a child to interact freely with experimental materials/ devices without asking guiding questions is insufficient for promoting discovery and transfer. Children's superior performance in learning and transferring the Control of Variable strategy in the probe condition further supports a growing body of studies demonstrating that the opportunity to generate self-explanations enhances children's learning.

Self-Generations

A number of studies have demonstrated the effects of mental activities during learning on discovery. Requesting students to generate evidence for their own opinions or to provide instances of principles has proven effective for fostering deeper understanding. Earlier research suggests that beginning lessons by asking students to generate their own ideas about phenomena, instead of directly telling students correct answers, is effective in facilitating formula comprehension and solving transfer problems. Similarly, encouraging students to generate concrete examples of abstract principles has been found to enhance understanding of the concepts and facilitate subsequent transfer. Other recent studies have shown that when students are asked to recall similar information, they tend to use superficial information in solving problems. In contrast, when students are required to process information by generating analogies, they tend to use underlying structural information.

Future Research

Discovery learning has long been favored as an effective approach to acquiring concepts, rules, and strategies. Despite the lasting and widespread appeal of active, mindful, explorative, and inquiring-oriented learning, the concept of discovery learning has been more of a philosophical belief or educational ideology than a pedagogical method that is grounded in and guided by empirical findings. Empirical research has suggested that guided discovery appears to be a better approach to promoting learning than pure discovery, and it has pointed to several approaches to promoting discovery and transfer during learning. A fruitful avenue for future research, according to Mayer, would be to explore precise mechanisms involved in discovery learning, in particular the quantity and quality of guidance that results in optimal learning performance. This type of empirical evidence generated from lab and classroom experiments can then be extended to and used to guide educational practice. Commonsense beliefs about the importance of inquisitiveness can then be separated from empirically driven educational practices, and discovery learning would then be established as a truly evidence-based educational method.

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See also Cognitive View of Learning; Constructivism; Explicit Teaching

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DISCRIMINATION

In the social sciences, *discrimination* refers to the differential treatment of people as a function of their group membership. Because many people experience

discrimination over the course of their lives, and because people may discriminate without conscious awareness, discrimination is an extremely relevant topic within educational psychology. This entry defines *discrimination* and then explains its causes and consequences. Finally, several attempts to combat discrimination will be described.

Definition of Discrimination

Discrimination includes differences in verbal and non-verbal behavior, such as when a White interviewer makes speech errors or less eye contact when interacting with an African American as opposed to a White job applicant. Discrimination may also be blatant or subtle in form, and it may be intentional or unintentional. For instance, discrimination may include obvious acts of aggression, social exclusion, differences in the allocation of valued resources (e.g., raises and promotions), or subtle acts of condescension. Discrimination may, at times, seem to be characterized by seemingly kind acts, as well as negative acts. Traditional women and elderly people, for instance, may be excessively praised for accomplishments because such accomplishments are not expected of women and elderly people. Importantly, however, such praise tends to be condescending because it has an implicit qualifier, such as "Wow, she's great, *for a woman!*"

Members of many different groups may be targets of discrimination. These groups include, but are not limited to, women, racial minorities, elderly people, gay men, lesbian women, immigrants, people who live in poverty, people with physical disabilities, and overweight people.

Causes of Discrimination

Discrimination is thought to follow from prejudice and stereotyping. Although this is often the case, stereotyping, prejudice, and discrimination are distinct constructs.

Stereotypes, prejudice, and discrimination are typically conceptualized as the three components of intergroup attitudes. Prejudice refers to the *affective* component of an attitude. It describes the way a person feels about a particular group, which can be negative or positive. Stereotyping refers to the *cognitive* component of an attitude. In other words, stereotypes are beliefs about a particular group. Like prejudice, stereotypes can have negative and/or positive content.

If someone thinks that women are warm and communal, but not influential and leader-like, then that person holds a stereotype about women. Discrimination refers to the *behavioral* component of an attitude.

Discrimination is a complex phenomenon that sometimes stems from prejudice. Some theorists, for example, argue that prejudice often is expressed through ingroup favoritism. People tend to value that which is and those who are familiar, and people tend to protect their values through ingroup favoritism. Others have linked prejudice and discrimination to personality constructs, such as the authoritarian personality (characterized by preoccupation with power, authority, and adherence to cultural ideals). Importantly, discrimination is related to the natural and adaptive mechanisms humans use to negotiate and make sense of complex social contexts. People view themselves as group members to satisfy the need to belong and to achieve positive social identities. By associating with groups and differentiating one's own group from other groups, people can belong to valued groups and achieve a positive sense of self. Ironically, adaptive self processes are often associated with discrimination, or favoring one's own group at the expense of the other groups.

There is also ample evidence that stereotypes and discrimination are linked. For instance, educational and social psychologists have conducted research on self-fulfilling prophecies, particularly in educational settings. The concept of self-fulfilling prophecy was first put forth by sociologist Robert Merton, who suggested that one person's expectations about another person could cause changes in that other person's behavior. Picking up on this idea, Robert Rosenthal and Lenore Jacobson published their famous "Pygmalion in the classroom" study. These researchers led teachers to believe that certain students in their classroom were "late bloomers," thus creating the expectancy that these students had traits that would lead them to be stars in the classroom. The so-called late bloomers were, however, randomly selected. Nevertheless, compared to a control group of students, the late bloomers showed more striking gains in IQ over their elementary school years. Rosenthal and Jacobson's seminal research inspired much theory, research, and debate. After nearly four decades of theory and research on self-fulfilling prophecy effects, and related outcomes, most acknowledge that stereotype-based expectations influence behaviors in ways that reinforce and maintain stereotypes, and the status quo more generally.

