Response Cards: An Effective Intervention for Students with Disabilities

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Abstract: In this review of literature, the author analyzed published research to determine the effectiveness of response card strategies on students with disabilities. The author determined that response cards are effective in increasing the number of opportunities that students respond, increasing the number of correct responses, increasing on-task behavior, and decreasing inappropriate behavior for the majority of the studies reviewed. Implications for additional research are also noted.

Instructional strategies that enable students to engage in a high rate of active participation offer several educational and behavioral benefits to a variety of learners. Active participation has been described as “the planned and cognizant component of the instructor’s lesson, which enables students to participate overtly in the lesson” (Pratton & Hales, 1986, p. 211). Active participation involves students performing a specific behavior, such as calculating mathematical equations or imitating a desired skill. Although active participation allows students the opportunity to practice the skill during the acquisition and fluency phases of learning, it also allows teachers the opportunity to monitor student progress and provide feedback while educational concepts are being acquired.

The traditional form of active participation involves students raising their hands and verbally stating the answer; however, this method has numerous drawbacks. First, active participation through the use of hand raising only actively engages one student while the remainder of the class is passively engaged in the task. Second, the enactment of No Child Left Behind and the “highly qualified” teacher requirement has led to a dramatic increase in co-teaching which has inundated general educators with students with a variety of disabilities who are engaged in their classrooms. In addition, the No Child Left Behind act requires that students with disabilities receive access to core content which has led to an increase of inclusion practices for students who have more significant disabilities. Therefore, the general education teacher must be providing students with a variety of disabilities the opportunity to actively participate in their natural environments. Although hand raising may be an acceptable technique to passively engage students without disabilities, it may not be a suitable technique for students who have physical disabilities or who are nonverbal. Furthermore, Heward’s (1994) review of active student response strategies revealed that instructional strategies that engage students in high rates of active participation promote the acquisition of skill development (Fischer & Berliner, 1985; Greenwood, Dequadri, & Hall, 1984) and increase students’ rates of on-task behavior (Miller, Hall, & Heward, 1995; Sainato, Strain, & Lyon, 1987), as well provide instructors with immediate feedback on student performance (Narayan, Heward, Gardner, Courson, & Omness, 1990). Simply put, the more opportunities that students have to actively engage in learning, the more time they spend learning instead of engaging in off-task behaviors.

Randolph (2007) contended that the underlying premise of active participation is based on the principle asserting that the learning trial is a fundamental component of instruction. The learning trial, which is found...
in both the acquisition and implementation stages of learning, is derived from three essential elements. The first element is formulated by the teacher posing a question to the entire class or a specific student. The second element consists of a response to the teacher directed question. The final element is the delivery of teacher feedback. The time elapsed between the three trial elements and the time elapsed between each trial presentation correlates to the number of opportunities for students to actively participate in a teaching sequence. Researchers also have stated that the pace and frequency of learning trials contributes to the acquisition of student learning (Heward, 1994). Instructional strategies that promote active student responding, such as response cards, guided notes, and choral responding, assist in capitalizing on the number of complete learning trials that can be delivered during whole group instruction (Randolph), while maximizing the number of opportunities that students have to actively respond to the stimuli presented.

One active responding method that repeatedly has been found to be an effective and efficient means to actively engage students in instructional practices is response cards. Response cards, which offer educators a low cost, low tech tool to increase active student responding during instructional sessions, have been described as “cards, signs, or other conveyances simultaneously held up by all students in the class to display their responses to a teacher presented question or problem – to be an effective way of increasing student participation” (Cavanaugh, Heward, & Donelson, 1996, p. 403). Berrong, Schuster, Collins, and Morse (2007) concluded that all learners, especially those with disabilities, can benefit from the systematic implementation of active student responding techniques (2007). Therefore, the purpose of this paper is to review and synthesize the published, empirical literature that has focused on using response cards as a means of active responding for students who have an identified physical or cognitive disability without regard to the severity of the condition. In addition, it is believed that substantial evidence exists to establish response cards as an evidenced-based practice for students who have been identified as having a disability.

