Teaching Problem Solving to College Students

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Abstract

This article describes steps of teaching problem solving to college students and provides examples in the context of a university course. The steps involve (1) identifying the types of problems and types of problem solving methods to be covered, (2) instructing the students in problem-recognition and problem solving methods, along with ways of choosing appropriate methods for different types of problems, (3) modeling how to apply the methods, (4) giving the students practice solving problems that reasonably represent the range of problems they will encounter after graduation, (5) giving the students feedback on their performance, (6) using teaching methods that help motivate students to learn, and (7) evaluating the results of the training in problem solving.

Teaching Problem Solving to College Students

Because of the **importance** of problem solving in work and in other realms of life (see Malouff & Schutte, 2008), many universities aim to produce graduates who are adept at solving problems, at least in one subject domain. Some of these universities go so far as to list problem solving ability as an "attribute" of its graduates (Graduate Attributes in Australian Universities, undated)

Teaching psychology students problem solving can occur at the program level and at the course level. This paper describes a **systematic approach** to training psychology students in problem solving at the unit level, using the example of a Behavior Modification course.

The **main steps** in teaching students how to solve problems involve (1) identifying the types of problems and types of problem solving methods to be covered, (2) instructing the students in problem-recognition and problem solving methods, along with ways of choosing appropriate methods for different types of problems, (3) modeling how to apply the methods, (4) giving the students practice solving problems that reasonably represent the range of problems they will encounter after graduation, (5) giving the students feedback on their performance, (6) using teaching methods that help motivate students to learn, and (7) evaluating the results of the training in problem solving. In *Behavior Modification*, I use all these methods.

Systematic training in problem solving initially requires **deciding which types of problems and problem solving methods to cover.** For *Behavior Modification*, the types of problems covered include psychological problems in general; these range from child refusal to attend school to adult depression. The types of methods covered include a large set of procedures based on learning, cognitive, and humanistic theories; these range from using gradual exposure to feared stimuli to using reinforcement to increase the rate of a specific Behavior.

The **instruction** I provide in problem solving includes a current textbook on behavior modification, supplemental readings, brief written comments by me in the unit guide, comments by me in class and online, and spoken commentaries in videos student watch. I tell students that both problems and problem-solving methods vary in complexity. I also point out to students that problem solving methods fall on a continuum from more general to more domain-specific. Some problem solving methods, such as continually searching for problems to solve and determining whether some action has actually solved a problem, apply across a broad

range of types of problems and thus are general methods. There are over 50 general methods of problem solving (Malouff, 2011). Other methods, such as using multiple baselines across participants, are domain specific, applying to a narrow situation, such as testing whether a certain type of behavioral treatment is efficacious. Many other problem solving methods have both general and domain-specific aspects. For instance, gradually and persistently exposing a phobic person to an intensely feared stimulus seems like a psychology-domain specific method, yet it is a specific application of a more general method of doing the opposite of what previously has proven ineffective for solving a problem.

The **modeling** I provide includes showing students problem solving in action via videos on topics such as how to help others overcome a specific problem, such as alcohol abuse or snake phobia. Further, the textbook provides students with written models of problem solving, and I tell anecdotes about how I helped solve various problems, such as that of a child who refused to go to school. The models I show are experts, but I involve the students in identifying both positive and negative elements of the problem solving methods used by the experts. The students thereby learn that problem solving often does not require perfection and that there can be various ways to solve a problem.

Students **practice** solving problems while completing small-group problem-solving tasks in class, while answering questions in their text, and while completing a major behavior-change project. The more students practice, the more they learn. The more realistic the practice problems are, the easier it is for student to generalize what they learn to problems outside the unit (Mayer, 1998). I vary the types of problems as much as possible in their focus and in how well structured they are so that students can generalize what they learn to real problems they encounter later at work or in other realms of life. The classroom practice and textbook practice are prototypical of mathematics units, but courses in almost any field can use the same training methods. The behavior-change project gives students a chance to apply problem solving methods to a real problem. By requiring students to attempt to solve a real behavioral problem, I give them practice similar in many ways to the type of problem solving they might do in an employment setting or other important realm of life. The more realistic the practice, the more students learn (Mayer, 1998). Many students find the assignment exciting because it is their first chance to test their ability to apply psychological principles for an important purpose. The assignment presents the students with a serious challenge and has suspense in that the outcome is unknown until the end. For supplemental practice, I encourage students to extend their learning by applying in their own lives each behavior-modification principle they learn in the unit and by obtaining paid or volunteer work in applying behavior-modification principles.

Students obtain **feedback** on their knowledge of problem-solving methods by answering questions I ask in class and evaluating my response; by checking their answers to problems

presented in the text and online; by receiving grades on exams and their written project report; by giving a required oral presentation on how to solve some specific type of problem of their choice with behavior-modification principles, after which they evaluate themselves; by submitting an assignment project proposal, regarding which I provide written feedback; and by evaluating the outcome of their behavior-change intervention; and by obtaining comments on a written report of their behavior-change project. Requiring the students to provide a written evaluation of the intervention gives the students valuable practice in providing themselves with carefully considered problem-solving feedback, which tends to facilitate problem solving (Taconis, Ferguson-Hessler, & Broekkamp, 2001).

I use **motivational teaching methods** to help facilitate student learning during the unit and thereafter (Malouff, Rooke, Schutte, Foster, & Bhullar, 2008; Malouff, Hall, Rooke, & Schutte, 2010). These methods include meeting individually with students to discuss how the unit might suit their career goals. I also try to use a variety of engaging methods that prompt students to use problem solving methods, as well as think, speak, and write about the methods. These methods include small-group problem-solving tasks and role-playing. Graded assessments also help motivate students.

I use various methods to **evaluate the effects of the problem solving training**. Assessment methods that test actual problem solving of the type the students might do in real life are ideal (Reeff, Zabal, & Blech, 2006). I use this real-life method in my behavior-change assignment. By evaluating real-world impact, I assess an important part of teaching impact (Malouff, Schutte, & Rooke, 2008). I assess also by evaluating scores on graded assessments and by determining the percentage of intervention successes with specific types of problems, such as helping someone overcome a phobia. In this regard, I sometimes know the usual success rate in studies of the type of interventions the students use, so I can compare the overall student success rate to that of experts. I also evaluate levels of student satisfaction. *Behavior Modification* has high levels of student satisfaction, as indicated by unit and instructor ratings well above the university means. Written comments on the evaluations make clear that the students see the practical value of what they learn and that they enjoy applying their knowledge to real-life problems.

With a bit of creativity, **psychology instructors can apply these methods** to other units and thereby help to produce graduates capable of solving important problems. For instance, when I teach a course on abnormal psychology, I set goals of students being able to identify different disorders and to recommend treatments for each that have evidence of efficacy. That is the type of problem they might face in a work place. For a statistics course, I set goals for students to learn how to analyze the data for specific types of research designs. That is the sort of problem they might have to solve working as scientists. One general way to proceed with

teaching problem solving in a specific unit is to conceptualize the question of how to teach problem solving as a problem itself and to use good problem solving methods, such as obtaining the views of experts, e.g., through this article and the sources listed below; creating a plan; implementing it; and evaluating its effects.

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