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# Exploring Creative Information Literacy Practices via Divergent Thinking

Joseph Hartnett  
*CUNY Bernard M Baruch College*

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### Exploring Creative Information Literacy Practices via Divergent Thinking

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by Joseph Hartnett  
Information Services Librarian  
Assistant Professor  
Baruch College, City University of New York  
[joseph.hartnett@baruch.cuny.edu](mailto:joseph.hartnett@baruch.cuny.edu)

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#### Abstract

Encouraged by the ACRL Framework's call for librarians to adopt more engaging methods to teach students, as well as for students to assume more active, creative, and reflective roles in relation to the information landscape, the author questioned whether methods put forward by creativity training proponent Edward de Bono for fostering creativity might have any potential value for helping students to engage in divergent thinking related to developing a research strategy, or as the framework would have it "Searching as a Strategic Exploration." In order to answer this question, the author investigated the work of Edward de Bono and conducted a small experiment where 20 students in an information literacy credit class were randomly divided into a control group and an experimental group. The experimental group was presented with a set of directed strategies offered by de Bono in addition to regular instruction, while the control group was not. Afterwards, all members of the class were given an open ended writing assignment about a vaguely worded topic where they were asked to be creative. Student responses were evaluated for indications of divergent thinking by counting the number of interested parties identified in their writing in relation to the topic. It was found that the experimental de Bono group engaged in significantly more divergent thinking than did the control group, both in terms of originality and in the total number of interested parties that were generated. As such it would appear that de Bono's methods and other similar approaches have potential value for promoting divergent thinking, an essential capacity for creativity, and likely for helping teaching librarians develop more active, creative, and reflective classroom practices. The model used is original within the realm of library pedagogy and has the potential to help librarians apply divergent thinking strategies to information literacy programs.

#### Introduction

The ACRL framework's constructive, student-centered approach to information literacy calls for librarians and faculty to adopt more engaging methods to teach students, as well as for students to assume a more active, creative, and reflective role relative to the information landscape (American Library Association, 2015). The framework uses language throughout that describes learners as open-minded, reflective creators of information rather than as passive recipients, and for good reason: generative thinking is important. Real life problem solving rarely involves simply picking items from a menu. It often requires creativity, or productive thinking, which Moseley described as "...not confined to the analysis of existing arguments but ...also concerned with generating ideas and consequences for action" (2005, p. 119).

In the author's experience, students do not have trouble converging on ideas, but in seeing information from different perspectives. Most librarians can recall easily the student who wants to find five scholarly articles about a predetermined topic and wants them fast. Many students are more interested in locating a scholarly source than in engaging authentically with the process of research. Moreover, in the age of autosuggestion, there are few subject-related structures that allow one to broaden and narrow topics in the electronic environment; ideas emerge only because someone else (the crowd) searched for them previously. The wisdom of the crowd may be helpful in answering questions with definite answers, but is not as useful when one is developing a strategic plan or making a choice. Such dispositions of efficiency and satisfaction serve a purpose, but ultimately, they are not particularly strategic for lifelong learning in the 21<sup>st</sup> century, which values creativity as a skill (Partnership for 21<sup>st</sup> Century Skills, 2008).

With this in mind, the author began to investigate ways in which creativity is encouraged, in order to identify processes or practices that better operationalize and encourage the creative dispositions called for in the framework (in conjunction with preparing to teach a credit-bearing information literacy class). While the ACRL framework provides various examples of practices and dispositions in which information literate learners may engage, it does not offer a great deal in terms of the means by which librarians and faculty can increase the likelihood that this type of learning takes place. This is, of course, a feature, rather than a fault of the framework, as librarians are free to develop their own outcomes and activities to meet local contexts. However, librarians interested in such means must look beyond the framework for such guidance.

It appeared that simply reminding students to adopt creative, open-minded dispositions was not likely to be as effective as actually providing opportunities for them to practice them.<sup>[1]</sup> The author had heard of processes and programs designed to promote creativity in the arts, such as those of Eno and Schmidt (2001), who used decks of cards designed to encourage creative thinking by oblique (sideways) strategies with musicians such as the late David Bowie. Further investigation led to the discovery that, rather than leaving it to chance, organizations including those involved in engineering, commonly adopt and promote creative strategies and programs to increase the likelihood that creativity and innovation will occur (Puccio & Cabra, 2010, p. 158).

While investigating along these lines, the author came across the work of Edward de Bono, who offers a wide range of problem solving techniques that claim to teach individuals and groups how to think more creatively. De Bono is known for coining the term "lateral thinking," a cognate for creative thinking that appears in the Oxford English Dictionary and is often mentioned in conjunction with his work (Moseley, 2005, p. 134). De Bono's methods have been adopted widely for use in industry and education, and they have enjoyed considerable popularity and commercial success (Burgh, 2014; Higgins, 2015; Moseley, 2005, p. 136; Puccio & Cabra, 2010, p. 160; Smith, Jeffery, & Smith, 2010). De Bono offers a wide range of metacognitive strategies described as "thinking tools," which constitute entire "thinking programs," such as his CoRT Thinking Program (CoRT is an acronym for his company, the Cognitive Research Trust) and his more widely known Six Thinking Hats program.

De Bono's CoRT Thinking Program offers 60 "attention director" processes divided into ten lessons that can be used individually or in sequence. Individual CoRT thinking tools are presented often in the form of acronyms or short descriptors and are designed to be practiced in order to take immediate and deliberative action in relation to thinking (de Bono, 1983, p. 118).