Method

The author completed an ERIC search and reviewed the Psychological Abstracts that were identified. Furthermore, she conducted a hand search of approximately 20 educational and psychological, peer-reviewed journals and reviewed the reference lists located in cited manuscripts. The procedures described yielded a total of six relevant studies. The six studies all used response cards as a means of engaging students in active responding, and most discussed the impact that the use of response cards had on student participation, on-task behavior, and the acquisition of the desired skill. Based on the criteria outlined in Horner, Carr, Ahlle, McGee, Odom, and Wольery (2005), responses cards should be considered an evidenced-based practice because the following guidelines have been met: (a) a minimum of five studies have adequately documented the use of experimental control in peer-reviewed journals, (b) the investigations were conducted by a variety of researchers in a variety of settings, and (c) the investigations were conducted with a minimum of 20 total participants.

Results

Table 1 provides information pertaining to the studies reviewed. Studies illustrating the effectiveness of response cards have been conducted with students in preschool through the ninth grade, in both inclusive and self-contained environments. Participants involved in the investigational studies have had varying degrees of disabilities, with participants having no identifiable disabilities to students with severe cognitive disabilities. An ABAB design was used to exhibit experimental control in five of the studies reviewed. Overall in each of the six studies, students exhibited an increased rate of accurate responses, while half of the studies reported an increase in on-task behavior and a decrease in the occurrence of inappropriate behavior.

Although the literature has been expanded in recent years pertaining to students with disabilities and the use of response cards, past research has been conducted in general education classrooms with students with and without disabilities. In one such study, Narayan,
Heward, Gardner, Courson, & Omness (1990) used response cards in a fourth grade social studies classroom. The researchers collected data on four dependent variables, including the rate at which the teacher presented instruction, the number of student responses, the accuracy of the student responses, and the students’ daily quiz scores. They divided each class period into three segments. The first segment consisted of the instructor delivering instruction with the use of an overhead projector and verbally questioning the learners after each concept had been presented. During the second segment, the instructor reviewed material presented during either the response card or hand raising condition. The remainder of the class was spent taking a quiz. In the hand raising condition, the instructor verbally stated a question; if the students wished to respond, they raised their hands. In the response card condition the instructor first presented a question to the whole class. The instructor then asked students to “write” their answer on their response cards. Last, the instructor requested that the students hold up their response cards. The instructor then swiftly scanned the students’ responses and provided feedback. If every student in the class responded accurately to the teacher-posed question, the instructor provided descriptive verbal praise in a statement similar to “Great job, the capitol of Kentucky is Frankfort.” However, if incorrect responses were indicated, the teacher provided whole class corrective feedback, such as “I see many of you indicated Frankfort is the capitol of Kentucky; that is correct.” If no student in the class responded correctly, the teacher said, “I see no one responded correctly, the capitol of Kentucky is Frankfort.” The use of descriptive feedback allowed the students to hear the correct information on multiple occasions.

Through the use of an ABAB design, the researchers found that (a) a greater number of students offered responses during the response card condition, (b) correct responses occurred at a higher rate during the response card conditions, and (c) daily quiz scores were

