The Effects of Cue-Do-Review on

Teaching Assistant and Student Perceptions of Learning

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**Abstract**

As a result of increasing emphasis placed on high quality education for all students through such legislative mandates as the Every Student Succeeds Act (ESSA) and the Individuals with Disabilities Education Act (IDEA), teachers cannot afford to waste valuable instruction time. Evidence-based practices are required to assist all students as they work toward meeting federal and state content requirements. Cue-Do-Review, a teaching sequence that can be used in any lesson, regardless of content level, age of the students, or ability level, is one way to help ensure classroom instruction time is used effectively, as well as efficiently. By purposefully targeting specific teacher behaviors at the beginning, middle, and end of a lesson, students are more likely to connect with, and remember content. In the current study, graduate school teaching assistants were asked to participate in a short one-hour professional development session, during which they learned specific behaviors to include in their lessons at the beginning, middle, and end. Undergraduate candidates were given a survey both prior to the professional development (before midterm), and at the conclusion of the course near the end of the semester. The teaching assistants were also surveyed before and after the professional development activity. An analysis of results indicated that undergraduate candidates whose teaching assistants used the Cue-Do-Review sequence, responded more positively to the learning experience, sharing that the sequence had a positive effect on their perceptions of learning. The researchers suggest possible interpretations for the results as well as areas for future study.

**Keywords:** lesson planning, lesson sequence, Cue-Do-Review, professional development, student perceptions of learning, teaching sequences

**Introduction**

In an increasingly diverse classroom, it is no surprise that the process of learning varies greatly from student to student, and what works best for the individual student depends on the characteristics of each. There are several aspects of the teaching process that have been found to help all students, despite their learning styles or the speed with which they learn. Experienced teachers understand that the best lessons are comprised of several distinct, yet interconnected parts or elements. These lesson elements include much more than the actual teaching of the content. In fact, a case can be made that the content being taught has meaning and value, only when the attentive teacher spends time at the beginning of the lesson to ensure that purposeful connections are made between the student and the content. In addition, successful teachers take time at the conclusion of the lesson to reinforce these same connections, and ensure that student understanding is cemented by reviewing materials, after instruction has been delivered.

In the current study, the researchers studied the effects of a specific teaching sequence, called Cue-Do Review. The Cue-Do-Review sequence is a part of the Strategic Instruction Model ™ (SIM) Content Enhancement Routines ™ (CER). The researchers did not use the other elements of the SIM ™ CER ™ , but focused only on the Cue-Do-Review sequence. In the following review of the literature, various instruction and lesson elements and processes will be examined. In addition, the Cue-Do-Review sequence will be more deeply discussed.

**Lesson Elements and Processes**

Today, teachers have higher demands for increased student achievement than ever before. Teachers are required to teach more information in the same amount of time, the information they are being asked to teach is complex and abstract, and classrooms are becoming more diverse. Teachers have students from all walks of life in their classrooms with varying needs and available resources. They have English Language Learners (ELL), gifted and talented students, students with disabilities, students who are at risk for dropping out of school, and many more distinctions. The burden of organizing information so that students can understand where they have been, where they are, and where they are going with the content falls upon the teacher (Boudah, Lenz, Bulgren, Shumaker, & Deshler, 2000).

The Every Student Succeeds Act (ESSA) and the Individuals with Disabilities Education Act (IDEA) federal legislation influences standards in classrooms, especially when pertaining to students with diverse learning abilities. All students, regardless of ability, need access to quality education. All students are being held to the same standards, which is why it is important to focus on identification and implementation of evidence-based practices in the classroom (Little & Hahs-Vaughn, 2007). All students have background information that can cue learning, and all students benefit from reviewing information that has been previously taught.