Some tools are simple ones, such as PMI (*Plus, Minus, Interesting*): learners examine an example situation and consider only its positive points. This is followed by a stage in which they consider only its negative points, and finally, consider only the interesting points of the problem (Moseley, 2005, p. 167). More complex and logical methods include Evidence Structure (*Key, Strong, Weak*): learners consider an argument and identify which

evidence offered is crucial, good, or unnecessary ([CoRTthinking.com](http://CoRTthinking.com), n.d.; de Bono, 1983, p. 123). There are also more unusual “lateral” techniques that involve the introduction of randomness and the suspension of judgment such as Random Input: learners introduce a new idea in conjunction with the idea at hand to produce something new (de Bono, 1983, p. 123). De Bono describes his theory of lateral thinking as at once an “attitude of mind”, and a set of processes designed to help learners break free from habitual “vertical thinking”—thought processes that tend to lead to predictable outcomes (de Bono, 1968, p. 18; Moseley, 2005, pp. 121, 138). Lateral thinking involves thinking deliberately about situations in different and sometimes unusual ways to generate new ideas “by suspending instant judgment or by directing the thinker’s attention to all the relevant and interesting aspects of a problem” (Moseley, 2005, p. 134).

The concept of lateral thinking is based upon his idea of the brain as a self-organizing system that establishes and uses routine patterns. De Bono describes creativity as a highly unnatural process that necessitates lateral thinking in order to introduce new patterns that produce new connections (de Bono, 1995). De Bono advocates that his processes and thinking programs should be taught as an area of study distinct from the regular curriculum, so that such instruction may serve individuals better than subject-based instruction (de Bono, 1976, pp. 158–9).

Given the need for instruction librarians to identify means with which to increase the probability that students will develop creative dispositions, the author wondered if any of de Bono’s many CoRT processes, lateral thinking or others, may have value in promoting the more thoughtful, exploratory, creative practices and dispositions called for in the new ACRL Framework in relation to information literacy. In order to answer this question, the author performed literature reviews on the major theories behind de Bono’s work and then conducted a small experiment.

## **Literature review**

### **De Bono and the Field of Psychology**

The study of creativity has a long, rich history in the field of psychology, which investigates this complex subject via its processes, the personality traits of creative people, and the characteristics of creative products and environments (Plucker & Makel, 2010, pp. 49, 51). The processes used in de Bono’s approach to creativity via lateral thinking are indeed topically situated within this field of investigation. However his theory of lateral thinking is not recognized as a coherent and empirically-validated theory within psychology (Higgins, 2015, p. 20; Moseley, 2005; Sternberg & Lubart, 1999).

A closer look at de Bono’s eloquent and encouraging work on the topic within his many publications soon reveals that they include no external references, other than those to his own previous publications, where he offers evidence in the form of anecdotal accounts and case studies of work he and his associates have conducted. The fact that de Bono does not situate his work within an academic context has been the source of a great deal of criticism on the part of academics over the past four decades (Burgh, 2014; Dingli, 2008; McPeck & James, 1983).

Psychologists take issue with commercial endeavors such as de Bono’s, as they diminish their more rigorous efforts to understand creativity as a field of study (Sternberg & Lubart, 1999). Despite this, they do recognize the potential usefulness of his tools and make a point not to reject them simply because they have not been studied and validated empirically (Begbie, 1970; Sternberg, Kaufman, & Pretz, 2002, p. 99; Sternberg & Lubart, 1999).

De Bono claims that he refuses to participate in academics because he is simply uninterested in its traditions, which he believes are adversarial in nature, and predisposed to “vertical,” deductive, critical, and argumentative thinking that prevents the emergence of new possibilities (Dingli, 2008). However, it should be noted that this

lack of interest very likely serves his own interests, as he is in the (apparently successful) business of selling his programs and services. De Bono reports that his methods have been used around the world by schools and governments, as well as business organizations, including AT&T, British Airways, British Coal, DuPont, Ericsson, Prudential, and Siemens. His methods also were used by the organizers of the 1984 Olympic Games in Los Angeles, as well as by the organizers of the 1983 America's Cup (de Bono, 1983, p. 115; de Bono, 1995; Dingli, 2008). For de Bono, the widespread use of his tools is sufficient validation (Moseley, 2005, p. 137).

### **Thinking as a skill**

De Bono's critics, such as philosopher James McPeck, note that his nonacademic stance is particularly problematic and egregious as he makes strong empirical claims about the nature of the mind and the ability of his products to teach "thinking as a skill" independent of subject matter (McPeck, 1983; Weisberg, 1986). There is, in fact, a longstanding academic debate about the notion that universal skills can exist separate from subject content (Smith, 2002, p. 659). In fact, the ACRL Framework rejects this notion specifically and approaches the subject of information literacy instead in terms of practices and dispositions rather than skills (American Library Association, 2015). For these reasons, critics ultimately have rejected de Bono's theories and his claims of being able to generate competence in universal thinking skills. Apart from a Venezuelan study in the 1970s that did show generalized improvement in pupils who completed the CoRT program (Nickerson, 1999) there otherwise is not a great deal of evidence in the literature that his programs provide generalized thinking competence as de Bono claims they do (Moseley, 2005).

