Original Paper

Checking for Understanding Strategies Using Formative Assessments for Student Learning

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Abstract

Effective teaching is not just standing in front of a classroom filled with students and sharing disciplinary content knowledge, especially with today's students. Without student learning, has teaching actually occurred, or was it just talking? What are students thinking about? What are students understanding? Are students able to connect new information presented with prior knowledge and then construct new knowledge that can be reinforced and committed to long-term memory? Are students able to use this knowledge to meet the learning goal of "knowing and being able to do", by making practical applications? Checking for understanding is a research-proven approach using real-time assessments of students' learning to inform teachers about students' progress in learning. Using a variety of questioning techniques is one approach to using in checking for understanding. One five-step process using a learning objective, cold calling, no op out, guided practice, and debrief offers a structure for helping students actively self-assess formatively as they progress in their learning. Over 30 strategies are provided for checking for understanding before, during, and after class, verbally, in writing, and through physical movements describing how to engage students in learning activities to reinforce what they know and are able to do.

Keywords

checking for understanding, student learning, formative assessment, effective teaching

1. Introduction

The goal of teaching is not covering the content in the textbook by standing in the front of a classroom and just talking (Briggs, 2014). Lecturing has been adopted as *the* favorite course delivery method in colleges for centuries because it is easier to do as well as assumed to be effective because it is the most popular choice (Barkley & Major, 2018). However, Bligh (2000) emphasizes that while lectures are effective in transmitting information, they are much less effective in promoting thinking and learning. That is, "just because we teach it, doesn't mean that students are learning it" (Berger et al., 2014, p. 59). College teachers seem to hope students understand information spoken during lectures, despite their inattentiveness, falling sleeping, non-academic use of technology devices, and too often lack of class attendance. Albert Einstein is credited with defining insanity as "Doing the same thing over and over again and expecting a different result". Yet, many college teachers continue lecturing throughout the semester despite disappointing evidence on tests indicating inadequate learning. Instead, college teachers during each class need to periodically assess whether or not students are understanding the content, and if not, then they need to make changes as Berger et al. (2014) emphasize.

> Checking for understanding during daily lessons encompasses a wide range of techniques—formal and informal, oral and written, verbal and nonverbal—used by teachers and students to track what students understand and can do throughout the lesson. As a result of this ongoing assessment, teachers and students make adjustments to what they are doing to ensure that gaps in understanding are addressed and that students who have mastered concepts may comfortably move on to another learning task. (p. 56)

Effective teachers incorporate continuous checking for understanding using real-time assessments of students' learning (Rosenshine, 2012) as information about students' progress toward achieving the learning objective (Berger et al., 2014). Checking for understanding, as formative assessment, informs teachers about students' current levels of knowledge and whether they are understanding information presented (McTighe, 2021). Simultaneously, these assessments provide feedback and support to students to enhance their learning (McTighe, 2021). Checking for understanding facilitates teachers' instructional pacing decisions during the content delivery, such as when to speed up, slow down, or re-teach to help facilitate student learning (Bogdanovich, 2014). Checking for understanding, at a minimum of three times per class, should incorporate student practice and application to make learning more permanent (Briggs, 2014). Use of a variety of checking for understanding strategies ideally occurs in each class, with none of these strategies repeated (Newman & Flaherty, 2012). Checking for understanding fosters a growth mindset by encouraging students to monitor and progress in their learning (Berger et al., 2014).

Classroom assessment helps "teachers find out what students are learning in the classroom and how well they are learning it. This approach is learner-centered, teacher-directed, mutually beneficial, formative, context-specific, ongoing, and firmly rooted in good practice" (Angelo & Cross, p. 4).

Checking for understanding uses formative assessments to provide students with direct, timely feedback. For example, Berger et al. (2014) suggest four ways to use questions when checking for understanding: (1) ask students how to connect the learning objective to prior knowledge learned; (2) scaffold questions from basic to more complex to strengthen their thinking skills, synthesize information, and make applications; (3) ask student text- and content-specific questions, rather than opinion questions, to elicit higher-order thinking; and (4) use questions to ensure students know the expectations for success.

