

Insights into the creativity process

John Munro

The creativity process : What happens to the knowledge ?

In this section we will try to understand how an individual's knowledge changes during the creativity process.

In earlier sections we have noted various aspects of creativity. One relates to the reporting of visual imagery use assisting the creative outcome, and that the creative idea 'suddenly appeared' in a wholistic form in the person's awareness.

To understand knowledge changes during creativity we need to look first at ways of describing a person's knowledge.

A microscopic on what you know. Suppose it were possible for someone to look at what you know about a particular topic through a very fine microscope. What might they see ? Suppose someone says to you "the topic is marsupials". Immediately some words or ideas would come to your mind. They might include

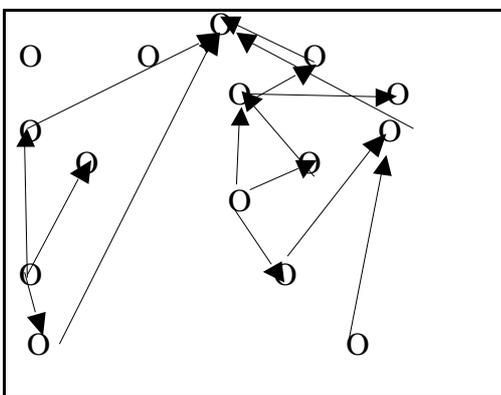
- Have pouches for their offspring
- Have backbones
- Live in Australia
- Kangaroos, platypus

Each of these ideas is a 'unit of meaning'. Your knowledge of this topic consists of a whole set of them.

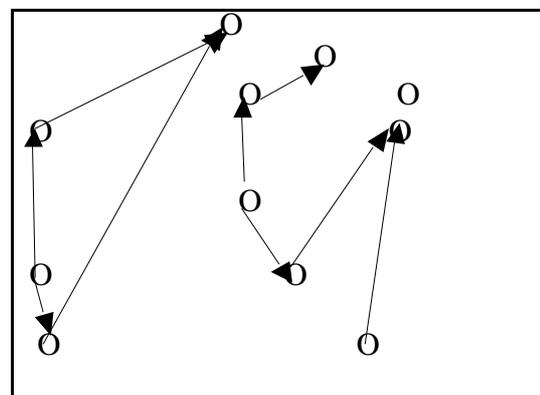
If you didn't know the topic, but overheard a conversation in which rescuing a baby wallaby from its mother's pouch' was mentioned, you would probably think of other units of meaning that were expected features such as the long tail of the mother, her claws and pointed ears. Our units of meaning for a topic are linked together into networks. When some units are stimulated by information we detect, there is a flow on to other linked units also being stimulated.

Our comprehension or awareness at any time can be described in terms of a set of these units. The set of meanings that are fired up at any time become a 'space' or 'window' for thinking.

We can draw pictures to show what the knowledge networks are like for different individuals. We can show each idea by O. Each idea is linked in a network. Incoming information lights up some ideas. When this happens, other ideas that are linked are also lit up. For a particular topic, we have drawn the meaning networks for two students A and B.



student A



students B

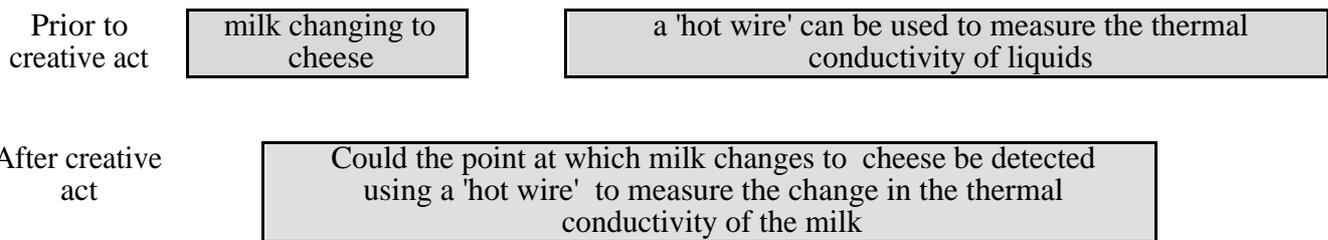
You can see that student A has a richer, more elaborate network of meaning units. It has both more meaning units and a greater number of links.

Imagine both students being exposed to the same information for this topic. Student A has more units of meaning for making sense of it. As well, this student can

- (1) end up with a broader understanding because the ideas are linked with other ideas.
- (2) chunk the information more efficiently, 'put together' more of the information into individual 'bites' or chunks.
- (3) come to an understanding more quickly.
- (4) operate more in a 'big picture' way
- (5) make wider links with existing knowledge, draw in a broader range of ideas.