### **Divergent thinking**

Although de Bono may not say so himself in his publications, his programs are noted by Sawyer (2015) as having been inspired by work conducted in the field of creativity studies by psychologist Ellis Paul Torrance, who in the late 1960s developed a battery of psychometric tests designed to investigate and measure the capacity for creativity. Torrance's work is based on the theory of divergent thinking (DT), a highly influential construct developed by psychologist J.P. Guilford in the 1940s, which suggests that "the ability to envision multiple solutions to a problem lies at the core of creativity" (Davidson & Frey, 2011). DT involves generating ideas, options, possible solutions, and different points of view, while convergent thinking, its opposite, involves narrowing thoughts to a single idea and, in doing so, evaluating one's results (Basadur & Hausdorf, 1996). DT thinking alone is of little use without evaluative and convergent thinking (Runco, 2003). DT is still the instrument used most widely in the field of creativity studies, and is referred to commonly as being an essential capacity for creativity (Runco, 2014; The RSA, n.d.). Although critics of de Bono's work reject his claims that his tools can develop "thinking skills," they do, however, recognize that de Bono's processes are useful instead for promoting DT (McPeck, 1981, p. 104; Paul, 1985; Sternberg & Lubart, 1999; Weisberg, 1986).

In this respect, the literature shows that portions of de Bono's work are potentially useful. A number of studies have provided evidence that CoRT tools have significant positive effects on increasing individuals' DT (Adams, 1989; Alkahtani, 2009; Birdi, 2005; Nickerson, 1999; Ritchie & Edwards, 1996). The literature also indicates the pedagogical usefulness of CoRT tools in structuring the conversation in science and special needs education (Rule & Stefanich, 2012), and for increasing motivation and engagement in work and classroom settings in engineering and design contexts (Barak & Doppelt, 1999; Christoforidou, Olander, Warell, & Holm, 2012; Raven & Smith, 2007). De Bono's Six Thinking Hats program (which shares a section with CoRT) also has been used successfully for similar purposes in a range of disciplinary contexts (Gregory & Masters, 2012; Karadag, Sarltas, & Erginer, 2009; Powers & Jones-Walker, 2005; Schellens, Van Keer, de Wever, & Valcke, 2009).

De Bono's processes do not involve simple brainstorming, but rather a directed problem solving structure for undertaking it in explicit steps. These processes serve to model an example of what problem solving can look like, and provide example considerations through which to reflect and apply DT. It has been shown that both modelling behavior and placing learning activities within a problem context are optimal means to promote memory and transfer (Cook & Klipfel, 2015). Creative activities, such as DT, can provide opportunities for deeper reflection and engagement in relation to subject content, which is a highly effective way to encourage retention (Baer & Garrett, 2010, p. 17).

### **Thinking routines**

De Bono's methods also are useful pedagogically from another perspective. His thinking tools clearly are representations of what are now referred to more commonly as "thinking routines," which are used for teaching thinking dispositions that help deepen content learning ("Project Zero: Visible Thinking," 2015). Such thinking routines are at the center of Harvard's Project Zero Visible Thinking initiative, which views them as potentially high-leverage means to promote thoughtful dispositions in classrooms (Ritchhart & Perkins, 2000). Visible Thinking researchers have found that teachers who promote these kinds of dispositions successfully "tend to create, adopt, and use specific routines as scaffolds" (Ritchhart, Church, & Morrison, 2011). Ritchhart (2002) described thinking routines as having the following characteristics:

Have only a few steps, are easily learned and remembered, can be easily scaffolded, get used repeatedly and are useful across a variety of contexts. These processes are used both in public as well as in private. They involve creative elaboration and other types of thinking. (p. 92)

Project Zero's Visible Thinking group offers a wide range of such thinking routine processes designed for specific types of thinking ("Project Zero: Visible Thinking," 2015; Ritchhart et al., 2011). Such processes provide opportunities for reflection and engagement with planned subject content in groups, as they make thinking visible in the classroom and allow teachers to become aware of and to assess it. Not only do these routines provide opportunities to practice DT, but they also send messages about the constructive and social nature of thinking, messages that are highly consistent with what the ACRL framework proposes. Such messages have the power to influence learners' conceptualizations about learning (Ritchhart, 2006, p. 41).

A difference between visible thinking routines and those that de Bono offers is that, in addition to being available freely, they are to be used to enhance classroom instruction rather than to serve as standalone skills.

### **Experiment: Testing de Bono's Theories in the Classroom**

As de Bono was inspired by Torrance's work and because his methods are seen to be useful in encouraging DT, which remains the measurement instrument used most widely in the field of creativity, the author wondered whether presenting students with some of his processes might result in increased DT in conjunction with developing a research strategy and designed an exploratory experiment.

The experiment presented 20 undergraduate students in a credit-bearing freshman level information literacy class with an interconnected series of de Bono's thinking tools used in association with the CoRT Thinking Program, TEC-PISCO, which represents a process that can be used for problem solving. The acronym stands for *Target; Expand; Contract; Purpose; Input; Solutions, Choice, and Operation*. TEC-PISCO serves as the final unit in the CoRT program and integrates many concepts covered in previous lessons. It is also used in conjunction with Blue Hat thinking in his Six Thinking Hats program (de Bono, 1985, p. 181).

## Methods

While nearly every frame within the ACRL framework offers general language that affirms the need for students to adopt open minded, exploratory dispositions, only the frame “Searching as a Strategic Exploration” mentions the word creativity specifically (offered as an example of a disposition). It also affirms specifically the need for students to engage in divergent thinking (offered as an example of knowledge practice). This knowledge practice is listed together with others, including the need to identify the scope of a research problem, and the need to identify interested parties who might produce information about a topic. Based upon this, the author imagined that presenting students with de Bono’s TEC-PISCO process might have an effect on the number of interested parties they identified in relation to a vaguely worded prompt about a hypothetical topic.

