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TEN RESEARCH-BASED TIPS TO IMPROVE LEARNING

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Ten Research-Based Tips to Improve Learning

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Abstract

This paper presents ten teaching strategies that are well supported by educational research. In each case, the presentation begins with a brief reference to the effects of the strategy and reference to where supporting evidence may be found. This is followed by a description of the strategy and simple directions on how to begin using them.

The ten strategies are Choral Responding, Response Cards, Guided Notes, Direct Instruction, Reinforcement, Feedback, Incidental Teaching, Prompts, Generalization and Maintenance, and Fluency building.

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The results of educational research often take time to become commonly used in classrooms. Research reports are written in technical language to inform other researchers and have too narrow a focus to be easily translated into classroom practice.

This paper presents ten teaching strategies that are well supported by research. Each presentation begins with a brief reference to the effects of the strategy and to where supporting evidence may be found. This is followed by a description of the strategy and simple directions on how to begin using them.

**Choral Responding**

**Research**

Several researchers have reviewed studies showing the benefits of having students respond actively (e.g., Brophy & Good, 1986, Rosenshine & Stevens, 1986). Heward (1994) reviewed research showing that increasing active student responses (a) generated more learning, (b) provided important feedback to the teacher, and (c) was correlated with increased on-task behaviour.

Choral responding is one method of producing active student responses. It was used extensively in Project Follow-Through (Watkins, 1997) and is an integral part of Direct Instruction (Adams & Engelmann, 1996).

**Using Choral Responding**

Choral responding is best suited for curriculum where students provide brief, predictable answers to teacher questions (e.g., "What colour is this?"). Teachers should provide brief clear directions, provide a thinking pause, and use a clear and consistent cue to signal when students should respond. The signal might be a word (e.g., "Now"), a sound (e.g., finger click, table tap), or a movement (e.g., hand drop). Teachers should present at a fast pace and provide immediate feedback and corrections that include the whole group, not just the student who made an error.

**Response Cards**

**Research**

Response cards are another way of having students respond actively. Heward (1994) summarized nine studies that used response cards, concluding that they reliably increased the frequency of student responding, the accuracy of their responses and their performance on delayed subtests. These results were obtained in regular and special education classes.

**Using Response Cards**

There are two types of response cards: pre-printed and write-on. When using pre-printed cards, the student selects a card with the answer he wishes to display. These may be Yes/No cards, numbers, letters, words, traffic signals, colours, etc. Cards are usually about 20-cm-by-30-cm. One side has the response written in large, bold lettering. The other side has the same response written in regular sized type. This permits students to select their response without revealing it to their classmates.

Write-on cards usually come in the form of a small piece of laminated board and students use water-base marker pens to write a brief response. These responses may be of the same type as preprinted cards. Write-on cards make responding slower but they allow more divergent responses.
When using response cards:

1. Have students sit where they can manipulate their cards,
2. Ask the question,
3. Provide time for students to select or write their answer,
4. Provide a signal (e.g., "Everybody, show me your answer . . . NOW!")
5. Quickly scan to monitor responses,
6. Provide feedback and corrections, and
7. Move quickly to the next question.

Guided Notes

Research
Some special education students are capable of learning content areas but have difficulty taking notes. Heward (1994) reviewed several studies, mainly unpublished theses, that used guided notes with special education students. In all of the studies he reviewed, guided notes improved the accuracy of information recorded and quiz scores improved by about 50%.

Using Guided Notes
Guided notes include information with spaces where students complete the notes. Teachers should prompt students so that they know what to record and where to record it. Students should record too much, so that they can spend time listening.

Direct Instruction

Research
Direct Instruction first emerged in Project Follow Through (Watkins, 1997) and has since been used in hundreds of studies with students in special and regular education (Adams & Engelmann, 1996). Direct Instruction has been highly successful in increasing students' achievement, thinking skills and self-concept.

Using Direct Instruction
Early versions of published Direct Instruction programmes included the DISTAR series. These have since been revised under titles such as Language for Learning, Reading Mastery, Expressive Writing and Reasoning and Writing. Teachers without access to published programmes can still design lessons using the following steps.