One of the most widely researched aspects of learning involves the “spacing effect.” The spacing effect is characterized by the notion that it is better to spread learning out across time, rather than to overload the brain and try to learn everything all at once (Novikoff, Kleinberg, & Strogatz, 2012). This concept can also be applied to teaching an individual lesson. The act of teaching does not solely consist of imparting content and concepts, but also crafting a lesson that begins with creating connections to prior learning and making a case for the relevance of content. This includes tieing up the lesson with a well developed review of processes as well as content.

 Students are encouraged to connect new information to prior knowledge and everyday life experiences regularly. In order to learn the novel information they are being taught, students draw upon what they know. When applied to teaching, this concept is referred to as contextualizing instruction. For example, some science programs encourage teachers to connect the curriculum to the students’ lives and what they interact with outside of the classroom. This allows the students to make meaningful, purposeful connections to what they are learning. The connections help students to learn and understand complex concepts. In a study by Rivet and Krajcik (2008), two science classrooms in middle schools were observed using contextualizing features in project-based science units. Students were encouraged to use context (situations or events outside of the classroom) to motivate and present information in the classroom. It was found that when students have a personal interest or connection to the content, they are more motivated and interested in the material.

At times, it is difficult for all teachers to make sense out of content area textbooks. Thus, teachers have the task of making the student- to- textbook connection explicit for their students (Dimino, 2007). One of the best indicators of being able to read increasingly complex books is the ability of students to connect new information to prior knowledge. Making connections between the words and the content helps students to reach deeper levels of reading and comprehension.

Students who make connections that are beyond the text, as opposed to just what is within the text, perform better on exams (Stomso, Braten, & Samuelstuen, 2003 as cited in MacMillan, 2014). It has been reported that only 30% of students indicate they are making connections between reading and outside knowledge (Manarin, 2012 as cited in MacMillan, 2014). Studies also show that anchoring learning to known information improves memory recall (CTGV, 1992b as cited in Rivet & Krajcik, 2008). New information needs to be learned in a way that is productive for the student. MacMillan (2014) found that students could make connections when prompted, and these connections indicated an increased understanding and appreciation of the articles content. This is true across all content areas and levels of education.

**Lesson Opening and Closing**

 Quality instruction begins with an opening that engages the learners in the lesson’s purpose and processes, and also helps the learner make connections. A critical element in the beginning of a lesson is linking new information to prior knowledge. The opening minutes of class offer a rich opportunity to capture students’ attention, as well as get them prepared to learn. Students have complex lives, and it is incumbent on instructors to begin class with deliberate efforts to bring student focus to the lesson of the day. In many classes, the critical first few minutes are wasted with frivolous tasks, including taking attendance, getting the technology turned on, writing on the board, etc. Lang (2016) recommends some specific suggestions for opening class more effectively, which include: starting with a question or two, reviewing previous learning, connecting with students’ prior knowledge, and engaging students in a brief writing task.

It is also important to review content information after it has been taught. Students who revisit new information can go for longer periods of time without review and still maintain the ability to recall the information (Novikoff, Kleinberg, & Strogatz, 2012). Reviewing helps with memory, later recall of information, helps to reiterate and highlight the main points that need to be learned, and can assist in wrapping up an entire lesson. At the end of the lesson, the students are then able to take that information and use it to make connections in the future. This part of the teaching sequence can include activities, such as quizzes, worksheets, or questions from the teacher to provide structure to the summation of material.

Other high quality instructional sequences are referred to in somewhat different terminology but continue to operate under these basic ideals. For instance, Madeline Hunter (1982) researched effective teaching and showed that quality instruction involves an anticipatory set that focuses student attention prior to the beginning of a lesson, and closure, consisting of wrap up, and final check for understanding. Hunter’s work as a lesson-planning expert has influenced countless teacher planning sessions.

**Content Enhancement Routines**

Content Enhancement Routines (CER)™ are routines that have been developed for use in the general education classroom. They are based on effective learning principles (Little & Hahs- Vaughn, 2007). These routines benefit all, but are specifically designed to meet the needs of students with diverse learning needs. The CERs™ help students organize and link new information, and assist teachers in planning and teaching material. CERs™ work to alleviate some of the challenges teachers face (Boudah et al., 2000).

