Why use active learning strategies in your class?

In the old teaching paradigm, the teacher was responsible for transferring knowledge to the students based on the assumption that learning was passive. In that model, students were compared to vessels or banks. They could easily be filled with knowledge through the use of proper lecturing techniques. More recently, researchers have argued learning outcomes are more significant for students when the teacher employs active learning strategies. In this newer paradigm, Johnson, Johnson, and Smith (2006) argue that students can discover and actively construct knowledge. In this active learning model, teachers are no longer the information transmitters via lecture but instead they become a guide helping students through the learning process as they work cooperatively with their peers.

Eric Mazur, renowned physics professor at Harvard University, has famously and humbly offered himself as the poster child for the challenge of moving from passive to active learning strategies. In his video, “Confessions of a Converted Lecturer” (see video link here), Mazur explains his watershed moment that led him to pioneer an active learning strategy known as “peer-instruction.” Upon realizing his students were not truly learning the information in his class at the depth he expected, Mazur transformed the way he delivered information. This active learning strategy closely mirrors what is more commonly known today as “Think/Pair/Share.”

In this model, students are given opportunities during class to informally check their learning via formative assessment with their peers. As a result, the teacher is able to pinpoint the area(s) of confusion and address them before a summative assessment (e.g., a test).

This document was designed to guide faculty through the process of applying the Think/Pair/Share model efficiently, effectively, and with the utmost confidence. Included are explanations for how to effectively use Think/Pair/Share and its multiple variations for specific learning goals.
Think/Pair/Share

Estimated Time: 5 minutes +

**DESCRIPTION**
Think/Pair/Share (TPS) is a simple but effective formative assessment technique that can highlight areas of confusion for students and allow instructors to address the confusion in a timely and helpful manner. This active learning technique provides students an opportunity to work collaboratively with their peers in order to co-construct their learning. This section will discuss when and how to use TPS effectively and will provide specific examples.

**PURPOSE**
This technique is best to use after introducing students to a new topic. TPS allows you to check your students’ level of understanding before moving deeper into the subject matter. It also gives students an opportunity to apply what they are learning, thus making your content more meaningful. Finally, TPS provides a safe opportunity for students to make mistakes or answer incorrectly without being penalized by losing points because they did not recognize knowledge gaps in their learning. See examples below for question stems that can prompt students as they begin engaging in this activity.

**POSSIBLE QUESTION STEMS BASED ON BLOOM’S TAXONOMY**

**APPLICATION:** Provide an example from everyday life that showcases one of the three persuasive principles we just discussed and explain why.

**ANALYSIS:** What are the major differences between the three persuasive principles we just discussed and why?

**EVALUATION:** Out of all three persuasive strategies discussed today, which one would be most effective to harness in an advertisement for college students selling school supplies?

**DIRECTIONS**

**THINK:** Pose a higher-order thinking question for your students to answer within a fixed period of time. Remember, the more challenging the question, the more time your students will need to think through the answer (1-3 minutes).

**EXAMPLE PROMPT:** Individually, think of a recent advertisement that showcases one of the three persuasive principles we discussed and explain why it is a good fit for the persuasive principle.

**PAIR:** Have students find a partner (i.e., “pair”) and share and compare their individual answers with each other. It might be helpful to walk around and listen carefully to the types of answers that they are discussing in order to get an idea of students’ current understanding (1-3 minutes).

**SHARE:** Either randomly call on student pairs or have them volunteer to share their answers as well as the reasons for their conclusions. Use this time to clear up any confusion on the various topics of discussion.
1. Having students pick their own peer can take time and cause confusion. It might be helpful to instruct them to turn to their neighbor if you are in a small class and there is an even number of people. However, for larger classes it might be helpful to have assigned peer pairs in order to save time and/or confusion in finding their pairs.

2. It might be helpful to have the prompt/question written down somewhere in the classroom for all students to see throughout the entire TPS activity. This will help students stay on task.