With permission from the college’s IRB, the author recruited and obtained informed consent from twenty students, all of whom were enrolled in the author’s fall freshman level class, Information Research in the Social Sciences and Humanities. The students included 13 male and 7 female freshmen aged 18-20 years. The author divided the class randomly into two groups, a de Bono group (7 males, 3 females) and control group (6 males, 4 females).

Over a period of several weeks during the semester, the author covered with the entire class a group of concepts in the ACRL Information Literacy Standards related to developing a research strategy, specifically the skills identified by SAILS (“SAILS Skill Sets,” n.d.). At the end of this period, rather than coming to class, the control group was assigned to review an online module related to choosing and focusing on a topic, which reinforced many of the topics that had been covered previously with the class as a whole. They were instructed to return to class for the following session ready to be asked about the concepts.

Members of the de Bono group convened in class as usual, and received an approximately 40 minute presentation of de Bono’s TEC-PISCO framework. At the end of the class, students in the de Bono group were assigned to review the same online module as the control group, and were likewise told to come to the following class ready to be asked about the concepts covered. The TEC-PISCO framework was presented as something that might be useful in developing a research strategy with respect to generating ideas, seeing information from different perspectives, and possibly for uses other than writing papers. The author explained that this framework is not a substitute for thinking, but rather a method to keep considerations related to solving problems organized in a potentially memorable way. Each step of the framework was accompanied by a PowerPoint presentation, and students were given handouts that described each tool. The author did not teach the entire CoRT program, but only the section related to the concept of developing a research strategy. Specifically, the students were presented with the following tools:

- *Target*: Targeting involves identifying the target of the student’s focus (de Bono, 1983, p. 123).
- *Expand*: Expanding includes the student’s exploration of the target by saying as much as can be said about it (de Bono, 1983, p. 123).
- *Contract*: Contracting involves narrowing the information to determine which aspect(s) is (are) most important. The process is said to be applicable generally and can even be used to help solve problems in the subsequent PISCO phase (de Bono, 1983, p. 123).
- *Purpose*: The hyphen in the mnemonic denotes the existence of two separate, but interrelated processes. The P in PISCO (a more in-depth approach than the general TEC method) refers to *Purpose*, which requires the student to identify a goal. De Bono makes distinctions among different purposes a learner may have, such as solving a problem, generating a plan, or making a decision (de Bono, 1983, p. 124). *Purpose* is similar to *Target* (T) in TEC.

- *Input* follows and involves identifying all of the information that goes into thinking that ultimately will result in output. De Bono asks the learner to consider factors such as the setting and scene, people involved, and information available (de Bono, 1983). *Input* is similar to *Expand* (E) in TEC, as it has the learner expand his/her considerations regarding facets related to a topic.
- *Solutions* follow *Input*. Here, the learner is required to identify multiple different solutions by considering obvious, copied, found (imagining “something” that can fulfill the outstanding needs), and improved solutions built upon existing solutions (de Bono, 2013).
- *Choice* is next. Students are asked to make choices from the list of solutions generated by the previous tool (de Bono, 1983).
- *Operation* is the final step in the PISCO process and focuses on carrying out the choices (de Bono, 1983).

During the following class when the entire group reconvened, all students were presented with an ungraded, open-ended, in-class writing assignment related to developing a research strategy in which they were asked to be creative, and to elaborate on how they would develop an excellent research paper for the vaguely worded topic, “Homelessness in our cities,” for a sociology class in which they were hypothetically enrolled. Students had one hour to complete the assignment. After the writing session, the author collected the student papers, removed identifying information from them, and then counted the number of people or groups each student identified in relation to the open-ended prompt to see if de Bono instruction helped the experimental group students think (or describe their thinking) more divergently.

## Results and Discussion

**(See Figures 1 and 2 at the end of the article)**

The results of a blind assessment of each paper demonstrated that, in response to the prompt, the de Bono group identified more ideas in the form of interested parties, as well as more original responses, than did the control group, and these results differed significantly. To determine this, the author identified any people or groups mentioned within each student’s paper, and counted the number of responses offered as a measure of fluency, as well as the number of original ideas. The de Bono group engaged in more DT in terms of fluency and originality.

These results occurred likely because students were prompted with a list of general contextual considerations related to problem solving that involved divergent and convergent thinking at each step, while the control group was presented with a disconnected set of less memorable considerations. The TEC-PISCO problem-solving model encourages and incorporates DT in explicit steps, such as in the *Expand* stage of TEC, and in the explicit instructions it offers in its *Input* and *Solutions* stages. Further, the tools likely provided the message that problem solving and DT are valuable. Another possible explanation for these results is that students were prompted with a memorable mnemonic sequence.

## Limitations of the Study

Admittedly, the author investigated a very narrow facet of student writing. There was no pretest to compare to these experimental results, and an official Torrance test was not used. The TEC-PISCO process was not offered and repeated multiple times throughout the semester to make it a true routine, and the quality or appropriateness of the results as search terms were not evaluated (although at face value, the de Bono group’s original ideas did appear to be more thoughtful). Thus, no claim is made that the responses offered represent the correct or most appropriate keywords one should use to undertake research about homelessness, but rather that they could be seen simply as an indication that students had a greater disposition or inclination to engage in DT because they had more practice and encouragement in doing so.



It is important to understand that DT tests do not measure creativity itself, and that DT should not be viewed as a singular ability or skill, as it is measured differently in different domains. For example, DT tests are presented not only with language cues, but also by using visual images, and there is no relationship between scores on these different tests (Baer, 2011): being a creative short story writer does not make one a creative dancer. It is believed widely that creativity is addressed best in context (Baer, 1998).