Content Enhancement Routines ™ include a variety of specific teaching routines designed for different purposes. Some examples include the Unit Organizer Routine ™ , the Course Organizer Routine ™ , and the Concept Mastery Routine ™ . These routines are based in several validated instructional principles: active participation in learning, abstract presented in a concrete form, information tied to previously learned information, important information distinguished from unimportant information, the relationship between forms of information made explicit, and how to explicitly learn specific information,etc. (Deshler et al., 2011).

CERs ™ use a variety of teaching methods that help facilitate learning, application, and generalization of knowledge in the classroom. They organize and explicitly present the material to students in a way that facilitates active and efficient learning . These practices have been validated through research as being effective (Little & Hahs-Vaughn, 2007). Students from various backgrounds can benefit from this form of learning, and teachers are able to deliver information that they feel is most important for students to learn. For the purpose of the current study, Cue-Do-Review is the targeted teaching sequence because of its versatility and application to any lesson, whether that lesson was also taught using Content Enhancement Routines ™ or not.

**Cue-Do-Review**

The Cue-Do-Review sequence, specifically, can be found within the research-validated Strategic Instruction Model ™ (SIM) Content Enhancement Routines ™ (CER) series. As previously mentioned, Content Enhancement ™ is an instructional method that relies on powerful teaching devices with which teachers organize and present content. This process presents the content in a way that is easy-to-learn and understand. For the Cue-Do-Review sequence, devices are used with a set of linking steps that consist of three distinct instructional phases, called Cue, Do, and Review.

The Cue-Do-Review sequence leads students through the content and engages them in the process of teaching and learning (Boudah et al., 2000). Although the Cue-Do-Review sequence is used in all the Content Enhancement ™ series, it is not CER™ dependent. The sequence can be used in *any* lesson, regardless of content, age or ability level.

In the “Cue” phase, teachers inform students what will be taught, the process by which instruction will be carried out, an explanation regarding how the process will help students learn (rationale), and identify what the teacher’s expectations are for students. Typically, teachers ask the students to attend to, and participate in a learning activity. Cueing can take as little as a few minutes and serves to focus student attention on what will transpire as the lesson unfolds.

In the “Do” phase, teachers lead learning while eliciting responses from students. The “Do” phase shapes student responses by asking higher order questions and helps students evaluate the accuracy of the information they are learning. This phase is typically what teachers refer to as the bulk or majority piece of the lesson. In the Content Enhancement Routines, the teacher uses a visual device to record information in an organized manner.

Finally, in the “Review” phase, the teacher checks students’ understanding of the processes used to teach, reinforces learning, and asks students how the process guided their learning. In essence, both critical content from the lesson and processes used in teaching are discussed and reviewed. Thus, the lesson ends with a brief review phase.

Although the SIM ™ CER ™ rely on the specific phases of Cue-Do-Review, opening and reviewing lessons have been widely recommended as good teaching. In his article on the opening of a lesson, Lang (2016) notes that the opening minutes of class offer a rich opportunity to capture students’ attention as well as get them prepared to learn. Of equal importance, during the last few minutes of class, Lang (2016) suggests that many instructors use the last few minutes of class to cram in additional information, make added points, or issue reminders as students are preparing to exit the classroom, students are packing up, ready to go. These last minute admonishments and bits of information are lost in the air and not paid attention to. Reese (2014) indicates that teachers miss opportunities to collect rich learner feedback when they neglect a purposeful class closure.

By purposefully spending time cueing and reviewing, teachers are enhancing both the beginning and end of a well-developed lesson. Because the Cue-Do-Review sequence appears to be a powerful way to deliver instruction, the researchers lifted critical elements of the sequence and applied these to the current study using Psychology Teaching Assistants (TAs) as the “teachers” and undergraduate candidates taking a general psychology course as the “students”. The Content Enhancement ™ series was not utilized in its entirety, but the Cue-Do- Review sequence referred to in the series was incorporated independent of the other components of the CER ™ .