3. It can be challenging to get students to come back to the large group discussion after working together in pairs. It is helpful to indicate how long students have to complete the prompt you give them in the beginning. Using a timer with a buzzer, for example, will not only keep students on task but also help transition into the large group discussion more quickly. To help manage time, there are many free online stopwatch tools that can easily be accessed using a computer and projected in the classroom for all to see (e.g., http://www.online-stopwatch.com).

REFERENCES


**Think/Pair/Share - Poll Everywhere**

*Estimated Time: 7 minutes +*

**DESCRIPTION**
Poll Everywhere is a free online tool that allows up to 40 respondents to respond to a poll in real-time via their cell phone or computer. This section will discuss tips on how to use it as a variation TPS activity.

**PURPOSE**
Poll Everywhere is an alternative to using Clickers in the classroom. The program showcases real time responses from your students that are visible to the entire class. This is a helpful tool that can showcase pre- and post-pair understanding of questions posed to students. Giving students the opportunity to collaborate with students on their answer and make adjustments to their original answer is an easy way to help students recognize their knowledge gaps and appreciate the peer-instruction process. Poll Everywhere allows both multiple choice and open-ended questions. This technique is best to use after introducing students to a new topic. See examples below for question stems that can prompt students as they begin engaging in this activity.

**POSSIBLE QUESTION STEMS BASED ON BLOOM’S TAXONOMY**

**COMPREHENSION:** Which persuasive principle makes logical predictions using historical facts?
A) Ethos  
B) Pathos  
C) Logos  
D) Bogos

**APPLICATION:** In the Lexus commercial we just watched, which of Maslow’s hierarchy of needs being targeted?
A) Esteem  
B) Safety  
C) Physiological  
D) Self-Actualization

**ANALYZING:** Billy Mays’s is a better example of the persuasive principle ETHOS instead of PATHOS because….
A) His charisma makes him appear to be a credible spokesperson  
B) His charisma makes it seem logical that we should buy the product he’s selling  
C) He makes us feel safe about the product he’s selling

**DIRECTIONS**
**GETTING STARTED:** In order to get started, first visit [http://www.polleverywhere.com](http://www.polleverywhere.com) to sign up. Upon signing up, look at the tutorial to get started by visiting [http://www.polleverywhere.com/guide](http://www.polleverywhere.com/guide)
**DIRECTIONS (CONTINUED)**

**THINK:** Start by posing a higher order-thinking question with an open-ended response or multiple-choice answers via Poll Everywhere. Remember, the more challenging the question, the more time you will need to allow your students to think about it and text their response. Even though the polling software is in real time, it may take a few seconds for the answers to show on the software (2-3 minutes).

**EXAMPLE PROMPT:** “In this classroom, which persuasive principle does your instructor use most frequently to persuade you to take this class seriously?”

A) Ethos  
B) Pathos  
C) Logos

**PAIR:** Have students find a partner (i.e., “pair”) and share and compare their individual answers with each other. It might be helpful to walk around and listen carefully to the types of answers that they are discussing in order to get an idea of students’ current understanding. Upon completion of their discussion, reset the poll and ask students to text in their answer again (assuming the majority of students have changed their mind). This allows students to re-think their answer after discussion in their pairs. It might be helpful to write down a quick recap of the original responses to see the change from pre and post pairing (2-4 minutes).

**SHARE:** Either randomly call on student pairs or have them volunteer to share the reasons for their conclusions. Use this time to clear up confusion on the various topics of discussion.

**TIPS FOR A SUCCESSFUL ACTIVITY**

1. Having students pick their own peer can take time and cause confusion. It might be helpful to instruct them to turn to their neighbor if you are in a small class and there is an even number of people. However, for larger classes it might be helpful to have “assigned peer pairs” in order to save time and/or confusion in finding their pairs.

