EDUCATIONAL PSYCHOLOGY

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Nathaniel Gage

Nathaniel Gage is important in educational psychology because he did research to improve teaching and understand the processes involved in teaching.[6] In 1963 he was the editor of the *Handbook of Research on Teaching*, which became an influential book in educational psychology. The handbook helped set up research on teaching and made research on teaching important to educational psychology.[6] He also was influential in the founding of the Stanford Center for Research and Development in teaching, which not only contributed important research on teaching but also influenced the teaching of important educational psychologists.[6]

Perspectives

Cognitive
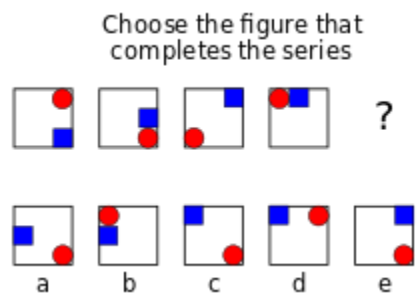
An example of an item from a cognitive abilities test

Each person has an individual profile of characteristics, abilities and challenges that result from predisposition, learning and development. These manifest as individual differences in intelligence, creativity, cognitive style, motivation and the capacity to process information, communicate, and relate to others. The most prevalent disabilities found among school age children are attention deficit hyperactivity disorder (ADHD), learning disability, dyslexia, and speech disorder. Less common disabilities include intellectual disability, hearing impairment, cerebral palsy, epilepsy, and blindness.[16]

Although theories of intelligence have been discussed by philosophers since Plato, intelligence testing is an invention of educational psychology, and is coincident with the development of that discipline. Continuing debates about the nature of intelligence revolve on whether intelligence can be characterized by a single factor known as general intelligence,[17] multiple factors (e.g., Gardner's theory of multiple intelligences[18]), or whether it can be measured at all. In practice, standardized instruments such as the Stanford-Binet IQ test and the WISC[19] are widely used in economically developed countries to identify children in need of individualized educational treatment. Children classified as gifted are often provided with accelerated or enriched programs. Children with identified deficits may be provided with enhanced education in specific skills such as phonological awareness. In addition to basic abilities, the individual's personality traits are

also important, with people higher in conscientiousness and hope attaining superior academic achievements, even after controlling for intelligence and past performance.[20]

Behavioral

Applied behavior analysis, a research-based science utilizing behavioral principles of operant conditioning, is effective in a range of educational settings.[21] For example, teachers can alter student behavior by systematically rewarding students who follow classroom rules with praise, stars, or tokens exchangeable for sundry items.[22][23] Despite the demonstrated efficacy of awards in changing behavior, their use in education has been criticized by proponents of self-determination theory, who claim that praise and other rewards undermine intrinsic motivation. There is evidence that tangible rewards decrease intrinsic motivation in specific situations, such as when the student already has a high level of intrinsic motivation to perform the goal behavior.[24] But the results showing detrimental effects are counterbalanced by evidence that, in other situations, such as when rewards are given for attaining a gradually increasing standard of performance, rewards enhance intrinsic motivation.[25][26] Many effective therapies have been based on the principles of applied behavior analysis, including pivotal response therapy which is used to treat autism spectrum disorders.

Social

Among current educational psychologists, the cognitive perspective is more widely held than the behavioral perspective, perhaps because it admits causally related mental constructs such as traits, beliefs, memories, motivations and emotions. Cognitive theories claim that memory structures determine how information is perceived, processed, stored, retrieved and forgotten. Among the memory structures theorized by cognitive psychologists are separate but linked visual and verbal systems described by Allan Paivio's dual coding theory. Educational psychologists have used dual coding theory and cognitive load theory to explain how people learn from multimedia presentations.[27]
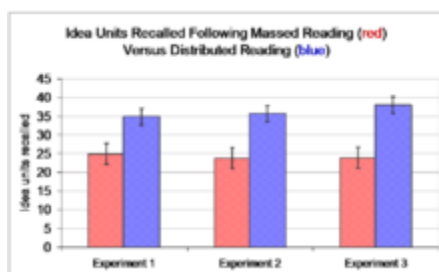
Three experiments reported by Krug, Davis and Glover[28] demonstrated the advantage of delaying a 2nd reading of a text passage by one week (distributed) compared with no delay between readings (massed).