**Method**

**Participants**

Participants were recruited from the University of Central Arkansas Psychology and Counseling Department. Initially, 232 students participated in the pre-intervention survey. These students were taking beginning psychology courses from one of four participating teaching assistants. The post-intervention survey was administered to 186 student participants. Specific attrition factors were not identified, and all student responses were collected without reference to the specific teaching assistant. The researchers did not code students, but rather included all pre and post-intervention survey results in the findings. It is believed that the results are valid even though attrition accounted for 46 participants not completing the second post-intervention survey. It is believed that students who did not respond to the post-intervention survey were either late to class, absent, or dropped the class between the pre- and post- intervention survey. It is also believed that all 186 participants from the post-intervention survey were also included in the pre-intervention survey. If they did not take the pre-intervention survey, they were asked not to fill out the post- intervention survey.

**Pre and Post Survey**

Students and teaching assistants were asked to fill out a brief survey about their experiences prior to the midterm examination and prior to the final examination of the Spring, 2018 semester. The student survey asked questions that probed students’ beliefs regarding their retention of class materials, their understanding of class materials, their beliefs about how helpful the class was in advancing their knowledge in the subject matter, their understanding of processes and expectations, and their beliefs regarding the effectiveness of their instructors’ teaching methods as it applied to their individual learning. At the conclusion of the study, students were given an information sheet explaining the Cue-Do-Review intervention and the purpose of the research study. The teaching survey focused on how the TAs believed their students understood and retained the information presented in class. The survey also posed a question about what methods the TAs utilized to help students remember information in class.

**Fidelity Checklist**

Teaching assistants were asked to fill out a fidelity checklist to hold themselves accountable for using the Cue-Do-Review teaching sequence. This checklist provided them with a guide so that they could make sure they were implementing the Cue and Review sequence components with fidelity. The fidelity checklist was modified from the Cue-Do-Review Observation Checklist. The Cue-Do-Review Observation Checklist had statistically significant mean differences between implementers (those who followed the checklist adequately) vs. non-implementers on their belief in CER ™ , application of CER ™ , and implementation of CER ™ (Little & Hahs-Vaughn, 2007). Researchers modified this checklist to fit the current study.

**Professional Development**

The participating teaching assistants attended a short, one-hour professional development activity that focused on the Cue-Do-Review teaching sequence. As the TAs were learning in the professional development, each step of the sequence was modeled for them. The professional development activity began with a detailed outline of the presentation contents, and participants were informed that the Cue-Do-Review sequence would be followed so that they could see how the sequence would look in an actual teaching situation. Participants were encouraged to ask questions and complete a notetaking guide as they went through the activity. The notetaking guide was comprised of the session’s main points using a fill-in-the blank handout. This was used to help keep participants actively engaged, and to demonstrate one way to keep their undergraduate students engaged in the learning process.

After the purpose of the study was shared with the teaching assistants, the components of the three steps in the Cue-Do-Review process were defined, and multiple examples were provided. The specific steps identified during Cue included: name the process to be used in the lesson, identify what is about to be learned, connect current learning to previously learned information, explain how learning process(es) will enhance learning, specify what students need to do to participate in class, and engage students in the discussion. Several examples for introducing class sessions were shared including graphic organizers, pre-assessment measures, use of videos, and providing key questions on which to focus. As each idea was shared, the teaching assistants were invited to discuss their ideas for future lessons.

Following the discussion of the Cue step, a brief discussion regarding the Do step ensued. Examples were shared including labs, lectures, discussions, and group work. The discussion was directed at identifying the most important processes for instructing and teaching content. Because the teaching assistants are regarded as experts in the content they were teaching, this part of the professional development addressed choosing the right format for the content being taught.

