional strategy where:

1. Students leave their "home" groups and meet in "expert" groups;
2. Each expert group receives a portion of the material to be covered which they discuss/solve/learn and think of ways to present to the other members of their "home" group;
3. The experts return to their "home" groups to teach their portion of the material and to learn from the other members of their "home" group.

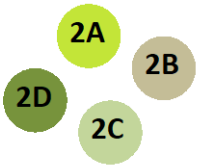
JIGSAW

1)

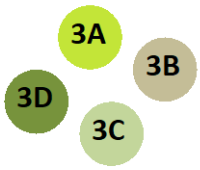
Expert group: Topic 1



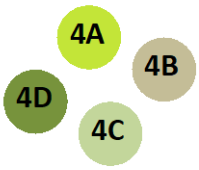
Expert group: Topic 2



Expert group: Topic 3



Expert group: Topic 4



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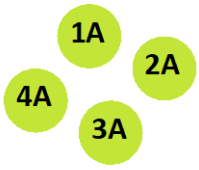
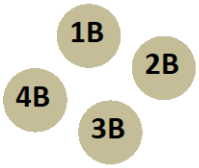
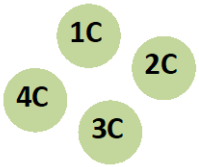
Home group A



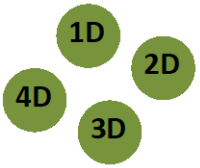
Home group B



Home group C



Home group D



SYNDICATE

Syndicate is used to describe a team-based learning approach. The class is divided into teams or syndicates of four to eight students. Each syndicate is given an assignment to research and present to the class. Syndicates may be given anywhere from one in-class session, up to the full term to complete the assignment. By making students responsible for their own learning and for educating their classmates on a topic, a greater level of understanding of the subject-material is necessarily required.

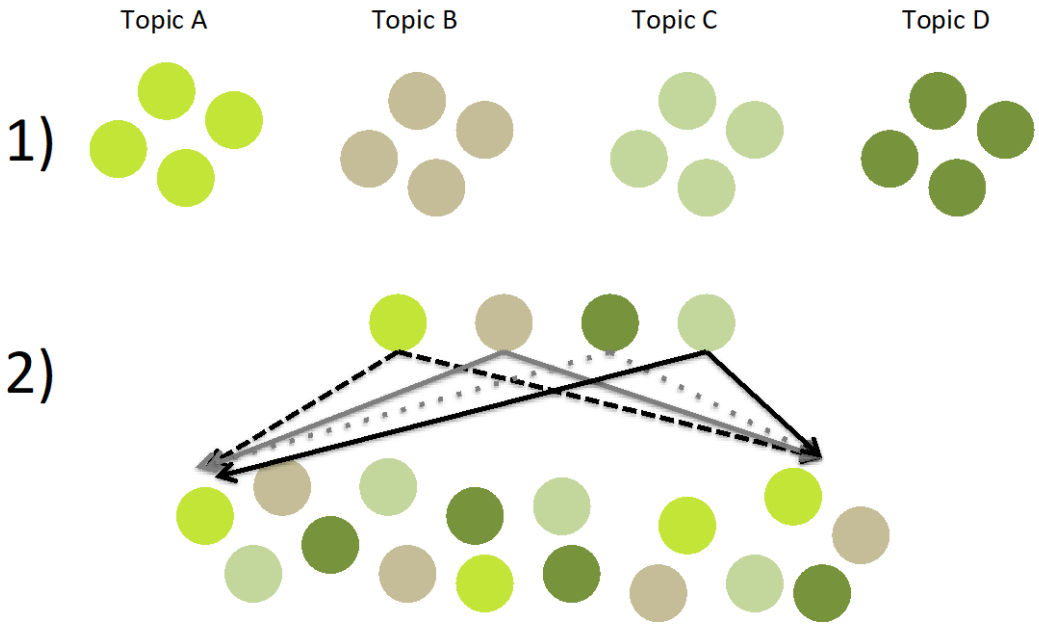
Benefits:

- Encourages collaborative learning between students and promotes academic social groups to form.
- Students are necessarily required to attain a deeper level of understanding of their particular topic in order to present their topic and effectively "teach" the class.
- Giving students responsibility in a team-atmosphere increases student motivation and encourages a deeper understanding of the topic.
- The responsibility of learning is shifted to the students and empowers them to take control of the learning process.

How it might be done:

1. Ask the class to form groups of 4-8 people. (Depending on the class you can adjust the size of the group or create groups randomly if you choose)
2. You may either assign each group a topic to research, or you can give the class a list and allow each group to choose a topic (it may be wise to disallow overlap of topics by groups).
3. Let groups know when the project is due and how long their presentation to the class should be.
4. You can increase the quality of presentations by encouraging creativity and by reminding students how boring lectures can be at times.
5. A marking scheme that includes a weighted peer-evaluation along with T.A and/or professor evaluation can be devised.

SYNDICATE



CHAINING

When students are working on a problem, project, or conducting a laboratory experiment, there are often one or more stumbling blocks that emerge that are common to the majority of the students in the class. Rather than addressing each student's (very similar) question in turn, you can use Chaining. Once you have interacted with one or two students with a similar problem, you can redirect subsequent inquiries to those students, who will pass along the solution. These peer instructed students then become part of the growing student teaching pool for that issue.