By evaluating de Bono's methods using DT alone, one of the most useful qualities of these kinds of processes is actually ignored. Encouraging students to engage in DT on their own in fact limits them to their own conceptualizations.

### **Areas for Future Research**

These kinds of processes are most beneficial when used in groups. This is the area in which de Bono's tools have found popularity and success, and is the theoretical foundation with which Project Zero's Visible Thinking initiative investigates them: as a way to enculturate thoughtful classrooms (Ritchhart & Perkins, 2008); this is another area that should be the subject of future research. Both de Bono's tools and thinking routines that incorporate DT, such as those compiled by Project Zero, can very likely be used in a group library instruction environment to address and discuss classroom readings, images, sources, or objects for the purposes mentioned thus far. In addition to TEC-PISCO, de Bono also offers a wide variety of potentially pedagogically relevant processes with which to investigate learners' values, beliefs, and emotions (especially interesting is his Six Thinking Hats system), all of which involve DT, and some of which diverge to the point of randomness in case the teacher feels adventurous.

With regard to practical uses of the TEC-PISCO framework, it could be beneficial in facilitating group discussions and scaffolding in a problem-based learning environment, or in engaging in a group conversation about how students might approach the topic of a research paper.

To determine whether students had more ideas after being presented with the method because they were prompted with a memorable mnemonic sequence, a future study might be undertaken to investigate this by presenting it with and without the mnemonic sequence.

Researchers should note that De Bono's systems are proprietary. While one can easily find examples of his many tools, one must pay to acquire full access to them. This may be neither feasible nor necessary for librarians. The purpose of this exploration was not to advocate such a purchase. This is especially true considering that there are many other thinking routine examples available free of charge. In addition to those offered by Project Zero, there exist other well-researched and freely available methods that have been validated theoretically and designed to encourage creativity, such as Osborne's Creative Problem Solving process, which in many ways appears quite similar to TEC-PISCO ("The Basics of Creative Problem Solving—CPS: Innovation Management," n.d.). Others include the Purdue Creativity Program, and Productive Thinking. All can provide insights to improve classroom teaching.

Librarians interested in DT may also consider investigating the effects that thinking routines may have by using mind maps, a library classroom instruction method already used commonly. Librarians might also take cues from the way that Project Zero schools investigate the efficacy of such routines: by teachers sharing with each other the thinking products made visible with the goal of modifying and improving their practices.

### **Conclusions**

This investigation confirmed what appeared clear at face value: that de Bono's processes do indeed have the potential to promote thoughtful, exploratory, creative practices in the context of information literacy. Students presented with a range of his tools showed a statistically significant increase in DT, which is an essential capacity in creativity. Therefore, it would appear that other similar approaches encountered while engaging in this investigation also have potential value in promoting DT dispositions, and likely in developing more active, creative, and reflective classroom cultures as opposed to those that promote one-size-fits-all skills. Given that the new ACRL framework provides encouragement to investigate, develop, and experiment with such means, librarians should not be afraid to do so, and apply them creatively to instruction in information literacy.

## References

- Adams, M. J. (1989). Thinking skills curricula: Their promise and progress. *Educational Psychologist*, 24(1), 25–77. [http://doi.org/10.1207/s15326985ep2401\\_2](http://doi.org/10.1207/s15326985ep2401_2)
- Alkahtani, K. (2009). *Creativity training effects upon concept map complexity of children with ADHD: An experimental study*. University of Glasgow. Retrieved from <http://core.ac.uk/download/pdf/9653880.pdf>
- American Library Association. (2015, February 9). Framework for Information Literacy for Higher Education. Retrieved from <http://www.ala.org/acrl/standards/ilframework>
- Anderson, L. W., Krathwohl, D. R., & Bloom, B. S. (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. New York, NY; London, UK: Longman.
- Baer, J., & Garrett, T. (2010). Teaching creativity in an era of content standards and accountability. In R. A. Beghetto & J. C. Kaufman (Eds.), *Nurturing creativity in the classroom*. Cambridge, UK: Cambridge University Press.
- Barak, M., & Doppelt, Y. (1999). Integrating the Cognitive Research Trust (CoRT) Programme for Creative Thinking into a project-based technology curriculum. *Research in Science & Technological Education*, 17(2), 139–151. <http://doi.org/10.1080/0263514990170202>
- Begbie, G. H. (1970). *The mechanism of mind*. By Edward de Bono. London, UK: Jonathan Cape, 1969. Pp. 304-5. *Experimental Physiology*, 55(3), 263–264.
- Birdi, K. S. (2005). No idea? Evaluating the effectiveness of creativity training. *Journal of European Industrial Training*, 29(2/3), 102–111.
- Burgh, G. (2014). Encyclopedia of educational theory and philosophy. In *Creative and lateral thinking: Edward de Bono* (pp. 187–189). Thousand Oaks, CA: Sage Publications, Inc. Retrieved from <http://knowledge.sagepub.com/view/encyclopedia-of-education-theory-and-philosophy/n86.i1.xml>
- Christoforidou, D., Olander, E., Warell, A., & Holm, L. S. (2012). Good taste vs. good design: A tug of war in the light of bling. *Design Journal*, 15(2), 185–202. <http://doi.org/10.2752/175630612X13258652805095>
- CoRTthinking.com. (n.d.). Evidence-Structure. Retrieved from <http://www.cortthinking.com/cort/3/evidence-structure>
- Davidson, T., & Frey, R. J. (2011). Creativity tests. In J. L. Longe (Ed.), *The Gale encyclopedia of children's health: Infancy through adolescence* (2<sup>nd</sup> ed., Vol. 1, pp. 644–647). Detroit, MI: Gale. Retrieved from

