

Study on cognitive psychology: problem solving and creativity



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Cognitive psychology has always been a normal part of everyday life that people tend to not notice it at all. When faced with a problem, cognitive abilities are used. Creativity is often used when thinking of a solution for a certain problem. The problem-solving process is described to be a cycle from recognizing the problem to creating a solution, evaluating the solution, and goes back to recognizing a new problem encountered (Sternberg et al., 2009, p. 430)

This paper provides a summary of the definition of problem solving and creativity, the link between the two and how creativity can be used in problem solving.

Cognitive psychology is a branch of psychology that delves on how the mind operates. Decision-making and problem solving are all based on how people recognize, remember, think, and speak (Jain, 2010, p. 5). It is very relevant to everyday experience. Goldstein (2007, p. 2) wrote an example on this in his book. He talked about Sarah, a lady who walked across campus and suddenly met a friend. She stopped and talked with her friend about the movie that they watched the previous night. She did not chat long with her friend, said goodbye and head off to her next appointment with the advisor's office to work out her schedule for her next term. This was just a typical day for Sarah but underneath that simple encounter was the following mental processes:

Perception. Sarah was capable of walking across the campus. She identified the person approaching her as her friend and was able to hear her talk.

Attention. While walking across the campus, she only focused on her line of vision. But recognizing her friend captured her attention.

Memory. Sarah remembered her friend's name, about her appointment, and about some details on the movie that she watched with her friend the previous night.

Language. She talked to her friend about the movie they watched together.

Reasoning and decision-making. Sarah had to determine what courses to take for the next semester, the reason for her appointment with the advisor.

PROBLEM SOLVING AND CREATIVITY

In the situation above, Sarah's needed to decide what courses to take for the next term, making this situation her problem. A problem occurs when one is required to do something's in a situation but does not know what to do.

Goldstein (2007, p. 396) defined problem as something that arises when one has a goal but does not know how to achieve his or her goal because it is blocked by an obstacle. This definition simply means that if one knows what action to take in a given situation, then he or she does not really have a problem.

Problem solving, according to Weisberg (2006), is determining what to do next. Since problem solving is considered to be an example of creativity, questions are raised regarding all kinds of creative thinking (Weisberg, 2006, p. 127). He cited examples like the creation of scientific theories, art works, and inventions, although sparked by creativity, were problem solving of one kind or another (Weisberg, 2006, p. 127).

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Creativity is usually connected to problem solving and cognitive theories of creativity usually focus on the process of problem solving (Runco, 2007, p. 14; Adams et al., 2009, p. 4; Hargadon & Bechky, 2006, p. 495). There are a lot of definitions for creativity. People often relate creativity with words like “new, unusual, ideas, out of the ordinary, imagination, unique, exciting, wacky, open, fuzzy or something radically different” (Isaksen et al., 2010, p. 2-3). The process of creativity is usually mysterious and sudden insights or moments of discoveries, those times when idea suddenly appears in the mind, make creativity appear to be sudden and difficult to find (Leung et al., 2008, p. 170).

In most cases, creativity is usually associated with the arts (music, sculpture, painting, literature, etc.). It is uncommon for people to relate creativity with the words like “usefulness, value, and purposeful” (Isaksen et al., 2010, p. 3) or anything that is not related to the arts. However, not all situations that is related to creative thinking is automatically associated with problem solving (Weisberg, 2006, p. 128).

There are two types of problems: the well-structured problems and the ill-structured problems (Sternberg et al., 2009, p. 434). Well-structured problems have paths to a clear solution while ill-structured problems do not. Well-structured problems are defined problems and an example of this is when the teacher asks the student for the area of a parallelogram. This problem is straight to the point because the only solution to this is by using the formula in computing for the area of a parallelogram (Sternberg et al., 2009, p. 434-435).

It is usually difficult to represent ill-structured problems because it is not straight to the point, therefore creating mental representations for these kinds of problems are a much bigger challenge. For this kind of problems, a plan composed of series of steps are usually followed in order to get a closer idea of the solution (Sternberg et al., 2009, p. 443).

THE PROBLEM-SOLVING CYCLE

The problem-solving process is like a cycle that includes the following: (1) problem identification; (2) problem definition; (3) creating a strategy or solution; (4) information organization regarding the problem; (5) allotment of resources; (6) observing the problem solving process; and (7) assessing if the solution worked (Sternberg et al., 2009, p. 430).

In view of these steps in problem solving, one must not forget to be flexible in the various steps of the problem-solving cycle and may have to tolerate ambiguity from time to time in order to be successful (Sternberg et al., 2009, p. 431). Emotions can also affect problem solving-whether in a positive or negative way. Mathematicians, who could control their emotions, showed that they have higher problem-solving abilities (Carlson & Bloom, 2005).

One of the earliest stages of problem solving is problem recognition or also known as problem identification (Caughron & Mumford, 2008, p. 204). Most of the time, this is a very difficult step because one might fail to identify what the goal is or the goal might be obstructed or the solution that one has thought of might not work (Sternberg et al., 2009, p. 431). An example of this is when one expects to land a job he applied for but someone else was hired (Sternberg et al., 2009, p. 431).

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Once the problem is identified, the next step should be defining and representing the problem (Sternberg et al., 2009, p. 431). Problem definition is the stage of problem solving wherein the problem's extent and objective are specified while problem representation refers to the way the mind uses concepts or symbols to interpret things (Hwang et al., 2007, p. 192). This is a very important step because if the problem is not properly defined and represented, there are less chances of solving it. (Sternberg et al., 2009, p. 431). For example, a student is writing a paper. He must clearly define his topic in order for him to focus what kind of research is he going to do and what kind of data is he going to gather (Sternberg et al., 2009, p. 431).

Hwang, Chen, Dung and Yang (2007) did a study on the multiply representation skills and creativity of students in solving mathematical problems when provided by a multimedia whiteboard system. The subjects they used were sixth grade primary school students who excelled in mathematics, tested and selected by the researchers. Twenty-one geometry and numerical problems were given to the students and they were asked to solve the problems, criticize the work of their peers, and respond to designed multimedia whiteboard system (Hwang et al., 2007, pp. 195-196). The researchers found out that the students used multiple representation skills in solving mathematical problems. Students who had high elaboration ability took better advantage of their interactions with their peers to create a more diversified solution (Hwang et al., 2007, p. 204) while students who had low elaboration ability had difficulty with their representation skills (Hwang et al., 2007, p. 206). The researchers concluded that elaboration ability on creativity greatly affects multiple representation skills of students. Their

study suggested that teachers should use a multimedia whiteboard system in problem solving activities to enhance student multiple representation skills (Hwang et al., 2007, p. 209)

CONCLUSION

Problem solving will always be connected to certain kinds of creativity but creativity does not always have to have problem solving. Creative problem solving should always be distinguished from the other types of problem solving (Runco, 2007, p. 15). Psychologists have studied and found distinctive differences among different kinds of problems and these require different types of mental processes, so they differ in terms of creativity (Runco, 2007, p. 15). Due to this reason, not all work on problem solving will be evenly applicable to studies of creativity (Runco, 2007, p. 16).