Newman and Flaherty (2012) argue that checking for understanding is the key to learning by using formative assessment techniques. First, they suggest identifying and displaying the *learning target or objective* for each class, such as on a presentation slide, when starting a new topic. In addition, teachers need to discuss the learning objective, including asking students to restate its meaning in their own words and explain how they can be successful in meeting this objective. Refocusing attention on the learning objective throughout the class reinforces learning and culminates in explicitly debriefing the class at the end while checking for student progress. Second, Newman and Flaherty urge the use of *cold calling* as long as the question asked precedes identifying the student to answer it. When cold calling, teachers can use a variety of techniques, such as random calls or shuffled cards with students' names to ensure all students contribute. Teachers scaffold questions from simple to complex while encouraging students to make connections with their own knowledge and build on classmates' comments with the goal of higher-order analyses. This process encourages attentively listening to classmates and helps facilitate an ongoing discussion to strengthen learning. Third, using the concept of *no opt out* when each question is asked, the teacher always ends with the correct answer. For example, if the student who initially is asked the question fails to answer or answers incorrectly, the teacher cold calls on another student, calls on a student with a raised hand, or provides the correct answer. The teacher again asks the initial student to answer the question correctly to reinforce learning, including providing coaching as needed, to achieve this outcome. Fourth, after teaching new knowledge or a skill, the teacher uses *guided practice* before expecting students to make independent applications. In guided practice, teachers ask students to use new knowledge or a skill in a specific learning activity or low-stakes assignment. For example, the teacher can identify a problem to be solved with a classmate or each student is directed to complete a writing assignment to describe in their own words the concept presented. While guided practice is occurring, the teacher moves around the classroom monitoring students' engagement with the task and determines if any students need re-teaching or would benefit from other examples or illustrations. If so, the teacher pulls the class together to share new learning strategies, correct common misunderstandings, and answer questions before challenging students to make independent applications. Fifth, each class concludes with an effective *debrief* by returning to the learning objective and asking students to reflect on whether it is achieved. Specifically, teachers challenge students by asking for evidence of their progress in learning and reinforcing learning

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connections and applications made. The teacher concludes the class by affirming and reinforcing students' achievement of the learning objective. This five-step process offers a structure for helping student actively self-assess formatively as they progress in their learning.

2. Strategies for Checking for Understanding

Checking for understanding is important before, especially during, and also after class, as well as verbally, in writing, and through physical movements as students engage in learning activities to reinforce what they know and are able to do (i.e., learning is occurring). When used before class instruction, checking for understanding can investigate students' prior knowledge as well as activate it. This helps teachers understand students' current knowledge and skills as a foundation upon which to build. Within classes, checking for understanding holds students accountable for engagement in creating and retaining new knowledge as well as how to communicate this knowledge with classmates and the teacher. Checking for understanding is essential for informing the teacher about students who are struggling with the concepts and need more guidance, while also helping students reflect and self-assess where they are struggling so they can ask for assistance (Model Teaching, 2021). Reflection through checking for understanding at the end of class provides valuable feedback to students and teachers about whether content has or has not been mastered. This section briefly describes a variety of checking for understanding strategies used before, during, and after class.

2.1 Before Class

- Bring to class in writing (students) what they already know about the class topic and what they want to know (Mugabi, 2019).
- Prepare questions (students) about the assigned text to quiz the teacher in class (Mugabi, 2019).
- Read teachers' answers to students' questions, such as from minute papers or emails, on Blackboard so all students can learn from responses (Lumpkin, Achen, & Dodd, 2015).

2.2 During Class (Verbal)

- Ask students to teach classmates what was learned in the previous class (McTighe, 2021).
- Begin each class with review questions (Brookfield & Preskill, 2005).
- Discuss with a classmate an answer to a question posed by the teacher (Rosenshine, 2012).
- Encourage students to ask questions of each another to gain a new understanding in a Socratic seminar (Briggs, 2014).
- Facilitate peer instruction by asking students to teach another student a concept learned, then exchange roles as the peer instructor (Briggs, 2014).
- Make cold calls randomly using names to ask students to respond to questions and restate concepts (Newman & Flaherty, 2012).
- Ask open-ended questions repeatedly throughout each class to help students determine what they have learned and what they still need to learn (Model Teaching, 2021).

- Avoid Yes/No questions and phrases like "Does this make sense?" In response to these questions, students usually say nothing. nod, or answer "yes," when in reality many students, if asked directly, would admit they do not understand the content presented (Briggs, 2014).
- Ask higher-order applying, analyzing, and creating questions from Bloom's Revised Taxonomy (Krathwohl, 2022) to develop critical thinking skills (Depka, 2017).
- Use think-pair-share to challenge students to think about an answer to a question, pair with a classmate to compare responses, and share with classmates (Barkley, Cross, & Major, 2005).
- Revise and restructure notes in a buzz group with a classmate for two minutes between lecture segments (Bligh, 2000).
- Use 3-2-1 by asking students to respond verbally (or in writing) with three things they learned, two things they want to know more about, and one remaining question they have (Barkley & Major, 2018).
- Ask students to provide verbal examples or applications other than those given by the teacher (Newman & Flaherty, 2012).
- Summarize verbally the key take-aways from the class (Barkley & Major, 2018).