[http://remote.baruch.cuny.edu/login?url=http://go.galegroup.com/remote.baruch.cuny.edu/ps/i.do?id=GALE%7CCX1918500223&v=2.1&u=cuny\\_baruch&it=r&p=GVRL&sw=w&asid=3183f5fc3e08a3d98bdc2d1a0odaf2](http://remote.baruch.cuny.edu/login?url=http://go.galegroup.com/remote.baruch.cuny.edu/ps/i.do?id=GALE%7CCX1918500223&v=2.1&u=cuny_baruch&it=r&p=GVRL&sw=w&asid=3183f5fc3e08a3d98bdc2d1a0odaf2)

De Bono, E. (1968). *New think; the use of lateral thinking in the generation of new ideas*. New York: Basic Books.

de Bono, E. (1976). *Teaching thinking*. London, UK: Temple Smith.

de Bono, E. (1983). The Cognitive Research Trust (CoRT) Thinking Program. In W. Maxwell, J. Bishop, & University of the South Pacific School of Education. (Eds.), *Thinking, the expanding frontier: Proceedings of the international, interdisciplinary Conference on Thinking held at the University of the South Pacific, January, 1982* (pp. 115–128). Philadelphia, PA.: Franklin Institute Press.

de Bono, E. (1985). *Six thinking hats*. Boston, MA: Little, Brown.

de Bono, E. (1995). Serious creativity. *The Journal for Quality and Participation*, 18(5).

de Bono, E. (2013). Solutions. Retrieved from <http://www.cortthinking.com/cort/6/s/teachers-notes>

Dingli, S. (2008). Thinking outside the box. In M. Runco, S. Moger, & T. Rickards (Eds.), *The Routledge companion to creativity* (pp. 338–350). Routledge. Retrieved from <http://www.crcnetbase.com/doi/abs/10.4324/9780203888841.ch28>

Eno, B., & Schmidt, P. (2001). *Oblique strategies: Over one hundred worthwhile dilemmas*. [Place of publication not identified]: [publisher not identified].

Gregory, S., & Masters, Y. (2012). Real thinking with virtual hats: A role-playing activity for pre-service teachers in Second Life. *Australasian Journal of Educational Technology*, 28(3), 420–440.

Higgins, S. (2015). A recent history of teaching thinking. In R. Wegerif, L. Li, & J. C. Kaufman (Eds.), *The Routledge international handbook of research on teaching thinking*. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=999230>

Karadag, M., Sarltas, S., & Erginer, E. (2009). Using the “Six Thinking Hats” model of learning in a surgical class: Sharing the experience and student opinions. *Australian Journal of Advanced Nursing*, 26(3), 59–69.

McPeck, J. E. (1983). A second look at de Bono’s hueristics for thinking. In W. Maxwell, J. Bishop, & University of the South Pacific School of Education. (Eds.), *Thinking, the expanding frontier: Proceedings of the international, interdisciplinary Conference on Thinking held at the University of the South Pacific, January, 1982* (pp. 115–128). Philadelphia, PA.: Franklin Institute Press.

McPeck, J. E. (1981). *Critical thinking and education*. New York, NY: St. Martin’s Press.

Moseley, D. (2005). de Bono’s lateral and parallel thinking tools. In *Frameworks for thinking: A handbook for teaching and learning*. Cambridge, UK; New York, NY: Cambridge University Press.

Nickerson, R. S. (1999). Enhancing creativity. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 392–430). Cambridge, U.K.; New York, NY: Cambridge University Press.

Partnership for 21<sup>st</sup> Century Skills. (2008). 21<sup>st</sup> Century Skills, Education & Competitiveness. Retrieved from

<http://wieettassessment.pbworks.com/f/21stCenturySkillsEducationandCompetitivenessGuide.pdf>

Paul, R. (1985). McPeck's mistakes. *Informal Logic*, 7(1). Retrieved from [http://celt.uwindsor.ca/ojs/leddy/index.php/informal\\_logic/article/download/2700/2141](http://celt.uwindsor.ca/ojs/leddy/index.php/informal_logic/article/download/2700/2141)

Plucker, J. A., & Makel, M. C. (2010). Assessment of creativity. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity*. Cambridge, UK; New York, NY: Cambridge University Press.

Powers, M. F., & Jones-Walker, J. (2005). An interdisciplinary collaboration to improve critical thinking among pharmacy students. *American Journal of Pharmaceutical Education*, 69(4).

Project Zero: Visible Thinking. (2015). Retrieved from <http://www.pz.harvard.edu/projects/visible-thinking>

Puccio, G. J., & Cabra, J. F. (2010). Organizational creativity: A systems approach. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity*. Cambridge, UK; New York, NY: Cambridge University Press.

Raven, D., & Smith, C. (2007). *CLIP/CETL professional report 2006/7: Thinking tools for creative learning: Connecting the units* (Report). London, UK: University of the Arts London. Retrieved from <http://ualresearchonline.arts.ac.uk/511/>

Ritchhart, R. (2006). Thinking routines: Establishing patterns of thinking in the classroom. AERA Conference.

Ritchhart, R., Church, M., & Morrison, K. (2011). *Making thinking visible: How to promote engagement, understanding, and independence for all learners*. San Francisco, CA: Jossey-Bass.

Ritchhart, R., & Perkins, D. N. (2000). Life in the mindful classroom: Nurturing the disposition of mindfulness. *Journal of Social Issues*, 56(1), 27–47. <http://doi.org/10.1111/0022-4537.00150>

Ritchie, S. M., & Edwards, J. (1996). Creative thinking instruction for aboriginal children. *Learning and Instruction*, 6(1), 59–75.