2. In order to save time it helps to have the poll everywhere website open and ready. It is possible to infuse Poll Everywhere into your power point slides using the Poll Everywhere presenter application, which is available at [http://wwwpolleverywhere.com/app](http://wwwpolleverywhere.com/app).

3. It may be confusing for students to respond to the poll at first as the software involves texting multiple numbers (see picture below). If you plan on using this multiple times it might be beneficial to have students program the specific number in their phones for polling in order to save time and confusion. If students have not used this software previous to your class, it might be helpful to sit down and chat with them about how it works in order to eliminate confusion.
4. It can be challenging to get students to come back to the large group discussion after working together in pairs. It is helpful to indicate how long students have to complete the prompt you give them in the beginning. Using a timer with a buzzer, for example, will not only keep students on task but also help transition into the large group discussion more quickly. To help manage time, there are many free online stopwatch tools that can easily be accessed using a computer and projected in the classroom for all to see (e.g., http://www.online-stopwatch.com)

The image above is a screenshot from a sample poll. The results of the poll are in the center of the screen: 8 students have responded “True,” 13 students have responded “False,” and 1 student responded “Not Sure.”
Think/Pair/Square/Share

Estimated Time: 10 minutes

DESCRIPTION
This particular variation of the standard TPS adds another pair of students to collaborate with. This section will discuss how to use it as a variation to the standard TPS activity and provide examples for effective results.

PURPOSE
The addition of another pair in the TPS format works best for problem solving strategies and/or complicated case studies that may involve more than one step or multiple different answers.

DIRECTIONS

THINK: Start by posing a problem or case study for your students to answer or solve within a fixed period time individually. Remember, when using this variation, it’s helpful to use problems or questions that involve multiple steps and call for multiple viewpoints. See examples below for question stems that can prompt students as they begin engaging in this activity.

POSSIBLE QUESTION STEMS:

CASE STUDY: Devin is an intern at a major company in a large city. He wants to make a great impression on his boss, but he notices that at times they have incompatible goals. Devin wants to speak up in order to get the most out of his internship. Assuming that this is a conflict that has not been expressed yet, what are some things Devin could do in order to express it in a nonthreatening way?

PROBLEM: If you were surveying a group of students and teachers about the challenges of using/providing textbooks, how would the questions differ? What questions would you ask each group?

PAIR: Have students find a partner (i.e., “pair”) and share and compare their individual answers with each other. It might be helpful to walk around and listen carefully to how well students are following the methodology to complete the problem and/or where they are getting confused (2-5 minutes).

SQUARE: Have each pre-assigned pair team up with another pair creating a team of four students. Ask them to share their answer and methodology. As one team of two pairs, they should come to a solid conclusion or formulate some plan using all of their ideas together (5 minutes).

SHARE: Either randomly call on student pairs or have them volunteer to share their answers as well as the reasons for their conclusions. Use this time to clear up confusion on the various topics of discussion.


**TIPS FOR A SUCCESSFUL ACTIVITY**

1. Having students pick their own peer can take time and cause confusion. It might be helpful to instruct them to turn to their neighbor if you are in a small class and there is an even number of people. However, for larger classes it might be helpful to have “assigned peer pairs” in order to save time and/or confusion in finding their pairs.

2. Indicate the amount of time students have to discuss in each step in real time. Make sure to account for extra time as the pair becomes square, as the team of four will need more time to explain their answer, why they came to their answer, and agree on one answer.

3. Use this think/pair share variation for more challenging and time oriented processes that involve multiple steps or methodologies.

4. It can be challenging to get students to come back to the large group discussion after working together in pairs. It is helpful to indicate how long students have to complete the prompt you give them in the beginning. Using a timer with a buzzer, for example, will not only keep students on task but also help transition into the large group discussion more quickly. To help manage time, there are many free online stopwatch tools that can easily be accessed using a computer and projected in the classroom for all to see (e.g., [http://www.online-stopwatch.com](http://www.online-stopwatch.com)).