Benefits:

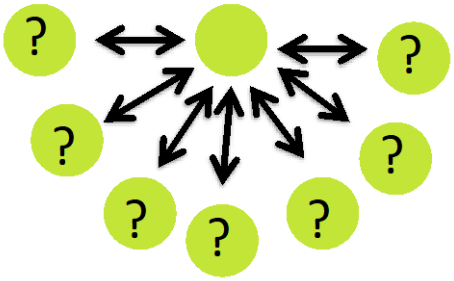
- By giving each student the responsibility of providing information to their peers, they must reflect on their own understanding rather than merely accepting your response without thought.
- Saves you from having to address the same questions *ad nauseam.*

How it might be done:

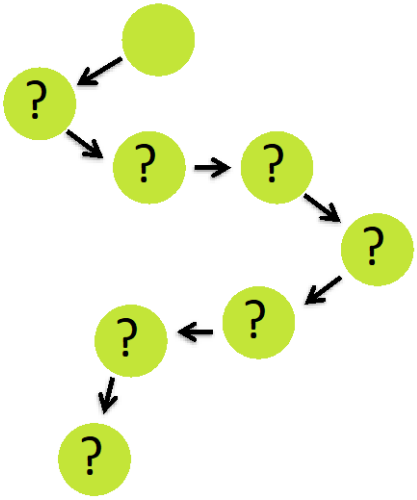
1. Once you have observed a common stumbling block, refer further requests about the problem to those students with which you have already discussed the issue.
2. Inform students that once they have explained the solution to one of their peers, they can refer subsequent inquiries of the same nature to that student.
3. The result is the propagation of the response or solution via this student chain.
4. Your task as instructor is to survey this process to ensure that the chain remains intact and coherent with respect to the material.

CHAINING

Traditional approach



Chaining approach



GAME SHOW

The Game Show format is a strategy which capitalizes on students' sense of competition by learning through the use of well-known games, such as Jeopardy!, or Who Wants to Be A Millionaire. This fun teaching strategy promotes cooperation within groups as much as competition between them. The use of the Game Show format is a technique most often used during review sessions, however it can also be adapted to classes involving new material or concepts.

Benefits:

- Can provide a boost to waning student energy levels at the end of the semester.
- It is fun!
- A useful format for reviewing a very large number of small concepts or ideas.
- Friendly competition provides incentive for students to participate and put in some effort.

How it might be done:

The Jeopardy! Format for review works as follows:

1. A series of problems are categorized and formulated as statements. *NOTE: Having some time set up before the Game Show, where students are asked to write the questions has the added value of students engaging with the material by categorizing and recalling important concepts or ideas from the course.*
2. Each problem has a dollar value ranging from 100¬500$.
3. Students have to answer the problem statements in the form of a question.
4. Creating a team structure can increase the level of engagement across a higher proportion of the class, since students are invested in the outcome of each question, rather than just when it is their turn.

Who Wants to Be a Millionaire is similar to Jeopardy!, except:

1. Answering in the form of a question is not required.
2. Participants are able to use any of the following “lifelines”:
    - Ask a Friend: ask one fellow student what they think the answer is.
    - Take a Poll: poll the whole class (by a show of hands).
    - Hint: ask the instructor for a hint.

QUESTION STORM

Question Storm is a type of discussion that is conducted entirely in the form of questions. It can be very useful in handling a variety of subjects, especially controversial ones, and works across a wide range of class sizes. In large classes, it is particularly useful because it allows a lot of students to make brief contributions without interventions by the professor, and because the exercise can be put to several uses.

Benefits:

- Provides a medium for students to ask questions about things they do not understand
- Stimulates the formulation and careful consideration of concepts before speaking
- Provides opportunities for students to clarify and expand their ideas without having to immediately present their thoughts for judgment

How it might be done:

1. The instructor explains the rules of Question Storm, which are:
    - Everything said must be in the form of a question.
    - Participants must wait until at least four (this number can vary with the size of the class) other people have spoken before they can speak again.
    - No statements in the form of questions are allowed (e.g. "All professors wear polyester, don't they?")
2. The instructor then sets out the subject for the Question Storm. This can be:
    - A problem (relatively complex ones are best, but obviously this has to be suited to the class) to be solved or confronted
    - A carefully formulated provocative question or statement
    - A text of appropriate length and difficulty to be analyzed or discussed.
3. Assigning someone to be the scribe during this process can provide a list of all the questions that were generated, which you can refer back to at a later time.

BUZZ GROUPS

Buzz Groups are a type of discussion group, where students are encouraged to freely explore a topic, object, concept or experience. In Buzz Groups, all learners need frequent opportunities to generate and share their questions and ideas in both small group and whole class settings.

Benefits:

- Helps students to make sense of the topic at hand
- Stimulates thought, explanation, reflection and recall
- Provides opportunities for students to clarify and expand their ideas and those of others
- Promotes positive group interaction and conversation
- Demonstrates effective questioning techniques

How it might be done:

Open-ended Buzz Group Discussion:

- Open-ended discussions begin with a sincere question (to which there is no one correct, concise or simple answer) posed by the teacher or a student.
- Incorporate pauses after students' responses to encourage extended or different responses.
- Clarify students' responses when necessary.
- Establish student-student dialog during the discussion whenever possible.
- Respect students' questions and their responses.
- Model the role of listener, collaborator, mediator, prompter, learning partner and questioner.

Guided Buzz Group Discussion:

- Guided discussions begin with teacher-posed questions that promote the exploration of a particular theme, topic or issue.
- Through discussion, students should achieve a deeper understanding of the topic.
- After some time is spent on teacher-directed questioning, students should be encouraged to facilitate discussions by continuing to formulate and pose questions appropriate to the topic of study.