Rule, A. C., & Stefanich, G. P. (2012). Using a thinking skills system to guide discussions during a working conference on students with disabilities pursuing STEM fields. *Journal of STEM Education: Innovations and Research*, 13(1), 43–54.

Runco, M. A. (2003). Education for creative potential. *Scandinavian Journal of Educational Research*, 47(3), 317–324.

Runco, M. A. (2014). *Creativity: Theories and themes: Research, development, and practice*. London, UK: Elsevier Academic Press.

Sawyer, K. (2015). Teachers College Record: A call to action: The challenges of creative teaching and learning. *Teacher's College Record*, 117(10). Retrieved from <http://www.tcrecord.org/library/abstract.asp?contentid=18082>

Schellens, T., Van Keer, H., de Wever, B., & Valcke, M. (2009). Tagging thinking types in asynchronous discussion groups: Effects on critical thinking. *Interactive Learning Environments*, 17(1), 77–94. <http://doi.org/10.1080/10494820701651757>

Smith, G. F. (2002). Thinking skills: The question of generality. *Journal of Curriculum Studies*, 34(6), 659–678. <http://doi.org/10.1080/00220270110119905>

Smith, J. K., & Smith, L. F. (2010). Educational creativity. In J. C. Kaufman & R. J. Sternberg (Eds.), *The Cambridge handbook of creativity*. Cambridge, UK; New York, NY: Cambridge University Press.

Sternberg, R. J., Kaufman, J. C., & Pretz, J. E. (2002). *The creativity conundrum: A propulsion model of kinds of creative contributions*. New York, NY: Psychology Press.

Sternberg, R. J., & Lubart. (1999). *Handbook of creativity*. Cambridge, U.K.; New York, NY: Cambridge University Press.

The basics of creative problem solving–CPS Innovation Management. (n.d.). Retrieved from <http://www.innovationmanagement.se/imtool-articles/the-basics-of-creative-problem-solving-cps/>

The RSA. (n.d.). *RSA ANIMATE: Changing education paradigms*. Retrieved from [https://www.youtube.com/watch?v=zDZFcDGpL4U&feature=player\\_embedded#!](https://www.youtube.com/watch?v=zDZFcDGpL4U&feature=player_embedded#!)

Weisberg, R. W. (1986). *Creativity: Genius and other myths*. New York, NY: W. H. Freeman.

### Figure 1: Fluency

#### Control Group Student Paper Identifiers: [A1 to A10]

#### Experiment Group Student Paper Identifiers: [D1 to D10]

Interested Parties Category	Control Group [A(1-10)]  Number of instances	Actual Words Used	Experiment Group [D(1-10)]  Number of instances	Actual Words Used
African Americans	0		1	African Americans [D7]
Authors	2	Creator of the graph [A7] Author [A8]	3	Author/ the original writer [D3] The person you got the information from [D4] People who own the YouTube channel [D7]

Children	0		1	Homeless children [D10]
Citizens	0		1	Citizens/ groups of citizens [D6]
Colleges/ College Students	3	Baruch college/ Hunter college [A2] College students [A3] Students [A9]	2	Baruch student [D3] CUNY student / Baruch College Student [D7]
Communities	0		1	Communities [D9]
Commuters	1	Bums on the train and streets [A10 ]	1	Public commuters in NYC [D2]
Congress	0		1	Congress [D6]
Doctors	0		1	Doctors [D6]
Donald Trump	1	Donald Trump [A9]	0	
Employers	0		1	Employers [D2]
Family	0		4	Homeless person's family [D2] People living in a small room with a family of six [D5] Homeless with family [D6] Homeless family [D9]
Friends	1	Close friends (my) [A10]	0	
Government	3	Government [A4] Government [A6] Government [A7]	6	The government [D2] Government spending [D4] Government's actions [D5] Government [D6] Government/ Government officials who advocate help, and who oppose help [D7] The government [D9]
Government officials who	0		1	Government officials who advocate help, and

advocate help, and who oppose help				who oppose help [D7]
Groups/ programs	3	Nonprofit organizations [A7] Social services [A1] Soup kitchens/ homeless shelters/ places where homeless come to get air/ nonprofit organizations/ homeless shelters [A7]	6	Various programs [D2] Programs and resources/ programs that help the homeless manage their finances and look for appropriate jobs/ interest groups / volunteer groups [D9] Interest groups [D7] Organizations/ groups to help the poor and homeless [D5] Groups of citizens [D6] Soup kitchens [D2]
Homeless	8	Homeless people [A1] Homeless people [A3] Credible people in the field of poverty [A4] Poor/ homeless/ beggar/ tramp/ vagrant/ hobo/ homeless people [A6] Homeless / people who get aid [A7] Homeless / homeless people [A8] Homeless person [A9] Homeless people [A10]	8	Homeless people [D2] Homeless people and their experiences [D3] Homeless people / the bottom 10% of poverty [D4] The homeless /people who are stuck in poverty/ The poor [D5] Homeless population [D6] The homeless/ beggars/ poor/ impoverished people/ people in need/ the needy/ poor people/ the poor [D7] Homeless [D9] Homeless children [D10]
Homeless refusing help	0		1	Homeless people who refuse help [D2]
Homeless with a pet	0		1	Homeless with a pet [D6]
Homeless with	0		1	Homeless with mental