**REFERENCES**

**Think/Write/Pair/Share**

*Estimated Time: 10-15 minutes*

**DESCRIPTION**
This particular variation of the standard TPS adds an element of accountability because students record their original answer before sharing with their partner. The writing portion of the traditional TPS offers more time for students to think and commit to their answer before pairing up. This section will discuss how to use it as a variation to the standard TPS activity and provide examples for effective results.

**PURPOSE**
This variation of TPS can be used as a summary tool at the end of a unit or a knowledge probe at the beginning of a unit. In either case, this variation is an excellent reflection tool that allows students time to think deeply about the subject matter in question.

**DIRECTIONS**

**THINK:** Students should be given enough time to think about their answers before writing them down. Start by posing a higher order-thinking question in the form of a prompt. Remember, the more challenging the question, the more time you will need to allow your students to write their answers. See examples below for question stems that can prompt students as they begin engaging in this activity. (2 minutes).

**POSSIBLE QUESTION STEMS:**

**SUMMARIZE (END OF UNIT):** Please summarize the definition of conflict as discussed in class making sure to include all of the important characteristics of it.

**CHECKING (KNOWLEDGE PROBE):** Based on my past experiences, I would define conflict as...(be as descriptive as possible).

**WRITE:** After a short period of reflection, instruct students to begin writing down their answer. It might be helpful to offer some writing length suggestions (i.e. a few sentences versus a few paragraphs). Make sure they understand how much time they have to write (3-5 minutes).

**PAIR:** Have students find a partner (i.e., “pair”) and share and compare their individual answers with each other. It might be helpful to walk around and listen carefully to how well students are following the methodology to complete the problem and/or where they are getting confused (3-5 minutes).

**SHARE:** Either randomly call on student pairs or have them volunteer to share their answers as well as the reasons for their conclusions. Use this time to clear up confusion on the various topics of discussion.
**TIPS FOR A SUCCESSFUL ACTIVITY**

1. In order to save time, ask students to be prepared with their writing utensil and paper in order to minimize the initial distraction of everyone pulling out their materials at once.

2. Consider allowing students to use their tablets or personal computers to write out their prompt as it may be more convenient and allow them to write more information.

3. Simply showing how much time is left in the activity is a simple way to keep students on task.

4. It can be challenging to get students to come back to the large group discussion after working together in pairs. It is helpful to indicate how long students have to complete the prompt. Using a timer with a buzzer, for example, will not only keep students on task but also help transition into the large group discussion more quickly. To help manage time, there are many free online stopwatch tools that can easily be accessed using a computer and projected in the classroom for all to see (e.g., [http://www.online-stopwatch.com](http://www.online-stopwatch.com)).

**REFERENCES**

Increase Participation with Think Write Pair Share. (2010). Academy of Art University. Retrieved from [http://faculty.academyart.edu/export/sites/faculty/assets/faculty/5a_ThinkWritePairShare.pdf](http://faculty.academyart.edu/export/sites/faculty/assets/faculty/5a_ThinkWritePairShare.pdf)
Think/Draw/Pair/Share Variation

Estimated Time:  5 minutes

DESCRIPTION
This variation from the traditional TPS asks students to draw a picture and explain the meaning behind it with a peer. The picture can be a cartoon, concept map, or whatever else will identify the learning objective. This section will discuss how to use it as a variation to the standard think/pair/share activity and provide examples for effective results.

PURPOSE
Adding the variation of drawing to the traditional TPS strategy enables students to visualize the major concept(s) in a simple but creative way. This also allows the learner to take ownership of what he or she is learning and helps to solidify the major details through visualization. This variation works best in the middle or at the end of a unit. See examples below for question stems that can prompt students as they begin engaging in this activity.

POSSIBLE QUESTION STEMS:

SYMBOLIZE IT: Draw a symbol for what each of the five common conflict styles that we discussed in class look likes.