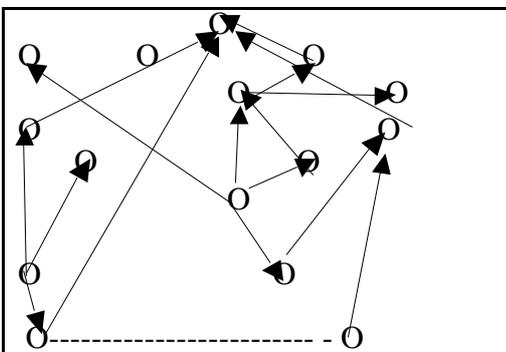
What happens to produce a creative outcome

In an earlier section, we said that a creative outcome occurs when two areas of knowledge that weren't linked become linked for the first time. This generates new ideas. We looked at the example of Hori's case, where two previously unlinked concepts, milk changing to cheese and using a 'hot wire' to measure the thermal conductivity of liquids became linked.

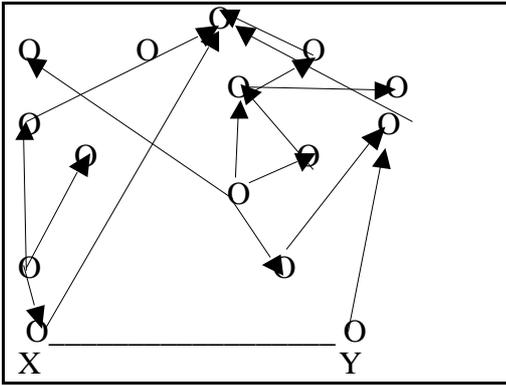


When a new possibility had been formed, two or more ideas that were previously not linked are now linked. The link is, however, a possibility. It needs to be tested and trialed and subjected to rational analysis. If the link stands up to this analysis and evaluation, the dotted line becomes more solid.

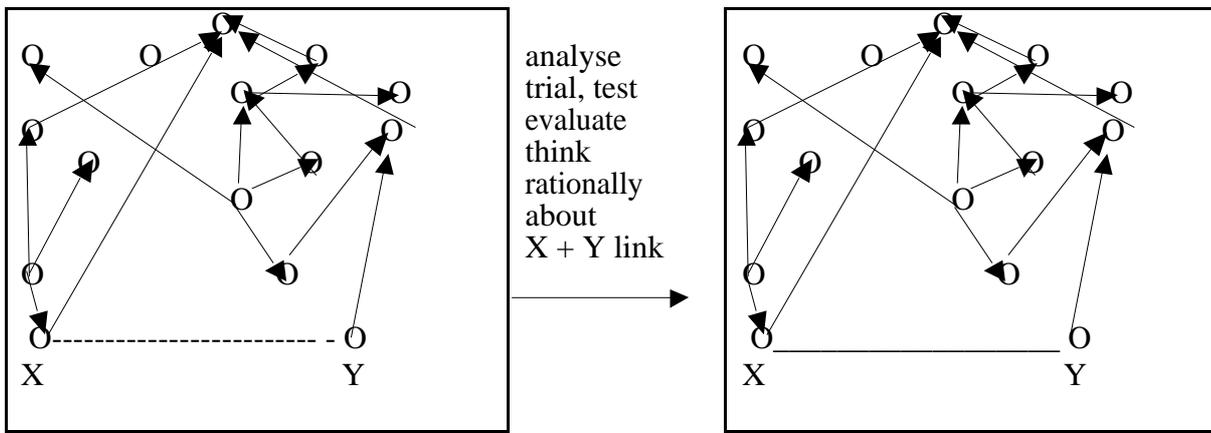
Suppose student A is thinking creatively about a topic and comes to believe that ideas X and Y could be linked. Initially they would be joined by a dotted line that indicates a possibility. At this time X + Y is a creation : it is a possible new idea that may lead to all sorts of innovation.



Student A now begins to evaluate the new X + Y link to see if it does work and if it does make sense. Student A may evaluate and analyse the new idea, submit it to rational or logical analysis, see if it does make sense. Student A may see if it is consistent with what is known in other areas of knowledge, and how it fits in. When Student A is more sure of the truth or veracity of the X + Y link, the link between X and Y becomes more fixed and secure.



The possibilistic and evaluative aspects of creative thinking are shown in the following diagram:



Creativity and Intuition

The dotted link between X and Y suggests a possibility. The solid line between them suggests a link that has been tested; it is more of a certainty. X ---Y is a novel link between two ideas that hasn't yet been tested logically or rationally. We can call the X ---Y an intuitive link between two ideas. Student A believes that it is a possibility but at that moment is unable to say why, validate it logically or give a rational reason for believing it. It just 'seems reasonable' or 'feels right' and A needs more time and effort to investigate it further.

The intuitive link is very important in creativity. Without the intuitive link, there would be no creativity because there would be no novel possibilities to evaluate. The intuitive phase in creativity involves initial data gathering and preliminary analysis (or preparation), incubating and illuminating new possibilities (Bastick, 1982).

Intuitive thinking is a process in which the brain accesses and recombines knowledge stored in long-term memory. This component of creativity as "insight ability...the ability to join remotely associated knowledge elements and form new combinations."(Lubart, 1994, p304).

When using intuitive thinking we reach a decision by making a judgment without implementing bit by bit incremental serial reasoning. The idea or flash of insight appears to come from a rearrangement of existing knowledge. We search our existing knowledge, for ideas relevant to the situation. These are temporarily in our thinking space or 'working memory'..."(Rose , 1998, p36) where we manipulate them our consciously.

Intuitive thinking, often saves time and other valuable mental resources. It is often associated with "holistic thinking, relying on hunches to cope with problems far too complex for rational analysis. " It is the alternative to thinking rationally in sequential steps which allows logical validation at any point. It involves "multiple memory searches in which the problem probe (or given topic) is

modified each time...one feature of the probe may be dropped...(and this) activates a greater number of related memory items.” (Lubart in Sternberg 1994:305). What the individual is searching for is particular ideas in experiences that fit with or match the topic or theme being maintained in the thinking space at that time. The breadth and possible speed of this process suggests rapid matching, linking incoming information in particular personal ‘non-rational’ or ‘non-objective’ ways to our experiential or episodic knowledge.

Knowledge from the memory searches is somehow ‘distilled’ in terms of a particular purpose or goal. It is not clear how the various memory traces that are stimulated or fired up at a point are synthesised and how the knowledge in them is prioritised so that some aspects become more important than others. It seems to involve rearranging, distorting or changing what we know in some ways (Johnson and Indivik, 1991:4).. The areas of knowledge that are often involved in intuitive thinking is our experiential or episodic knowledge. This knowledge is often more personal and ‘non-rational’ or ‘non-objective’. In other words, intuition involves the rapid evaluation or distillation and synthesis of several selected episodes or experiences..

The individual seems to have an impression of what a suitable outcome would look like, for example, the questions it would answer, the effect or emotion it would invoke in others, the things that it would do. Because of its speed, we think the search and matching process is rapid. However, because it is largely unconscious, we cannot be sure of this.

The issue of intuition drawing on unconscious knowledge and incorporating previous experience to foster new insights is important to many writers in this area. We can operate on many levels at one time, so that other issues of interest or concern may be incubating while our conscious attention is focused on the information in our ‘working memory’ (Goldberg, 1983). The incubation stage of problem solving most likely “involves:

1. active processing similar to conscious work;
2. slow, automatic spreading of memory activation;
3. passive forgetting of superficial details or previous attempts;
4. associative play between the problem elements.”(Lubart in Sternberg 1994:316) .

In the outcome or illumination a novel idea or new insight becomes consciously available to us. This is the an ‘intuitive flash’. When the idea or insight becomes conscious, this particular intuitive phase of the creative process concludes. Further intuitive phases may, however, follow, each marked by a new illumination. The intuitive outcome may be experienced in various ways: (Agor, 1986, p 6) as muscle tension and or ‘gut feel’ (a physical sensation), an instant feeling of what is right or wrong in a given situation (an emotional sensation), as ‘seeing’ a pattern or order in seemingly unrelated facts (a cognitive sensation) or as awareness of how an individual’s actions relate to the well being of on all living things (a spiritual sensation).

Whether an individual engages intuitive or rational thinking patterns may depend in part on the parameters of the context in which the thinking occurs. Rational thinking may be more likely when there are recognised parameters and intuitive processes when no explicit standards presently exist. Intuitive thinking involves dealing with uncertainty and generating hunches to cope with problems that at the time may be too complex for rational analysis (Mintzberg, 1994) (Spitzer and Evans 1999). It should be noted that some writers argue that intuition is a highly rational decision making skill (Agor 1986, p5), but because some of the steps of the intuitive process are unconscious they are seen as irrational.

Intuitive ‘listening’ to intuitive prompts is a skill that requires practice. Without this the novel idea may be disregarded before its possibilities are considered. It usually involves both conscious and unconscious memory searches.

Unanswered questions about intuitive thinking include

- The mechanism for distillation ? "
- How the notion of intuitive thinking fits with the transition from being a novice knower of a topic or theme to expert knower of the topic?
- Are there any developmental trends in intuitive thinking?

- Do various demographic factors such as age, gender or culture influence intuitive thinking ?

References

Agor, Weston (1986) *The logic of intuitive decision making: A Research-Based Approach for Top Management*. New York: Quorum Books.

Bastick, T. (1982) *Intuition: how we think and act*. New York: Wiley.

Goldberg, Philip (1983) *The intuitive edge: Understanding Intuition and Applying It in Everyday Life*. Los Angeles: Tarcher, Inc.

Lubart, P (1994). In Sternberg, Robert, J. (Ed.) (1994) *Thinking and problem solving: Handbook of Perception and Cognition*. USA: Academic Press pp. 304 – 342.\

Mintzberg, Henry (January - February 1994) USA: *Harvard Business Review*, pp107 –114. The fall and rise of strategic planning.