19. What do I typically do to help students practice skills, strategies, and processes?

When the content involves a skill, strategy, or process, the teacher engages students in practice activities that help them develop fluency.

**Teacher Evidence**
- Teacher engages students in massed and distributed practice activities that are appropriate to their current ability to execute a skill, strategy, or process, such as the following:
  - Guided practice if students cannot perform the skill, strategy, or process independently
  - Independent practice if students can perform the skill, strategy, or process independently

**Student Evidence**
- Students perform the skill, strategy, or process with increased confidence.
- Students perform the skill, strategy, or process with increased competence.

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**How Am I Doing?**

<table>
<thead>
<tr>
<th></th>
<th>4 Innovating</th>
<th>3 Applying</th>
<th>2 Developing</th>
<th>1 Beginning</th>
<th>0 Not Using</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helping students practice skills, strategies, and processes</td>
<td>I adapt and create new strategies for unique student needs and situations.</td>
<td>When content involves a skill, strategy, or process, I engage students in practice activities, and I monitor the extent to which the practice is increasing student fluency.</td>
<td>When content involves a skill, strategy, or process, I engage students in practice activities, but I do so in a somewhat mechanistic way.</td>
<td>I use the strategy incorrectly or with parts missing.</td>
<td>I should use the strategy, but I don't.</td>
</tr>
</tbody>
</table>

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Element 19: What do I typically do to help students practice skills, strategies, and processes?

**Strategies**

**Close monitoring**

When students are learning a new skill, the teacher provides a highly structured environment and monitors student actions very closely to correct early errors or misunderstandings. As students become more adept with a skill, strategy, or process, the teacher encourages them to monitor their own progress and evaluate their own performances.

**Frequent structured practice**

When students are learning a new skill or process, the teacher first provides a clear demonstration of the skill or process. After this demonstration, students should have frequent opportunities to practice discrete elements of the skill or process and the process as a whole in situations where they have a high probability of success. Students should experience success multiple times before moving away from this type of practice.

**Varied practice**

Once students have engaged in frequent structured practice, they begin practicing a skill or process in more challenging situations. Students should still experience success, but they might be required to work a bit harder than was necessary during frequent structured practice. During this type of practice, the teacher should encourage students to monitor their progress with the skill or process and to identify their strengths or weaknesses.

**Fluency practice**

Once students are comfortable with a skill or process and have experienced success with it in a wide range of situations, they engage in independent practice whereby they focus on performing the skill or process skillfully, accurately, quickly, and automatically. The teacher assigns this type of practice with a skill or process as homework. Students keep self-monitoring charts to track their progress and improvement over time.

**Worked examples**

While students are practicing skills and processes, the teacher provides them with problems or examples that have already been worked out so they receive a clear image of the correct procedure.

**Practice sessions prior to testing**

The teacher sets up a practice schedule to ensure that students each have a chance to review and practice skills and processes before they are tested or retested on them.

**Technology Links**

- Search the Internet for example problems or situations at varying levels of difficulty for student practice.
• Provide students with access to audio and video recordings that review important steps and information that students will need as they practice a skill or strategy.

• As students practice a skill or strategy, invite them to post questions or issues to a class website, blog, or wiki. Other students or the teacher can offer help or explain a step of the process in more detail. Teachers can also use these questions to detect patterns of issues or errors that should be addressed with the whole class.
Design Question 3
What Will I Do to Help Students Practice and Deepen Their Understanding of New Knowledge?

Module 8

Helping Students Practice Skills, Strategies, and Processes

When reading this module, it is important to remember the distinctions between declarative and procedural knowledge. In the former, students extend and refine their understanding of key information such as facts, generalizations, and principles by constructing personal meaning and integrating new information into their existing cognitive schema. The activities described in Module 7 can be used with both declarative and procedural knowledge. However, they don’t address advanced development of procedural knowledge.

In contrast, this module emphasizes ways to maximize students’ complete learning of procedural knowledge. As students become fluent and independent in their use of procedures, they move toward a condition of automaticity in which they are able to retrieve and use the procedure as an essential part of their cognitive toolkit. When they achieve the level of automatic retrieval and independent application, they can be said to have truly “learned” a new procedure.

Reflecting on Your Current Beliefs and Practices

Before examining the strategies in this module, take some time to examine your current beliefs and practices by answering the following questions:
1. How do you typically help students acquire and integrate new procedural knowledge?

2. How do you ensure that students develop effective models for procedural knowledge, internalizing the models' key attributes and behaviors?