1. Determine what is to be learned and sequence it so that simple, factual material is taught before strategies that use that material.
2. Design teaching sequences that allow the teacher to present brief pieces of information and then require student responses to it. For example:
Teacher: (holds up a blue object) "This colour is blue. What colour is it?"
Students: "Blue."
Teacher: (holds up another blue object) "This colour is blue. What colour is it?"
Students: "Blue."
Teacher: (holds up a red object) "This colour is not blue. Is this colour blue?"
Students: "No."
Teacher: (holds up a blue object) "Is this colour blue?"
Students: "Yes."

3. Design and present information using a Model, Lead, Test sequence.
   Model: The teacher demonstrates what the students should do
   Lead: The teacher leads (supports) the students as they imitate the teacher.
   Test: The teacher checks that the students can accurately perform the response.

4. When students make errors, immediately correct them. This is done by saying that the response was wrong and then providing another model, lead, test sequence.

5. Have all of the students respond in unison, using signals. In this way, they all get to make responses and to learn. Occasionally call on an individual student to respond alone. This varies the pattern so that everyone has to pay attention and it allows you to monitor particular individuals. Seat near you those students whose achievement you are less sure of and monitor them closely.

6. Do all of this at a brisk pace.

Example of these sequences and how to adapt them for classrooms are available in Carnine, Silbert, and Kameenui (1990); Kameenui and Simmons (1990), and Stein Silbert and Carnine (1997).

Reinforcement

Research
Thousands of studies have demonstrated that reinforcing a response results in that response being repeated more frequently (e.g., Alberto & Troutman, 1984; Cooper, Heron, & Heward, 1987; Wolery, Bailey, & Sugai, 1988). In a meta-analysis of teaching effects in almost 3,000 studies, Walberg (1984) found that reinforcement was the most powerful variable in causing learning, with an effect size of 1.17.

Using Reinforcement
1. Look for opportunities to reinforce behaviour. This can mean that teachers sometimes need to wait and then reinforce immediately the behaviour occurs. Ensure that reinforcement follows desired behaviour; take care to not accidentally reinforce behaviour that you do not want.

2. Reinforce in small amounts, and often.

3. Use a range of verbal reinforcers. Use words like "superb", "exquisite", "fantastic", and "wonderful".
4. Smile, wink, move closer to, and give thumbs up signs.

5. Provide smiling faces, stamps, and stickers.

**Feedback**

**Research**

Feedback is a type of reinforcement. It contains information about performance. As with reinforcement, thousands of articles have shown that using feedback is a powerful teaching strategy. Walberg's (1984) analysis found that feedback had an effect size of 0.97.

**Using Feedback**

Look for specific features of a student's performance such as changes in the frequency, strength, or quality of student responses. Tell the student about these changes and why they are important.

Sometimes feedback also includes information about aspects of performance that need to change. This type of feedback (corrective feedback) is always accompanied by prompts or other information on how to change the response.

**Incidental Teaching**

**Research**

Sometimes teachers succeed in having students learn to perform a skill in their classroom, only to find that they cannot use the skill in real-life situations. Wolery, Ault, and Doyle (1992) describe and review the research supporting the use of incidental teaching, a technique that has the student practice a skill under naturally occurring conditions.

**Using Incidental Teaching**

This procedure relies upon waiting for a student to initiate a request and the teacher taking this opportunity to teach the student the relevant skill. For example, a student may wish to use a computer and indicates this by pointing to it. The teacher may use this naturally occurring opportunity to teach a skill such as asking verbally, using the word "please", or turning the computer on. The Picture Exchange Communication System (Bondy & Frost, 1994) is a form of naturalistic teaching.

**Prompts**

**Research**

Prompts are frequently necessary to produce a response. Wolery, Ault and Bailey (1992) devoted an entire book to describing prompting strategies and reviewing the research supporting their use. They are also described in practitioner texts and manuals such as Maurice, Green, and Luce (1996).