health issues				illness and health problems/ Homeless patients [D2]
Learner/ reader	0		2	The reader [D4] Someone who is an auditory or visual learner [D7]
Librarians	5	Librarian [A1] Librarian [A3] Librarian [A5] Librarian [A8] Librarian/ public library [A10]	1	Librarians [D3]
Middle class	0		1	Middle classes [D4]
MLK	0		1	MLK [D7]
My Sister	1	My sister [A10]	0	
Orphans	0		1	Orphans [D10]
Parks	0		1	Park [D2]
Peers	1	Peers [A9]	0	
President	0		1	A new president [D5]
Previously homeless	0		1	Previously homeless [D6]
Purdue OWL	1	Purdue OWL [A8]	0	
Republicans	0		1	Republicans [D7]
Rich	1	The rich [A3]	1	Rich [D4]
Scholars/ teachers	5	Your sociology teacher [A3] The professor [A6] Sociology professor / My sociology teacher [A8] Formal scholars [A9] Credible people in the field of poverty [A4]	6	Scholars for the certain subject [D1] Sociology professor [D3] Sociology professor/ discipline you are studying [D4] Sociologists [D6] My sociology teacher [D7] Sociology [D8]
Schools	1	Public schools [A4]	0	

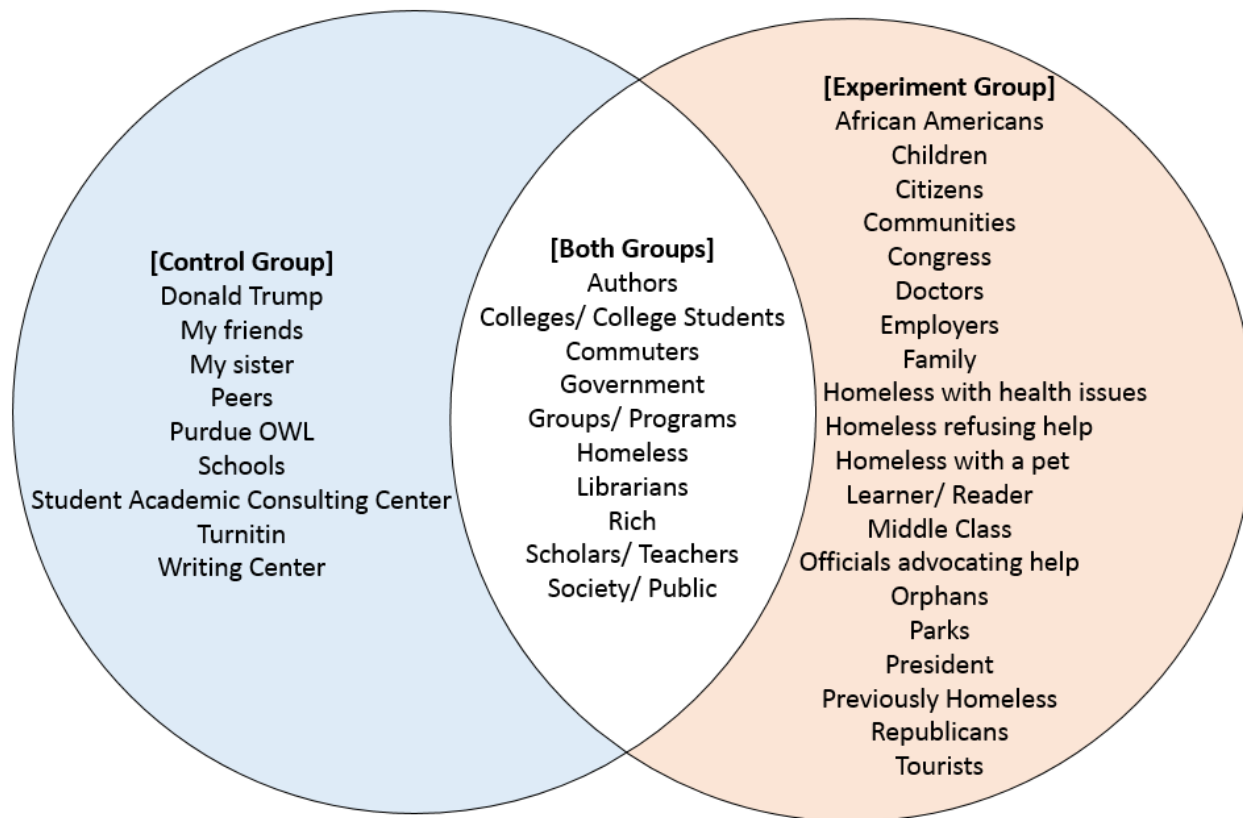


Society/ Public	1	Society / public [A5]	5	Society [D2] The society in cities or countries handling this situation the best or the worst [D5] The public [D7] Society [D9] Society [D10]
Student Academic Consulting Center	1	SACC [A8]	0	
Tourists	0		1	Tourists [D2]
Turnitin	1	Turnitin [A8]	0	
Writing Center	1	The writing center [A8]	0	
<b>Fluency Score</b>	<b>41</b>		<b>64</b>	

**Figure 2: Originality**

**Control Group: 9**

**Experimental Group: 20**



[1] While one might think that finding ways to encourage creativity in the classroom is more likely to distract students from learning than encourage it, this is, in fact, not the case, as “the most effective ways to teach skills and content knowledge often involve the very same activities one would emphasize to promote creative thinking” (Baer & Garrett, 2010). The process of constructing or creating is a highly effective and generally applicable means to engage students, as it allows other types of learning to be incorporated simultaneously (Anderson, Krathwohl, & Bloom, 2001, p. 235).



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