WHO DOES IT BEST: Draw a picture of someone that accentuates the five characteristics of emotional intelligence (i.e. what parts of a person would demonstrate his/her emotional intelligence?)

DIRECTIONS

THINK: Ask the students a question about a major concept or idea that you have recently shared with your students. You can also use this strategy to see what students know about a topic by posing a “knowledge probe” or question about a concept you have not yet discussed.

DRAW: Instruct each student to draw a picture in a limited time frame that sums up the concept or idea that was posed in the question. It might be helpful to remind students that there are no limits or expectations to their drawing expertise.

PAIR: Have students pair up and share their pictures as well as what they represent or why it is applicable to the question at hand.

SHARE: Either randomly call on student pairs or have them volunteer to share their pictures and why they represent the question posed.

TIPS FOR A SUCCESSFUL ACTIVITY

1. Having students pick their own peer can take time and cause confusion. It might be helpful to instruct them to turn to their neighbor if you are in a small class and there is an even number of people. However, for larger classes it might be helpful to have “assigned peer pairs” in order to save time and/or confusion in finding their pairs.
2. Indicate how long students have for each step in real time.

3. Remind students that they are not expected to be artists but instead expected to help the class visualize the topic at hand in a memorable way.

4. It can be challenging to get students to come back to the large group discussion after working together in pairs. It is helpful to indicate how long students have to complete the prompt you give them in the beginning. Using a timer with a buzzer, for example, will not only keep students on task but also help transition into the large group discussion more quickly. To help manage time, there are many free online stopwatch tools that can easily be accessed using a computer and projected in the classroom for all to see (e.g., http://www.online-stopwatch.com)
Think Aloud Problem Solving Pairs (TAPPS)

Estimated Time: 10-15 minutes

DESCRIPTION
Think aloud problem-solving pairs (TAPPS) is another variation of TPS with a twist. In each pair, one student acts as the problem solver and the other student acts as the listener. The problem solver’s role is to verbally explain each sequential step in order to solve the particular problem in question. The listener’s role is to make sure the problem solver completes each step thoroughly, carefully, and correctly. When there appears to be a missed step or confusion by the problem solver, the listener is supposed to use questioning in order to alleviate confusion in order to move forward. Upon successful completion, the roles are switched and the pair is given a new problem. This section will discuss how to use it as a variation to the standard TPS activity and provide examples for effective results.

PURPOSE
This technique allows students opportunities to learn listening skills and to find gaps in their understanding of methodologies or concepts. This technique also teaches students to follow guidelines, steps, and procedures carefully. It would be helpful to use this technique after students have been introduced to a new methodology that involves multiple steps to complete.

DIRECTIONS

SETUP: There are multiple different ways to set up this procedure. However, it is important to note that this will be challenging for students who have not completed this learning activity before. In order for this to be an effective learning exercise, it is important to make sure that you walk around carefully and answer questions while students try to explain the methodology in order to solve the problem given. It might be helpful to have students raise their hands when the pairs do not know how to move forward. Finally, before starting the exercise, have each pair of students identify who will be the problem solver and who will be the listener for the first problem.

PROBLEM: Students should be given a problem that involves multiple steps in order to solve it. Setup a reasonable time limit that will allow each pair enough time to complete the problem successfully.

SHARE: Either randomly call on student pairs or have them volunteer to share their process with the rest of class and compare their answers. Also, feel free to discuss the confusing aspects of the steps involved and/or where people may have gotten confused. Also, discuss what questions the listener posed in order to help the problem solver get past their confusion.

SWITCH: Setup a new but similar problem and have the partners switch roles so that every student will have played both the role of the problem solver and of the listener.
1. This process might be more efficient if students know who their partner will be and what role they will play for the first problem before assigning the problem.

2. Walk around to keep students accountable and get an idea of where they might be getting stuck.

3. Feel free to have students work through various parts of the problem solving process without having to necessarily complete the entire problem.