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**TABLE 1**

Overview of Response Card Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Method</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Narayan et al. (1990)</td>
<td>4th grade social studies students with and without disabilities</td>
<td>ABAB design</td>
<td>Response cards resulted in increased response rate, correct responses, and daily quiz scores</td>
</tr>
<tr>
<td>Cavanaugh et al. (1996)</td>
<td>9th grade science students with and without disabilities</td>
<td>ABAB design</td>
<td>Response cards yielded higher rates of accuracy on next day and weekly quiz scores</td>
</tr>
<tr>
<td>Godfrey et al. (2003)</td>
<td>Preschool students with attending difficulties</td>
<td>ATD design</td>
<td>Response cards resulted in increased on-task behavior and greater rates of responding, as well as diminished occurrences of inappropriate behavior</td>
</tr>
<tr>
<td>Davis et al. (2004)</td>
<td>4th grade English students identified with learning and behavior disorders</td>
<td>ABAB design</td>
<td>Response cards resulted in higher rates of active responding and correct responses</td>
</tr>
<tr>
<td>Horn et al. (2006)</td>
<td>Middle school students identified with moderate to severe disabilities</td>
<td>ABAB design</td>
<td>Response cards resulted in greater occurrence of active responding, on-task behavior and acquisition of the targeted skill occurred at an increased rate</td>
</tr>
<tr>
<td>Berrong et al. (2007)</td>
<td>Elementary students identified with moderate to severe disabilities</td>
<td>ABAB design</td>
<td>Response cards resulted in higher rates of active responding, on-task behavior and lower occurrence of inappropriate behavior.</td>
</tr>
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</table>
higher during the response card condition as opposed to the hand raising condition. Furthermore, the results indicated that, during a 20-min instructional session, students responded fewer than two times during the hand raising condition. During the response card conditions, students responded an estimated 30 times per 20-min instructional session. Cumulatively, response cards could offer students an additional 5,000 opportunities to actively participate during an entire academic year.

The effectiveness of response cards also has been investigated by Cavanaugh et al. (1996) through the use of review sessions conducted at the conclusion of a ninth grade general education science class. The researchers collected data from 23 ninth grade students with and without disabilities during next-day and weekly science tests. The next-day science tests included 12 fill-in-the-blank questions, and the weekly tests involved 42 fill-in-the-blank questions. Instructional sessions consisted of a 30-min science lesson that was divided into three parts. The first part involved the teacher lecturing on science material. The second segment involved an experiment or demonstration in which the class was actively participating. The final segment entailed the teacher reviewing the content of the lesson. During the passive review condition of the experiment, the teacher read each key point of her science lesson while disclosing it to her students via an overhead projector. After providing students with the key term definition expressed in a complete sentence, the instructor prompted students to write the word in order to complete the point. Once the teacher’s verbal cue had been given, students were required to hold their response card above their head. The instructor immediately surveyed the results and then provided the class with the correct response before proceeding to the next question.

The results obtained through an ABAB design indicate that students performed with a higher degree of accuracy on next day and weekly fill in the blank quizzes when response card conditions were in effect. Although the data indicate that response cards were effective in teaching science material to students with and without disabilities, the research indicates that the response card condition was also effective in providing the instructor with immediate feedback on the effectiveness of the lesson taught. On numerous occasions during the response card condition, the instructor was able to identify that teaching was ineffective when no students were able to provide an accurate response to material previously taught. Although end of the unit tests may provide instructors with information pertaining to the effectiveness of their teaching strategy, the use of response cards provides immediate feedback that can assist instructors in planning subsequent lessons with a higher rate of efficiency.

In a more recent study, Godfrey, Grisham-Brown, and Schuster (2003) used an alternating treatments design to assess the effectiveness of active student responding techniques with five preschool students who previously had been identified as having attending difficulties during large group instruction. The researchers compared the effectiveness of a traditional hand raising technique to choral responding and response cards. They collected data to determine which technique was most efficient in (a) increasing on-task behavior, (b) increasing student participation, and (c) decreasing the occurrence of inappropriate behavior during a morning calendar group activity. Each calendar session consisted of eight teacher-directed questions pertaining to the daily calendar or current weather conditions. Students were required to raise their hands, respond in unison, or use their response cards to answer the teacher-directed question, depending on the condition being implemented in the study. The response card condition involved students attaching their response to a laminated response card. Each participant was encouraged to make an independent selection from four predetermined choices given to each student following each teacher-posed question. The data indicated that, when response card conditions were in
effect, students responded to a greater number of teacher-directed questions. The use of response cards also was more effective in promoting on-task behavior for all students than choral responding or hand raising conditions. Additionally, when response card conditions were in effect, students participated in fewer occurrences of inappropriate behavior as compared to the choral responding or hand raising techniques.