3. How do you use massed and distributed practice to help students shape their use and understanding of key skills, strategies, and processes? For example, to what extent do you design initial massed, structured practice sessions and gradually distribute and vary the nature of practice sessions?

4. How do you help students progress toward conceptual understanding and independent transfer of procedural knowledge? For example, how do you design practice sessions that enhance students' fluency—that is, their growing capacity to use procedural knowledge independently?

5. To what extent do you incorporate a variety of cooperative learning structures and tasks to reinforce students' modeling, shaping, and internalizing of procedural knowledge?
Recommendations for Classroom Practice

This module addresses the following strategies for Design Question 3:

- Providing opportunities for students to practice skills, strategies, and processes
- Determining the extent to which cooperative learning groups will be used

Providing Opportunities for Students to Practice Skills, Strategies, and Processes

The opportunities for students to practice skills, strategies, and processes should be organized so that they progress along a predictable and certifiable continuum. Initial practice sessions should be highly structured, spaced closely together, and heavily monitored by the teacher for purposes of on-the-spot coaching. As students begin to shape their use of skills, strategies, or processes, however, they will begin to move toward growing levels of fluency and independent use. At this point, practice sessions should become gradually less structured and more varied. Throughout this developmental process, students should be encouraged to monitor their growing competency, their evolving efficiency, and their movement toward automatic retrieval and use of the skill, strategy, or process.

Structured Practice Sessions Spaced Closely Together

At the beginning of the process of acquiring new procedural knowledge, students benefit from critical-input experiences that provide a clearly articulated model of the procedure. Such activities should allow students an opportunity or two to try out the procedural knowledge, with careful monitoring and coaching by the teacher. After the initial input experience, students should participate in a series of practice sessions spaced closely together. Initial massed practice sessions should reinforce students’ success rates and concentrate on a small part of an overall strategy or procedure. A dance instructor, for example, may work with students to learn a new and perhaps complicated dance. She begins by modeling initial steps and movements, and then has her students model them in controlled sessions that allow her to coach and monitor their behaviors. The well-crafted modeling of initial steps and procedures ensures that all students acquire and integrate the basics of the dance before attempting more complicated or intricate movements and interactions with a partner.

Practice Sessions That Are Gradually Less Structured and More Varied

As students progress from initial modeling toward shaping of a procedure, practice sessions can be designed to allow students to practice increasingly complex and
interrelated steps and elements. Students learning to use a specific computer application, for example, might begin by modeling and replicating essential elements of the strategy. As they progress toward the shaping phase of acquiring procedural knowledge, however, their teacher designs activities and tasks that allow them to apply their strategies in more complex situations. At this point the teacher may also choose to incorporate opportunities for cooperative learning interactions such as a pair-share or peer-coaching exercise. Throughout this process, the teacher is also careful to revisit with students the criteria for effective execution of the procedure.

Practice Sessions That Help Students Develop Fluency

The final phase of learning procedural knowledge is to develop it to a level of fluency or automatic independent transfer. Fluency is necessary for procedural knowledge that students will need in later life in their education or in their careers. Fluency evolves as students participate in exercises and tasks that replicate how the strategy or procedure might be used in real life.

Students’ accuracy and speed in using procedural knowledge can be emphasized during this phase of knowledge acquisition by asking students to keep track of their progress in their academic notebooks. To practice speed and accuracy, students must be able to execute a skill, a strategy, or a process independently. At this level, practice can be assigned as homework when appropriate. When trying to develop speed and accuracy, it is useful to have students record their progress as depicted in Figure 8.1. Here a student has kept track of her speed and accuracy in typing over four practice sessions. She recorded speed in total words typed over a two-minute interval. She recorded accuracy as percent of errors.

<table>
<thead>
<tr>
<th>Practice Session</th>
<th>Speed (Total Words Typed)</th>
<th>Accuracy (% of Errors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>75</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>83</td>
<td>12%</td>
</tr>
<tr>
<td>3</td>
<td>80</td>
<td>8%</td>
</tr>
<tr>
<td>4</td>
<td>101</td>
<td>8%</td>
</tr>
</tbody>
</table>

Teachers should work with students to determine when they may be ready for a culminating performance task or project that requires their application of procedural knowledge to authentic, real-world tasks and settings. Regarding the computer application
mentioned previously, for example, a teacher might ask students to work with a partner to use the application for a simulated business or educational presentation. Part of their presentation might include a debriefing on how they have progressed in their understanding and independent transfer of the procedures they have learned during the unit.

Examples

*Elementary Physical Education.* This physical education teacher is focusing on teaching the overhand baseball throw. At first, she models the procedure for students and engages them in highly structured practice activities. Students spend some time practicing the procedure every day for the first three days. After that, the practice sessions are spaced further and further apart.