**Using Prompts**

Scheduled prompts are part of a teaching plan. Teachers may decide to help a student make a pointing response by guiding the student's hand in the correct direction. As the student gains more confidence, the teacher will fade the prompt; that is, the teacher will gradually reduce the amount of assistance. Corrective prompts are used when a student makes an error or fails to respond. These are used to teach students the correct way to respond, rather than to allow them to only practice incorrect responding.
Ten Teaching Strategies
Dennis Rose

There are several systems of prompting. For example, least-to-most prompting begins with a small prompt and adds larger prompts progressively the correct response is produced. Most-to-least prompting involves providing progressively smaller prompts as student performance becomes more accurate. Other prompting systems include shadowing (the teacher places her hands near the student as a gesture but does not touch) and time delay (the teacher delays the prompt to promote independence or to allow the student to self-correct).

No matter which system of prompting is used, it is important to fade and eventually remove prompts so that the student learns to respond independently. Teachers should also be careful not to use irrelevant or distracting prompts. For example, if we want a student to recognize the letter “a”, telling the student that it is the red letter, or the letter with an apple beside it, encourages the student to attend to irrelevant features. The student will discriminate “a” on the basis of colour, or its association with apple, not on the unique features of “a”.

Generalization and Maintenance

Research

Students who have learned a skill, sometime fail to use it in other appropriate places or at later times. Stokes and Baer (1977) provide an often-cited analysis of this problem and categorized solutions discovered by researchers. Baer (1981) produced a simple list of strategies that teachers could use when teaching.

Using Generalization and Maintenance Strategies

1. Identify other settings in which a response should be performed (e.g., at home, on the bus) and arrange for the student to perform the response there. Ensure that the response will be prompted if necessary and that it will be reinforced.

2. Use other people to teach, prompt, and reinforce the response. The ensures that the student does not become restricted to acting only when the teacher is present.

3. Use a variety of reinforcers, especially naturally occurring reinforcers (reinforcers that occur as a natural consequence of performing the response.) A natural reinforcer for correctly dialing a telephone number is to have a conversation.

4. Teach many examples. For example, crossing the road at traffic lights is different from crossing at non-controlled corners, in the middle of a block, when traffic is light or heavy, and in unfamiliar surroundings. Road-crossing needs to be taught in a variety of settings.

5. Teach loosely. Use different teachers, settings, materials, and instructions. Teach at different times, and in noisy and quiet, bright and shadowed settings. Vary your own behaviour by sometimes being brisk and other times casual, loud and soft, sitting and standing, etc.

6. Delay reinforcement and deliver it intermittently so that students will continue to act when reinforcement is not always present.

7. Provide on-going practice, a little and often, under a variety of conditions.
Fluency Building

Research

Once a response has been acquired, further practice is necessary for it to become a firm part of a student’s repertoire and for the student to become both competent and confident.

One way of doing this is to increase fluency; that is, the rate at which the student can perform the response. The term often used for rate building is Precision Teaching (Lindsley, 1992; West, Young, & Spooner, 1990) and this method has been highly successful in making student performance endure after teaching has finished (e.g., Johnson & Layng, 1992).

Using Fluency Building

1. Break learning into very small components and have students practice those components, performing as many responses as they can in a short period. Begin with “sprints” of 10 to 15 seconds and build to 60 second practices.

2. Converting the count of correct responses to a per minute rate and record it on a graph. Precision teachers use a semi-logarithmic chart. Encourage the student to try to improve on the previous score.

3. For academic skills, students could practice saying letters or words (or pointing to letters or words that the teacher says, writing, answering simple mathematics facts, telling the time, etc.

4. Simple motor movements that can later be used as components of complex behaviour include reaching, pointing, touching, grasping, releasing, placing, pulling, pushing, shaking, squeezing, twisting, tapping. Once fluent and confident, students can combine some of these movements into complex tasks such as opening a door (reach, grasp, twist, pull, release) or typing (reach, point, tap).

This paper is a brief introduction to teaching strategies that work. Each of these strategies is supported by research showing that they improve the learning of students with special educational needs. The descriptions are brief but sufficient for interested teachers to experiment with them. Teachers are urged to consult the reference list to learn more.
References