2.3 During Class (Written)

- Integrate writing and other critical thinking activities to facilitate richer class discussions and student engagement (Bean, 2011).
- Reflect on and write briefly about what was learned from the day's reading assignment (Lumpkin, Achen, & Dodd, 2015).
- Do a quick write in response to the teacher's or a classmate's question (Mulvahill, 2021).
- Ask open-ended questions challenging students to respond in writing using higher-order thinking skills, such as analyzing, evaluating, or creating (Lumpkin, 2019).
- Ask students to reflect during the last five minutes of class on the content presented and write what was learned and how to make applications other than the examples provided by the teacher (McTighe, 2021).
- Facilitate concrete learning by asking students to make applications of information presented to real-world issues or problems (Nilson, 2010).
- Require an exit ticket on which students are asked to write a response to a question or prompt before leaving class (Berger et al., 2014).
- Use written quizzes to check for understanding (Mugabi, 2019).
- Record in class notes student-developed written definitions of key concepts (Mugabi, 2019).
- Summarize in writing one or two sentences the main idea(s) presented and discussed in a class and exchange these written ideas with a classmate (Rosenshine, 2012).

- Respond to a minute paper with these two questions: "What was the most important thing you learned today in class?" and "What important questions remains unanswered?" (Angelo & Cross, 1993).

2.4 During Class (Physical Movement)

- Raise hand if agree with the answer provided by a classmate (Rosenshine, 2012).

- Use technology, such as student response games like Kahoot and Quizlet (Mulvahill, 2021).

- Use technology-based clicker quizzes to check for understanding (Briggs, 2014).

- Ask students to give a physical response, such as Thumbs up: I understand and can explain it in my own words; Wave hand: I'm not completely sure and doubt I could explain it; Thumbs down: I don't yet understand and cannot explain it (Mulvahill, 2021).

- Ask students to give a physical response, such as four-finger response (1—I do not understand; 2—I am still confused; 3—I understand. I can do it by myself; and 4—I understand it and can teach it to a classmate) (Mulvahill, 2021).

- Ask students to stand beside on a stop sign (Red means I need help with this before we move on!; Yellow means I almost have this, but I need a little bit of help before we move on!; Green means I got this down and am ready to move on) (Mulvahill, 2021).

- Use four corners to provide opportunities for students to respond to questions by moving to one of the four corners of the classroom where signs are posted stating "I strongly agree," "I strongly disagree," "I agree somewhat," and "I'm not sure" (Briggs, 2014).

- Provide response cards for students to hold up, like index cards or signs with yes or no, true or false, or agree or disagree when responding to closed-ended questions (Briggs, 2014).

2.5 After Class

- Ask students to write questions they need help answering to bring to the next class or send via email to the teacher for answers (Mugabi, 2019).

- Assign students to write and bring to next class an example or application of what was learned in class (Mugabi, 2019).

- Keep a reflections journal listing the key learning points after every class (Mugabi, 2019).

Rosenshine (2012) in his article "Principles of Instruction: Research-based Strategies that all Teachers Should Know" recommends strategies based on research about instruction in cognitive science, classroom practices of master teachers, and cognitive supports that concur and reinforce how to help students learn complex tasks. In introducing these principles, he states,

> The most effective teachers ensured that their students efficiently acquired, rehearsed, and connected background knowledge by providing a good deal of instructional support. They provided this support by teaching new material in manageable amounts, modeling, guiding student practice, helping students when they made errors, and providing for sufficient practice and review. (p. 12)

Rosenshine (2012) also offers a list of 17 principles that overlap with and offer slightly more detail than those described in the article. These principles affirm and reinforce that checking for understanding using continuous formative assessments is essential for student learning.

1) Begin a lesson with a short review of previous learning.

2) Present new material in small steps with student practice after each step.

3) Limit the amount of material students receive at one time.

4) Give clear and detailed instructions and explanations.

5) Ask a large number of questions and check for understanding.

6) Provide a high level of active practice for all students.

7) Guide students as they begin to practice.

8) Think aloud and model steps.

9) Provide models of worked-out problems.

10) Ask students to explain what they have learned.

11) Check the responses of all students.

12) Provide systematic feedback and corrections.

13) Use more time to provide explanations.

14) Provide many examples.

15) Reteach material when necessary.

16) Prepare students for independent practice.

17) Monitor students when they begin independent practice. (p. 19)

3. Conclusion

Effective teaching requires going beyond just lecturing. To actually learn, students need to actively and repeatedly engage through answering questions, reviewing content verbally and in writing, sharing what they learning through incremental steps, and making practical applications. Students can learn from the teacher and each other and benefit from and enjoy learning through concrete, real-world examples. The passivity of traditional college classrooms needs to be replaced with learning environments filled with students emersed in discovering how they can develop a growth mindset by thinking more deeply and reflecting upon and synthesizing information in their own words.

The research is clear that using a variety of checking for understanding strategies before, during, and after class, verbally, in writing, and through physical movements will lead to greater student learning. Unless information learned is reviewed, practiced, and stored in long-term memory, it is easily forgotten, rather than mastered. The most effective teachers use checking for understanding strategies to engage students in learning activities to reinforce what they now know and are able to use.

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