4. It can be challenging to get students to come back to the large group discussion after working together in pairs. It is helpful to indicate how long students have to complete the prompt you give them in the beginning. Using a timer with a buzzer, for example, will not only keep students on task but also help transition into the large group discussion more quickly. To help manage time, there are many free online stopwatch tools that can easily be accessed using a computer and projected in the classroom for all to see (e.g., http://www.online-stopwatch.com).

### References


Note Checking Pairs

Estimated Time: 5 minutes

DESCRIPTION

Note checking pairs are a quick and easy way for students to check the accuracy and depth of their notes. In this TPS variation, students simply compare their notes at specific times during the course lecture in hopes that each student will take away specific information that may be missing from each other’s notes. This section will discuss when and how to use it effectively and provide example prompts for students to use.

PURPOSE

It can be overwhelming for students to take notes effectively and accurately in a classroom for many different reasons including lack of practice, over-stimulation, and poor working memory. This variation of TPS allows students to compare their notes for both depth and accuracy. The goal of this procedure is for students to take away important information from each other’s notes that may have been missing. See examples below for question stems that can prompt students as they begin engaging in this activity.

POSSIBLE QUESTIONSTEMS:

SUM IT UP: What are the instructor’s three main points?

SURPRISE: What is most surprising that you have in your notes thus far?

CHECK FOR UNDERSTANDING: What part appears to be most confusing right now?

DIRECTIONS

PAIR: Instruct students to pair up with the person next to them or their note-taking partner (30 seconds).

SHARE: Have each student read the information in their notes while the other student checks their notes for inconsistencies. It is important in this step that each student plays the role of the note sharer and of the listener. The activity is not complete until both students have added something to their notes that was previously missing (3-5 minutes).

CHECK: In some cases, if time permits, add an extra step for the pairs to “square” or join other pairs of students to double check that there are no inaccuracies or missing information (take as much time as needed).

TIPS FOR A SUCCESSFUL ACTIVITY

1. Indicate how long students have for each step in real time. Walk around to keep students accountable and get an idea of where they might be getting stuck.

2. Offer prompts for the students to use in order to check each other’s notes. Feel free to switch up the prompts each time you use this think/pair/share variation.
3. Be timely and strategic. Waiting until the end of class, following a full day’s lecture might not allow enough time for students to accurately check for information. Try using this variation throughout the lecture.

4. It can be challenging to get students to come back to the large group discussion after working together in pairs. It is helpful to indicate how long students have to complete the prompt you give them in the beginning. Using a timer with a buzzer, for example, will not only keep students on task but also help transition into the large group discussion more quickly. To help manage time, there are many free online stopwatch tools that can easily be accessed using a computer and projected in the classroom for all to see (e.g., http://www.online-stopwatch.com).

REFERENCES

**Additional Resources**


**The Benefits of Think/Pair/Share (The Teacher Toolkit).**
This resource contains a short video that showcases the think/pair/share activity and explains the rationale behind it.

**More Information on TAPPS (Journal of Engineering Education).**
This article offers research driven insight into how TAPPS can be used in the classroom as an effective learning tool.

**More Information on Collaborative Learning Structures (National Institute for Science Education).**
This is a comprehensive website that offers more information on collaborative learning structures like the think/pair/share variations discussed in this paper.
[http://www.wcer.wisc.edu/archive/cl1/cl/doingcl/clstruc.htm](http://www.wcer.wisc.edu/archive/cl1/cl/doingcl/clstruc.htm)

---

**Consultations, Teaching and Learning Resources, and More Available at FaCIT**

Contact us or visit our website if you would like assistance or feedback for any aspect of your teaching or course design. FaCIT services and feedback are confidential.

Phone: (989) 774-3615
E-mail: facit@cmich.edu
[http://facit.cmich.edu](http://facit.cmich.edu)