*Secondary Science.* This science teacher has provided students with a safety procedure they will be using in all their science experiments. To ensure that students can perform the procedure with fluency, she has them chart their speed and accuracy once they obtain a level of skill at which they can perform the procedure without help.

**Activity Box**

Identify a skill, a strategy, or a process you have taught or will teach. Describe how you could use the types of practice described in this section.

**Determining the Extent to Which Cooperative Learning Groups Will Be Used**

The authentic, real-world use of procedural knowledge frequently involves working with others in collaborative, interactive ways. Therefore, as students move toward fluency, they should have opportunities to participate in a range of cooperative learning activities and structures. Cooperative learning activities involving procedural knowledge can be as simple as a pair-check or listen-think-pair-share. After individual students have worked through a practice activity, for example, they can meet in small groups to check their work for accuracy and describe their personal approaches to the exercises.

However, more complex cooperative learning structures such as a jigsaw (with students forming base and expert groups and helping to coach one another in variations for use of the procedural knowledge) and student tournaments (in which informal competitions encourage students to display high levels of accuracy and speed in their use of procedural knowledge) allow for more varied roles as well as both individual and group
accountability. These more complex structures also simulate more natural settings in which the procedural knowledge is used in real-world, authentic ways. Ideally, cornerstone activities involving procedural knowledge can be designed to help students gain experience that replicates professional applications of the procedures they are learning.

Comparison Activities

While learning procedural knowledge, students might be asked to participate in a variety of small and highly structured cooperative learning tasks involving variations on the process of comparison: for example, comparing and contrasting, classifying, and creating metaphors and analogies. Such activities can deepen students’ ability to explain the procedural knowledge they are acquiring and monitor their own progress via peer coaching and feedback. Paired partners might answer such questions as the following: How does our progress now compare to when we first started learning these strategies and processes? How might we classify techniques for improving our work with these strategies and processes? If we were to coach other students in using this knowledge, what metaphors or analogies might we use to help them?

Error Analysis Activities and Opportunities for Cooperative Practice

After students move from initial massed practice toward more distributed applications of procedural knowledge, they can work with partners or in small teams to assess their progress using clearly articulated evaluation criteria. In pairs or triads, for example, they can compare their individual progress, including data concerning their increasing speed and accuracy in using the procedural knowledge. Peers can also coach one another in identifying errors or missteps in using the skill, strategy, or procedure. Variations on this process can include paired practice sessions in which one partner tries out or applies the procedure while the other provides coaching feedback and advice. After each partner practices and receives feedback, pairs can make observations about areas of strength and areas in need of improvement.

Authentic, Real-World Cooperative Learning Tasks and Peer Critiques

As suggested previously, a major goal for teaching procedural knowledge is to help every student achieve a level of fluent, automatic use of the procedure. Cooperative learning tasks and projects are ideal venues for helping students demonstrate independent use and internalization of key procedural knowledge. The dance instructor mentioned previously, for example, might ask her students to move from modeling to shaping toward
independent application of what she has taught them by ending a unit with authentic class performances. These culminating performances might require students working in pairs or quartets to create and present to the rest of the class an original version of the dance they have been studying. At the conclusion of their performance, peer review activities might occur, with other students giving praise, asking questions, and ending with any suggestions for improvement they may have identified.

Examples

*Elementary Mathematics.* While having students practice estimation strategies, this teacher organizes them into triads and assigns them a real-world task that requires them to solve a series of estimation problems. As the teams work on these tasks, they identify strengths and weaknesses in their estimation skills.

*Secondary Geography.* This teacher has been working with students on the skill of reading a contour map. To provide a real-life context for this skill, she provides students with a contour map of the area around the school. Students interpret the map and then evaluate its accuracy via a field trip to specific locations they have examined.

Activity Box

Describe how you have used or could use cooperative learning strategies when teaching procedural knowledge.

Checking for Understanding

Use the following rating scale to assess your current understanding and comfort level regarding key strategies and processes presented in this module:

- **4** = I understand and already fully implement this strategy in my classroom.
- **3** = I understand this strategy, but I need to practice using it in my classroom.
- **2** = I can explain this strategy, but I am not fully confident that I can use it.
- **1** = I do not understand this strategy, and I do not currently use it in my classroom.
1. Spacing practice sessions
   Based on my rating, I may need to revisit the following:

2. Having students chart their speed and accuracy
   Based on my rating, I may need to revisit the following:

3. Using cooperative groups to enhance the development of procedural knowledge
   Based on my rating, I may need to revisit the following: