

## Insights into the creativity process : The components of creativity

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Creativity is an extremely complex process to understand. It is frequently assumed that human processes as complex and as 'personal' as creativity cannot be studied scientifically or captured in a theory. How can we challenge that? One approach to studying it has been to attempt to unpack what happens during creativity activity and to identify what things that people know, believe and do. The componential theories of creativity identify the aspects or components of individual activity that need to be in place for creative outcomes.

Componential theories of creativity have been proposed by Amabile (1996) and Urban (2002, 1991). These models identify several components they see as necessary for generating creative outcomes. Amabile's (1996) theory identifies three components or aspects necessary for creativity, while Urban's (1991) componential model of creativity identifies six components of human activity necessary for creativity. The components are grouped into two main areas of human activity:

Cognitive or knowledge and thinking components	Personality or motivational and emotional components
<ul style="list-style-type: none"><li>• Having a high level knowledge and skills of a specific topic area</li><li>• Being able to think divergently about the topic</li><li>• Having a well developed general knowledge and thinking base</li></ul>	<ul style="list-style-type: none"><li>• Having high level focusing and task commitment</li><li>• Having high intrinsic motivation and motives</li><li>• Being 'open' about the topic and prepared to tolerate ambiguity in the area.</li></ul>

**The following dimensions have been identified:**

***Specific knowledge base- expert knowledge*** The first component relates to the knowledge or topics about which you will be creative. In order to be creative about an area of knowledge, you first of all need a sufficiently well developed knowledge or mastery of the specific subject or topic. Amabile (1996) refers to this as domain-relevant skills (i.e., knowledge, technical skills).

A person's understanding of the topic needs to be sufficiently comprehensive and detailed to support the linking of ideas in novel ways. Learning this specific knowledge and skills requires disciplined topic commitment and persistence on a high level.

The problem in question about which the person may think creatively and the connected networks of ideas need to be kept in the focus of attention over a long period of time. The individual needs to collect, analyze, evaluate, and elaborate information. Focused concentration and selectivity are necessary here. Case studies cited by Weisberg in Sternberg confirm that "creativity has a strong basis in and continuity with previously existing knowledge..."(1994:297).

Not only does the person need to have a sufficiently well developed knowledge of the subject, but also believe that this knowledge is 'our best interpretation at this time' rather than seeing it 'set in concrete' and absolute. If individuals believe that their knowledge about a topic is fixed and not available to be questioned, they are less likely to think creatively about it.

**Divergent thinking** A second component refers to what the person knows about how to think creatively about the ideas. Amabile (1996) proposed this included

- planning and exploring new pathways,
- keeping options open for as long as possible, and
- suspending judgment.

Urban identified the following subcomponents :

- Fluency – how quickly you can generate ideas.
- Flexibility – how many different categories are reflected
- Originality – how ‘relevant’ are the ideas.
- Re-structuring- how well you can re-prioritise or link ideas in different ways.
- Elaboration- how well you can predict or infer from some ideas to others.

The starting point for creative thinking is problem sensitivity, the ability to see or find problems. Individuals differ in their ability to do this; a particular situation may evoke a questions in some individuals but not in others. Most children ask questions naturally, it is an early form of verbal expressions and is closely linked with natural curiosity, the drive for exploration and knowledge. Students can generate multi domain questions about an issue. They can ask directed questions that are based on focused, intense activity and defocused activity.

Divergent thinking is related to various emotional aspects. This type of thinking requires a level of autonomy, that involves resistance to group pressure.

**General knowledge and thinking** Urban proposed that there are also several aspects of general deep knowledge and thinking that are necessary for thinking creatively. These refer to more general aspects of thinking than divergent thinking. They include

- storing knowledge in a flexible memory,
- analysing,
- logical thinking
- critical and evaluative thinking.

Divergent thinking needs to be based on a broad general deep knowledge and thinking base. Fluent, flexible and associational thinking requires

- quick perception and processing of information and data,
- storage in a flexible, accessible memory network.

Students need to analyse and think logically at various stages of creativity:

early stage		final phase
Think about information to generate problems	analyze and evaluate the outcomes of divergent thinking (reformulated, redefined or reconstructed problems) in terms of their usefulness.	Think critically and evaluatively about the creative outcome and its elaboration

Need dynamic balance of general knowledge and divergent thinking for creative thinking.

**Focusing and task commitment** : for creativity individuals need persistence, perseverance, task commitment.

**Motives and motivation** Urban and Amabile note the need for motives, drive and task motivation, particularly intrinsic, for the development of creative outcomes. This emerges through engagement with novel aspects of the task.

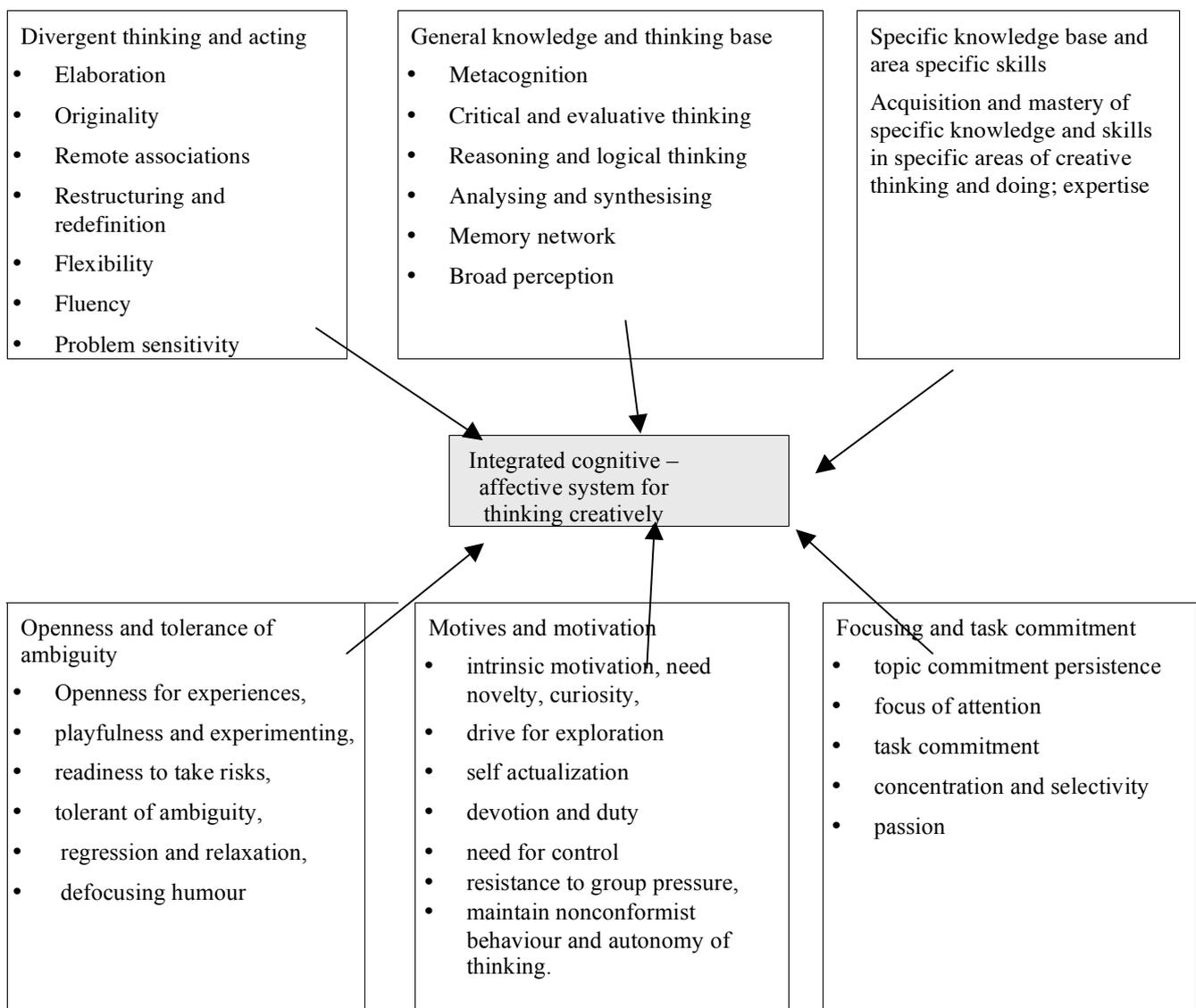
These drives need to be supported by the environment; a culture for learning. Students need to feel free to bring in new ideas into the relationship and to receive personalised feedback. Urban believes that all children have inherently the need for novelty, curiosity and a drive for exploration and knowledge. This is often suppressed by parents or the educational environment.

**Openness and tolerance** Urban notes that, in parallel with focusing and task commitment, creativity needs openness and tolerance of ambiguity. Related subcomponents include

- a resistance to pressure from the peer group,
- a preparedness to maintain nonconformist behaviour and
- autonomy of thinking.

The readiness to take risks allows individuals to make remote associations, playfulness and experimenting accompany fluency and flexibility and the tolerance of ambiguity is supported by passion. Einstein noted the need to balance between focus and defocusing.

Urban’s components with their subcomponents are shown in the following figure:



## Values of the model

The componential models of creativity can be used to facilitate teaching in a number of ways: to

- unpack the concept of creativity and to examine what it might actually ‘look like’ in their teaching.
- assist teachers and schools to evaluate their teaching to examine the extent to which each component is being developed
- implement teaching that could target each aspect.

### *What would each component actually look like in teaching ?*

<i>Specific knowledge and skills : students</i>	<i>Divergent thinking : students</i>	<i>General knowledge and thinking base : students</i>
<ul style="list-style-type: none"> <li>• develop their own special interests that can be linked with extra curricular experiences.</li> <li>• pursue in-depth how earthworms live and direct their own learning and research projects</li> <li>• build up a special competence profile about earth worms</li> <li>• use activities that show that expertise about how earthworms live is valued, for example, through student quizzes,</li> </ul>	<ul style="list-style-type: none"> <li>• generate problems and questions about how worms live</li> <li>• have sufficient time to solve problems in more than one way</li> <li>• explore ideas from different perspectives and value ideas from all perspectives</li> <li>• redefine and reformulate questions and issues raised</li> <li>• work on open ended, ill-structured problems</li> <li>• question ideas at a number of levels and generate their own problems.</li> <li>• think both individually and collaboratively to explore ideas</li> <li>• observe creative thinking, and learning modeled by teachers</li> <li>• have choice in completing tasks</li> </ul>	<ul style="list-style-type: none"> <li>• comment on how the ideas interest them and where their interests lie</li> <li>• generate and respond to good questions re the topic, including ‘why’ and ‘what if’ questions</li> <li>• do learning tasks that require broad different perceptions as well as a restrict focus.</li> <li>• are challenged to think inductively and deductively about the topic. reflect on evaluate ideas</li> <li>• are challenged to think both inductively and deductively about the topic.</li> <li>• are encouraged to reflect on evaluate ideas</li> </ul>
	The life cycle of earth worms	
<i>Focusing and task commitment : students</i>	<i>Motives and motivation : students</i>	<i>Openness and tolerance of ambiguity : students</i>
<ul style="list-style-type: none"> <li>• work in groups and develop a ‘community of purpose’ in the classroom</li> <li>• are encouraged to invest more time in their special interest re the topic and to pursue a passion in learning</li> <li>• can complete tasks in a variety of ways</li> <li>• think about how they focus</li> <li>• are encouraged to see enquiry based learning as important</li> <li>• see that task commitment is both required and valued</li> <li>• have the chance to direct and control aspects of their own work.</li> </ul>	<p>students</p> <ul style="list-style-type: none"> <li>• see that divergence of thought is encouraged</li> <li>• receive genuine feedback for high level outcomes</li> <li>• see that intrinsic motivation based personal interest knowledge on is allowed and that natural curiosity and strive for knowledge are supported</li> <li>• have opportunities for self determined discovery learning and research</li> </ul>	<ul style="list-style-type: none"> <li>• See that ideas at one point may not fit,</li> <li>• Are encouraged to take risks, to vary between detail and big picture thinking</li> <li>• Are encouraged to value ambiguity, and to see it in matching the experiences of others</li> <li>• Have time to persevere with and complete tasks</li> <li>• Have the opportunity to follow their level of understanding</li> <li>• Can learn through on interdisciplinary research</li> <li>• Are encouraged to use fantasy and imagination to learn</li> <li>• Learn that errors and mistakes are valuable parts of learning</li> <li>• Celebrate achievements</li> </ul>

**Teacher self improvement** You can evaluate the extent to which your teaching fosters each component of creativity. Audio-tape and analyze a sequence of lessons using the following checklist

How often does your teaching help students	Never	Not often	Some times	Often	Al-ways
<p><b>Divergent thinking :</b> To what extent does the teaching</p> <ul style="list-style-type: none"> <li>teach or support thinking activity that could be called divergent thinking ?</li> <li>show a sensitivity to and value problems, questions raised by students ?</li> <li>make students aware of problems ?</li> <li>make time available for more than one attempt at solution to problems ?</li> <li>examine topics from different aspects ?</li> <li>show a valuing of multiple ways of solving problems?</li> <li>use open ended vs ill-structured problems for learning ?</li> <li>encourage students to question ideas at a number of levels and generate their own problems ?</li> <li>encourage students to explore ideas from different perspectives ?</li> <li>positively value ideas from all perspectives ?</li> <li>encourage individuality in understanding ?</li> <li>model how to think and learn creatively by teachers ?</li> <li>give students the opportunity to solve problems and learn collaboratively ?</li> <li>give students the opportunity to explore ideas ?</li> </ul>	<input type="checkbox"/>				
<p><b>General knowledge and thinking base :</b> To what extent does the teaching</p> <ul style="list-style-type: none"> <li>take account of and build on student interest in what they learn ?</li> <li>use good questioning skills to develop new topics ?</li> <li>show that the teachers have a great passion for their subjects ?</li> <li>require students to take a broad focus on the topics they are taught ?</li> <li>use different sense channels ?</li> <li>target systematic analysis and synthesising of problems, topics, facts ?</li> <li>encourage inductive and deductive reasoning ?</li> </ul>	<input type="checkbox"/>				
<p><b>Specific knowledge base and specific skills :</b> To what extent does the teaching</p> <ul style="list-style-type: none"> <li>encourage students to draw on their individual interests and experiences when learning new topics ?</li> <li>encourage students to pursue in-depth studies for topics being covered ?</li> <li>provide opportunities for research projects and self directed learning ?</li> <li>value expertise?</li> </ul>	<input type="checkbox"/>				
<p><b>Focusing and task commitment :</b> To what extent does the teaching</p> <ul style="list-style-type: none"> <li>foster a community of purpose in the classroom ?</li> <li>value longer occupation by students in tasks that have a special interest ?</li> <li>allow students to complete tasks in a variety of ways ?</li> <li>help students think about how they focus ?</li> <li>foster enquiry based learning ?</li> <li>encourage students to pursue a passion in learning ?</li> <li>encourage task commitment ?</li> </ul>	<input type="checkbox"/>				
<p><b>Motives and motivation :</b> To what extent does the teaching</p> <ul style="list-style-type: none"> <li>encourage divergence of thought ?</li> <li>provide genuine feedback for high level outcomes ?</li> <li>allow intrinsic motivation ?</li> <li>balance formal curriculum outcomes and personal interest knowledge ?</li> <li>support natural curiosity and strive for knowledge ?</li> <li>allow opportunities for self determined discovery learning ?</li> </ul>	<input type="checkbox"/>				
<p><b>Openness and tolerance of ambiguity :</b> To what extent does the teaching</p> <ul style="list-style-type: none"> <li>Encourage students to reflect on ideas don't seem to fit, take risks ?</li> <li>Encourage students to welcome / value ambiguity ?</li> <li>Develop students' ability to self reflect ?</li> <li>Allow students to persevere and complete tasks ?</li> <li>Encourage interdisciplinary learning ?</li> <li>Encourage fantasy and imagination ?</li> </ul>	<input type="checkbox"/>				

• Value the individuality and uniqueness of each person ?	<input type="checkbox"/>				
• Allow students to make errors and mistakes during regular learning ?	<input type="checkbox"/>				
• Encourage students to celebrate achievements ?	<input type="checkbox"/>				

### ***Integrating the components***

The various components do not operate as separate aspects but instead in an integrated ways to lead to creative outcomes. It is important that teachers and students have the opportunity to synthesize them. As well as providing the opportunity for students to ‘get a feeling’ for thinking in fluent and flexible ways in thinking about particular topics, it is important that they experience integrating the components in a holistic way. It is not sufficient to teach each component separately.

### ***Conditons for creativity that are often neglected in regular teaching***

Teaching needs to provide the best conditions necessary for achieving it. These include the following:

- Regular teaching frequently focuses more on extrinsic than on intrinsic motivation. Students need to be given the opportunity for intrinsically motivated activities during their learning of most topics. Teachers can use tasks and challenges that can be processed in multiple ways and that are open-ended, that foster a questioning attitude, that stimulate broad and open perceptions. Conditions that foster a high level of autonomy, self initiative, spontaneity and experimentation during learning and that reduce the pressure for formal achievement are useful.
- There is often a tendency to teach specific topics in ways that favour convergent thinking. Students need to be encouraged to think about the topic in more divergent oriented ways. Subject area knowledge needs to be taught in ways that allow more open-ended thinking. The teaching can include use questioning to explore topics and problem solving.
- In line with this, teaching frequently has less of a focus on self determined learning by students and more on the external management by teachers. Creative thinking is much more likely when there is the opportunity for aspects of self directed and managed learning.
- Encouraging an attitude towards learning to modify one’s thinking during learning and learning how to use the errors made during learning and how to do this is sometimes lost when there is a focus on ‘learning to do things the right way’.
- The teaching can allow students to pursue aspects of topics they are learning on individual basis as well as through social learning. Both social co-operative individual creativity can be fostered.
- Valuing intuitive, ‘non conformist’ and original interpretations of ideas is useful. Students need to see that their original ideas are accepted and valued, even if they assist only in leading to other ideas.

### **References**

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