The next part of the professional development addressed ways to review at the end of a lesson. Specific components of the Review step included: check for understanding of the content, ask questions about how processes that were used helped students learn the content, get feedback regarding unresolved concerns and areas of misunderstanding, and ensure that the class content was summarized to the understanding of all class participants. Multiple examples of ideas to incorporate when wrapping up class were shared, such as using a ticket out system, completing a discovery card ( what I expected, what I learned, what I am wondering about), working in small groups to craft a summary statement, using group responses to indicate level of comfort with the content, and completing a graphic organizer.

At the conclusion of the professional development activity, the teaching assistants were asked to participate in a wrap up activity. In addition, each participant was given the fidelity checklist that detailed the Cue-Do-Review sequence with specific behaviors to include. The TAs were asked to use the checklist as a guide when teaching to remind themselves of the Cue- Do-Review sequence and critical components, especially at the Cue and Review parts of the sequence.

**Results**

**Students**

Questions were modified slightly from the pretest to the post -test. Even though wording was changed, the themes remained the same and the questions were matched based on the theme. A paired samples t-test was conducted to compare student perceptions of their learning before the implementation of cue-do-review and after the implementation of cue-do-review. There was no significant difference in how well the student believed they would retain the material taught in class that day before cue-do review implementation (*M*=3.74, *SD*=.74) and after cue-do-review implementation (*M*=3.86, *SD*= .77), t(184)= -1.50, *p*= 0.14. However, there were significant differences in students’ perceptions of their understanding of the class material before cue- do-review implementation (*M*=4.19, *SD*=.82) and after cue-do-review implementation (*M*=4.40, *SD*=.69), t(184)= -2.44, *p*= 0.02; students’ perceptions of degree to which the instructor helped the student understand the processes and expectations of the classroom before cue-do-review implementation (*M*=4.39, *SD*= .76) and after cue-do-review implementation (*M*=4.63, *SD*= .61), t(184)= -3.39, *p*= .001; the degree to which the instructor helped the students understand the content before cue-do-review implementation (*M*=4.41, *SD*=.73) and after cue-do-review implementation (*M*=4.61, *SD*=.63), t(184)= -2.78, *p*= 0.01; and the perceived effectiveness of the instructors teaching methods before cue-do-review implementation (*M*=4.27, *SD*=.86) and after cue-do-review implementation (*M*=4.49, *SD*=.72); t(184)= -2.55, *p*= 0.01. These results suggest that cue-do-review did have a positive impact on students’ perceptions of their learning. This is evident in all questions, except for the question addressing students’ beliefs about their retention of the material.

In addition to the questions asked for the purpose of comparison of pre and post implementation of cue-do-review, additional questions were asked on the post test survey to help generate information about students’ thoughts and opinions that might be applicable for further research and discussion. The first of these three questions asked, “How helpful has it been to have the instructor explain at the beginning of class what topics and information will presented that day,” showed a positive response from students (*M*=4.49, *SD*=.77). The following two questions showed a positive response as well, “To what extent do you believe the instructor has presented the material to you in a way that engages you in the material” (*M*=4.42, *SD*=.80) and, “How helpful has it been to have the instructor review the material at the end of class in some way” (*M*=4.43, *SD*=.77).