Although expectancies can be formed consciously, the self-fulfilling prophecy effect can be considered unconscious in that people don't purposefully set out to change the behavior of others through their expectations. However, stereotyping can also influence discrimination at an unconscious level. For instance, stereotypes can be automatic in that when a person sees someone else, he or she automatically processes certain key information about that person (the person's age, race, and gender) without conscious awareness. This categorization activates stereotypes associated with particular groups. For example, when someone categorizes another person as African American, stereotypes about African Americans become activated. Thus, the person who is doing the categorizing may behave in discriminatory ways based on the group to which the target was ascribed. For instance, the perceiver may stand further away from the person being categorized than if that person had been categorized as White.

Consequences of Discrimination

Discrimination often has damaging consequences. For instance, many scholars have theorized that discrimination leads to decreased confidence and self-esteem. Although this idea has been challenged, evidence remains that discrimination leads to harmful emotional effects. These include anxiety, self-doubt, decreased confidence, increased anger, and fear of confirming negative stereotypes.

In addition to psychological consequences, discrimination may result in tangible, everyday harms. One of the most frequently documented cases of discrimination involves "equal pay for equal work." Although women frequently do not realize that they are the victims of discrimination because they do not have access to the financial records of men in their companies and therefore do not know that they are earning comparatively less, they still earn an average of only 76 cents for each dollar earned by men.

Discrimination can also adversely affect academic performance. Members of stigmatized groups often underachieve in academic settings. This could be due to many factors, including the students' fears of confirming stereotypes about their groups. This phenomenon is known as *stereotype threat*. Thus, stereotyping leads to decreased academic performance, which in turn leads to discrimination, as grades and standardized test scores influence hiring and admission decisions. This results in a system whereby members of stigmatized groups experience discrimination due to their underperformance on academic tasks, which is at least partially the result of stereotypes about their group.

Combating Discrimination

To reduce discrimination, the U.S. government has implemented several policies, including affirmative action. Affirmative action began in 1965, when President Lyndon B. Johnson signed a mandate requiring federal contractors to not "discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin" and to "take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex or national origin."

Affirmative action has created controversy with regard to employment and admission to institutions of higher education. In the 1978 *Regents of the University of California v. Bakke* case, the Supreme Court ruled (five to four) that universities could consider racial heritage when making admissions decisions. In 2003, the Court upheld this decision in cases involving the University of Michigan by ruling that race can be one of many factors considered in admissions. The Supreme Court further ruled, however, that point systems such as those used by the University of Michigan's undergraduate admissions program had to be modified because they do not provide individualized consideration of the applicants.

Nongovernmental intervention programs have also been implemented across the United States. For instance, one study found that African Americans performed significantly better in school when asked to write about values that were important to them as a way to reaffirm their sense of personal adequacy. Such intervention programs suggest that the harmful effects of discrimination can be reduced through strategies targeting stigmatized group members.

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See also Cultural Diversity; Ethnicity and Race; Gender Bias; Stereotypes

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DISTANCE LEARNING

Distance learning is a term in wide use today. Educators also refer to it as *distance education* and, in some settings, *distributed education.* For the purposes of this entry, *distance learning* is defined as the communication over distance between teacher and student mediated by print or some form of technology designed to bridge the separation between teacher and student in space or time. Advances in information and communication technology are changing the manner in which instructors have traditionally conducted distance learning, and these changes are providing many transformational possibilities for all levels of education. With the development of many online tools and the easing of prices for handheld computers and audio/video players, students are increasingly able to shift their distance learning experience not only beyond temporal necessities, but also into new physical environments. Research libraries with access to full-text documents are as available to students as are lectures and symposia either streamed live or delivered asynchronously. Educators could argue the case that advances in information and communication technologies may make distance learning even more interactive than face-to-face teaching and far less distant than once considered.

After an examination of the origins of distance learning and a review of its basic features, this entry examines some of the effects on pedagogy of course management systems and other telecommunications tools that are transforming the nature of schooling, lifelong learning, and communities of learners.

Origins and Evolution of Distance Learning

Distance learning has been available in one form or another for hundreds of years. One of the earliest examples of distance learning occurred in England in the 1840s. The Pitman Company offered training in shorthand through a series of lessons mailed to students across the country. In hindsight, this was very much a one-way, noninteractive approach to distance learning.

Until recently, public interest in distance learning was especially high only where there was a widely distributed student population. One of the more famous modern examples of distance learning took place in Australia. Beginning in 1951, the School of the Air officially opened to broadcast, by radio, lessons to the children of the Outback. Beginning with one-way transmissions, coordinators soon added a question period to follow the broadcasts. Interactivity, even in the beginning stages of technology-enhanced distance learning, was highly valued.

Today, many institutions of higher education, both public and private, are making use of distance learning to broaden the reach and scope of their particular curricula. Of course, it is very important that students who participate in distance learning are self-motivated and able to work independently, but teachers also have a particularly vital role to play in the process of distance learning and its overall evolution.

Basic Features of Distance Learning

Distance learning and distance education programs are experiencing a boom of sorts with the advent of the Internet and the ability to transmit increasingly large audio and video files over increasingly available and accessible bandwidth. A proper examination of distance learning must begin by determining how distance learning differs from face-to-face learning. In fact, many research studies focusing on the efficacy of distance learning compare it with face-to-face learning. For that reason, researchers view many of the tools and affordances of modern distance learning