The spaced learning effect, a cognitive phenomenon strongly supported by psychological research, has broad applicability within education.[29] For example, students have been found to perform better on a test of knowledge about a text passage when a second reading of the passage is delayed rather than immediate (see figure).[28] Educational psychology research has confirmed the applicability to education of other findings from cognitive psychology, such as the benefits of using mnemonics for immediate and delayed retention of information.[30]

Problem solving, according to prominent cognitive psychologists, is fundamental to learning. It resides as an important research topic in educational psychology. A student is thought to interpret a problem by assigning it to a schema retrieved from long-term memory. A problem students run into while reading is called "activation." This is when the student's representations of the text are present during working memory. This causes the student to read through the material without absorbing the information and being able to retain it. When working memory is absent from the readers representations of the working memory they experience something called "deactivation." When deactivation occurs, the student has an understanding of the material and is able to retain information. If deactivation occurs during the first reading, the reader does not need to undergo deactivation in the second reading. The reader will only need to reread to get a "gist" of the text to spark their memory. When the problem is assigned to the wrong schema, the student's attention is subsequently directed away from features of the problem that are inconsistent with the assigned schema.[31] The critical step of finding a mapping between the problem and a pre-existing schema is often cited as supporting the centrality of analogical thinking to problem solving.

Developmental

Neo-Piagetian theories of cognitive development

Developmental psychology, and especially the psychology of cognitive development, opens a special perspective for educational psychology. This is so because education and the psychology of cognitive development converge on a number of crucial assumptions. First, the psychology of cognitive development defines human cognitive competence at successive phases of development. Education aims to help students acquire knowledge and develop skills which are compatible with their understanding and problem-solving capabilities at different ages. Thus, knowing the students' level on a developmental sequence provides information on the kind and level of knowledge they can assimilate, which, in turn, can be used as a frame for organizing the subject matter to be taught at different school grades. This is the reason why Piaget's theory of cognitive development was so influential for education, especially mathematics and science education.[32] In the same direction, the neo-Piagetian theories of cognitive development suggest that in addition to the concerns above, sequencing of concepts and skills in teaching must take account of the processing and working memory capacities that characterize successive age levels.[33][34]

Second, the psychology of cognitive development involves understanding how cognitive change takes place and recognizing the factors and processes which enable cognitive competence to develop. Education also capitalizes on cognitive change, because the construction of knowledge

presupposes effective teaching methods that would move the student from a lower to a higher level of understanding. Mechanisms such as reflection on actual or mental actions vis-à-vis alternative solutions to problems, tagging new concepts or solutions to symbols that help one recall and mentally manipulate them are just a few examples of how mechanisms of cognitive development may be used to facilitate learning.[34][35]

Finally, the psychology of cognitive development is concerned with individual differences in the organization of cognitive processes and abilities, in their rate of change, and in their mechanisms of change. The principles underlying intra- and inter-individual differences could be educationally useful, because knowing how students differ in regard to the various dimensions of cognitive development, such as processing and representational capacity, self-understanding and self-regulation, and the various domains of understanding, such as mathematical, scientific, or verbal abilities, would enable the teacher to cater for the needs of the different students so that no one is left behind.[34][36]

Constructivist

Constructivism is a category of learning theory in which emphasis is placed on the agency and prior "knowing" and experience of the learner, and often on the social and cultural determinants of the learning process. Educational psychologists distinguish individual (or psychological) constructivism, identified with Piaget's theory of cognitive development, from social constructivism. A dominant influence on the latter type is Lev Vygotsky's work on sociocultural learning, describing how interactions with adults, more capable peers, and cognitive tools are internalized to form mental constructs. Elaborating on Vygotsky's theory, Jerome Bruner and other educational psychologists developed the important concept of instructional scaffolding, in which the social or information environment offers supports for learning that are gradually withdrawn as they become internalized.[37]