**Teaching Assistants**

 A paired samples t-test was conducted to compare teacher perceptions of their students’ learning before the implementation and of Cue-Do-Review and after the implementation of Cue-Do-Review. There were no significant differences in teaching assistant perceptions in the students’ ability to retain the information presented before Cue-Do-Review implementation (*M*=3.0, *SD*= 0.0) and after Cue-Do-Review implementation (*M*=3.5, *SD*=.58), *t*(3)= -1.73, *p*= .182; the teaching assistants’ perceptions of degree to which the students understood the materials presented in class before implementation (*M*=3.25, *SD*=.50) and after implementation (*M*=3.25, *SD*=.50), *t*(3)= 0.00, *p*= 1.0; the teaching assistants’ perceptions of how helpful the course was for advancing students’ subject matter before implementation (*M*=3.75, *SD*=.50) and after implementation (*M*=3.25, *SD*=.50), *t*(3)=0.00, *p*=1.0; the teaching assistants’ perceptions of the degree to which the students understood the class expectations before implementation (*M*=2.50, *SD*=.58) and after implementation (*M*=3.50, and *SD*=.58), *t*(3)= -2.45, *p*=.092; the teaching assistants’ perceptions of the degree to which the teacher helped the students understand the content before implementation (*M*=3.25, *SD*=.50) and after implementation (*M*=3.75, *SD*=.50), *t*(3)= -1.0, *p*=.391, and the teaching assistants’ perceptions of how effective they believed their teaching methods were before implementation (*M*=3.0, *SD*=0.0) and after implementation (*M*=3.50, *SD*=.58); *t*(3)=1.73, *p*=.182.

As with the student survey, three questions were added to the teaching assistant perception post- survey in order to generate information about thoughts and opinions that may be applicable for further research and discussion. The questions were as follows: “How helpful do you believe it has been to to explain at the beginning of class what topics and information will be presented?” (*M*=3.75, *SD*=.50), “To what extent do you believe you have presented the material in a way that engages the student in the material?” (*M*=3.75,*SD*=.50); and “How helpful do you believe it has been to review the material at the end of class in some way?” (*M*=4.25,*SD*=.957). These findings did not generate significant results.

**Discussion**

Previous research on the importance of engaging students in material to be presented in the lesson, as well as reviewing the material at the lesson’s end are consistent with the findings in the present study. In a sample of 186 students, the results suggest the structure of Cue-Do-Review has the potential to be effective for students in an undergraduate psychology course. Results demonstrated that the Cue-Do-Review teaching sequence increased students’ perceptions of course effectiveness; specifically, students’ perceptions of understanding class materials, the degree to which the instructor helped the students understand the processes and expectations of the classroom, the degree to which the instructors helped them understand the content, and the effectiveness of the instructors’ teaching methods. This research has important implications for how instructors at all levels of education can structure their teaching sequence to effectively and efficiently use the face- to- face time they have in the classroom with students.

There are several limitations to this study. First, there was a small sample size of teaching assistants. Teaching assistants in this study were a convenience sample and future research should focus on gathering more data across disciplines. Second, teaching assistants did not show statistically significant positive perceptions of the teaching sequence and the perceived effects of their teaching on student learning. There are a few reasons that this could be the case. The first is the small sample size. The second has to do with teacher experience. Teaching assistants obtain minimal training in teaching and much of that training is geared towards what content needs to be covered. Due to the limited expertise of short term experience, it is quite possible that teaching assistants were not aware of the impact the strategy was having on student learning. It is also possible that their basis for the effectiveness of the implementation was primarily based on student grades over student perception. Future research should conduct a true experimental study with a control group in order to assess the effectiveness on student achievement.

 The questions administered on posttest, but not pretest, are intended to spark further research or later thoughts for this subject. The questions, “how helpful has it been to have the instructor explain at the beginning of class what topics and information will presented that day”, “to what extent do you believe the instructor has presented the material to you in a way that engages you in the material,” and, “how helpful has it been to have the instructor review the material at the end of class in some way,” showed high student scores, all averaging over 4.4 out of 5. The post questions demonstrate positive student response to Cue-Do-Review implementation throughout the lesson.

**Conclusion**

 Cue-Do-Review is a powerful teaching sequence that can enhance the teaching learning process regardless of content, ability, or age of students. The current study suggests that this sequence, when used even by inexperienced instructors, still has a positive impact on students as measured by their perceptions of their learning. By purposefully focusing on what happens at the beginning, middle and end of a lesson, teachers can generate improved experiences for their learners.

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