Furthermore, the researchers noted that the use of response cards allowed the students to participate in kinesthetic, auditory, and visual modes of learning that can be beneficial when dealing with more active learners. Allowing students to manipulate items during instruction may have contributed to the increase in on-task behavior for the students participating in the study as well as the decrease in inappropriate behavior, considering students' attention remained focused the materials involved with their response cards.

In the next study, Davis and O’Neill (2004) compared response cards to hand raising during a writing skills class with four middle school students who were identified as having learning disabilities and who were receiving English as a Second Language (ESL) instruction. The researchers collected data within an ABAB reversal design during an English class in which instruction focused on the acquisition of writing skills. The researchers collected data on the rate of student academic responses, percentage of correct responses, percentage of trials in which student’s responses occurred after raising their hands, and the occurrence of off task behavior. In addition, the researchers collected data on fill in the blank quizzes pertaining to material that had been taught during instructional sessions that had occurred the preceding week. The researchers also obtained social validity information pertaining to which response technique was more effective in increasing student participation and learning. The results of the study indicated that students had higher rates of academic responses, as well as higher rates of correct academic responses, during response card conditions. Substantially higher quiz scores also were evidenced during the response card phases of the study. However, response card usage had limited effects on the occurrence of inappropriate behavior for students participating in this study.

In addition, the social validity data indicated that students did not prefer to use response cards as a learning tool. However, when students were asked to elaborate on their preference for the hand raising condition, all comments provided had a negative connotation. Students indicated that, when the hand raising condition was in effect, the classroom was too noisy, students’ performance was lower, and only one student was able to respond to the instructor’s question. Students indicated they did not like having to provide a written response during the response card condition. The social validity data provided by this study is in direct contradiction to the literature reviewed. It should be noted that students participating in this study were receiving instruction on writing skills, which may have contributed to their negative reactions regarding response card usage that required writing.

In yet another study, Horn, Schuster, and Collins (2006) used an ABAB design to determine the effectiveness of response cards in a middle school special education classroom to teach three students with moderate to severe disabilities how to tell time. The researchers collected data on four dependent variables that included the rate of active responding, on-task behavior, occurrence of inappropriate behavior, and the accuracy of student responses. During each training session, the instructor asked students 10 telling time questions. During the hand raising condition, students were required to raise their hand and wait to be called upon. During the response card condition, each student had a response card that could be manipulated to provide an answer that would resemble the face of a digital clock. Results indicated that students’ active responding rates were consistently higher when response card conditions were in effect. Students had higher percentages of on task behavior during response card conditions with lower occurrences of inappropriate behavior. Data collected also indicated that students acquired the telling time skill with substantially higher rates during all response card conditions as compared to the implementation of the hand raising conditions.

Social validity data indicated that all stu-
Students preferred the response card condition when compared to the hand raising condition. Additionally, when response card conditions were in effect, students provided each other with immediate feedback on their performances. Students provided feedback on their counterpart’s time to respond, encouraged them to “focus” after an incorrect response, and provided one another with “high fives” when correct responses were recorded for the group.

Berrong et al. (2007) also used response cards with eight elementary students who were identified as having a low incidence disability. One individual participating in this study did not have the ability to raise his hand and was allowed to tap on the table as a means of responding. Additionally, a second student had a hearing impairment and did not verbally communicate. Instruction occurred in a self-contained classroom during calendar group. During the hand raising condition, students were required to raise their hands or independently tap on the table in order to respond. The response card condition required students to grasp their response cards in their hands and place them in the appropriate position on their response boards within 10 s of the instructor’s question. The instructor collected data on the percentage of active responding, the percentage of on-task behavior, and the occurrence of inappropriate behavior. During response card conditions, students had higher rates of active responding as well as higher rates of on-task behavior. The occurrence of inappropriate behavior was lower during response card conditions for the majority of the students participating in this study.

Although Berrong’s research failed to look at the acquisition of an academic task, it provided clear evidence that response cards can be used successfully to increase on-task behavior, decrease inappropriate behavior, and elevate the number of active responses expressed by students during group instructional activities. Furthermore, Berrong’s study illustrates that response cards can be used effectively with students who are physically impaired, as well as students who have limited verbal communication. Response cards provide access to the curriculum, which may have been previously unobtainable in the general education classroom. Additionally, response cards provide a low cost, low-tech solution when compared to the majority of augmentative communication devices.

**Discussion**

Although the published research on the effectiveness of response cards is limited, the research available clearly illustrates that response cards can be a beneficial tool in the educational process of students with and without disabilities. The research available provides clear evidence that response cards can be a low cost, high power instructional tool. In general, response cards have been shown to increase student rates of active responding, decrease inappropriate behavior, promote skill acquisition and enhance the occurrence of on task behavior exhibited by students.

The recent enactment of No Child Left Behind has inundated general education teachers with students with an array of disabilities. Response cards may be the instructional tool necessary to promote increased rates of academic responding among the diverse populations inhabiting our classrooms. The research provides substantial evidence that response cards are an effective instructional tool that does not require additional planning time or reduce the monetary resources that are currently in short supply. Response cards not only enhance on-task behavior and skill acquisition, but they also provide educators with immediate feedback on their instructional practices, which can be used to guide subsequent lesson formation.

One of the most important features of response cards is the opportunity they provide to students. Response cards allow students to actively engage in the acquisition, fluency, maintenance, and generalization phases of learning. Although the acquisition of the skill may be the most beneficial feature to learners, incorporating response cards into the fluency, maintenance, and generalization phases of learning are also extremely beneficial because they afford students the opportunity to respond while allowing educators to continually assess student learning.

The benefits that the use of response cards provides to educators also are immense. First, incorporating response cards into a whole
group instructional sequence has been proven to reduce the occurrence of inappropriate behavior exhibited by students with and without disabilities. Although the research does not indicate a specific reason for this reduction, a variety of ideas can be hypothesized. One hypothesis for the reduction in inappropriate behavior may be attributed to the notion that, when response card conditions are in effect, students have items to manipulate. The kinesitcics involved in the most minute of movements required by response cards may assist students in remaining focused on the appropriate task.

Second, the use of response cards can provide students with additional opportunities to practice the knowledge being taught. Response cards allow students to respond to questions throughout the instructional lesson while instructive feedback affords students with an additional opportunity to acquire the knowledge being taught. Furthermore, the research also indicates that teacher-posed questions occur at a substantially increased rate over more traditional responding techniques. Additionally, contrary to the traditional hand raising technique, response cards enable the whole class to answer the teacher-directed questions instead of a select few who volunteer to respond.

Third, response cards provide educators with immediate feedback on the effectiveness of the instruction being delivered to their students. Most educators do not systematically evaluate their performance on a daily basis. The use of response cards enables instructors to present material, pose a question, and immediately evaluate if students successfully acquired the necessary information. Although, seatwork and homework activities allow educators to evaluate student performance, they do not provide a clear link to the instructional practices being administered in the classroom. However, if an instructor is introducing a new topic, providing definitions and simultaneously delivering questions to the class as a whole, judgments can be made about the effectiveness of the lesson and adjustments can be implemented immediately.

Last, response cards can be a low cost, low-tech tool to accommodate students with a variety of disabilities. Response cards can assist students who have limited verbal skills in the communication process as well as assist students who have limited fine motor abilities by constructing their response cards with high frequency selections that relate to the topic being discussed.

Conclusion

In conclusion, the available research on the use of response cards with children with disabilities was summarized. The research provides clear evidence to support the use of response cards with students who have a variety of disabilities. Although the author’s search of relevant material only produced six studies, the results are clear. Response card usage can positively affect the number of opportunities students have to actively respond, as well as increase the students’ performance on assessment material. Furthermore, response cards can be effective in increasing on-task behavior as well as diminishing the occurrence of inappropriate behavior. Additional research is warranted to determine if response cards can be effectively implemented into various collaborative settings involving additional content with the continued success of previous studies.

References


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