

Critical Discussions

“C3” thinking: Critical, creative and collaborative

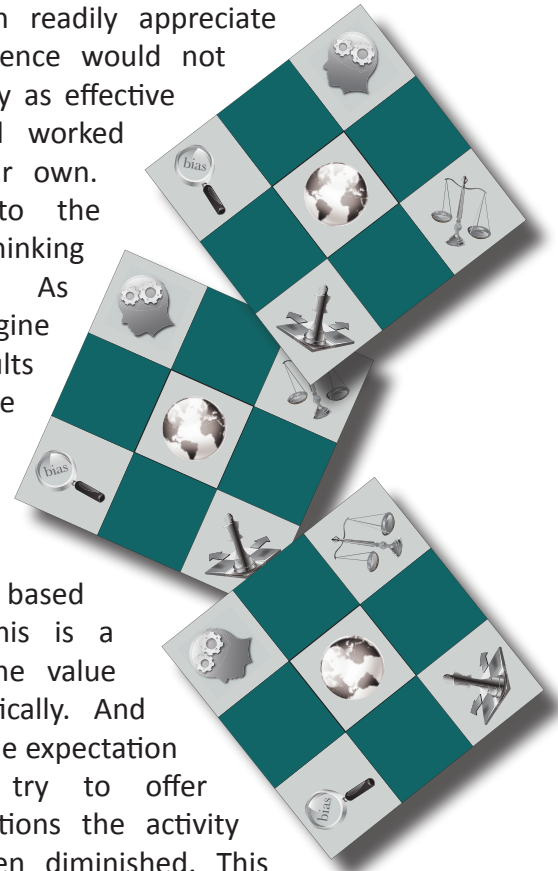
— Garfield Gini-Newman and Roland Case, The Critical Thinking Consortium

This article explains the interrelated nature of three dimensions of thinking—critical, creative and collaborative. More specifically it discusses:

- the merits of an integrated approach to thinking
- common misconceptions associated with each of these dimensions
- ways in which the three dimensions powerfully reinforce each other.

The power of an integrated approach to thinking became evident while working with mathematics teachers in India. By grade six, students in the school we were assisting had had two previous years of memorizing the formula for calculating profit and loss, and applying the formula as prescribed in countless problems. Despite repeated drill, many students were unsuccessful with the problems and most didn't really understand the formula. With support from our team, teachers created several scenarios of simple commercial ventures where the profit or loss was to be calculated. Working in groups, students were asked to figure out the answers as best they could, and then to produce a formulation using as few words as possible (or only symbols if they were able) that represented all of the variables and the relationships among them. Students came up with varied and in some cases imaginative ways of representing their “formula.” Working again in their groups, students tested their draft formulations using different problems to see if they worked in each case. They shopped their version around to other groups to see if they could arrive at more complete, reliable and concise formulations. In reflecting on this experience in a learning log, one student remarked that while this was the third time he had been exposed to the topic, for the first time he understood what he was doing. He wasn't worried that he would forget the formula at exam time, because now that he understood it, the formula was more memorable to him. He went on to explain that even if he did happen to forget the formula, he was confident he could reconstruct it because of this learning experience.

Most of us can readily appreciate that this experience would not have been nearly as effective if students had worked entirely on their own. This testifies to the value of thinking collaboratively. As well, we can imagine the inferior results if students were not expected to test and revise their ideas, but simply arrive at conclusions based on hunches. This is a testament to the value of thinking critically. And finally without the expectation that students try to offer original formulations the activity would have been diminished. This is a testament to the value of thinking creatively. Considered together, they illustrate the synergy and value of seeing effective or quality thinking as a composite achievement.



This article is a slightly adapted version of a chapter, “Critical, creative and collaborative dimensions of thinking”, in Garfield Gini-Newman & Roland Case (2015), *Creating thinking classrooms: Leading educational change for a 21st century world*. Vancouver: The Critical Thinking Consortium, pp. 45-60.



The Critical Thinking Consortium
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Our discussions thus far have intentionally referred to “thinking” rather generally, without trying to define it precisely. The 21st century reform literature has focused particularly on the three forms highlighted in the above scenario: critical, creative and collaborative thinking. As is the case with many complex concepts, their meaning and interrelationships are variously interpreted. When we say we want to our students to “think,” what do we mean by this? Which form or forms of thinking do we have in mind? Creative thinking has often been framed in opposition to critical thinking. The former is typically characterized as spontaneous, productive and non-rational; whereas the latter is often described as deliberative, reactive and logical. Is this a fair and helpful classification? Many discussions of collaborative thinking immediately move to references to cooperative learning. Are these two terms synonymous? Answering these and other questions about the meaning and interrelation of critical, creative and collaborative thinking (C3 thinking) is an important step in conceptualizing and implementing a thinking classroom.

The power of an integrated approach to thinking

The relationship between critical, creative and collaborative thinking can be characterized in three ways:

- as distinct and opposing forms of thinking
- as distinct but complementary forms of thinking
- as intertwined and mutually reinforcing dimensions of one form of thinking.

The chart on the next page illustrates each of these interpretations. But before showing why C3 thinking is best understood as intertwined and mutually reinforcing dimensions of one form of thinking, let’s briefly explain why it matters which interpretation we adopt.

- **More practical.** One reason for a composite form of thinking is that it is simpler and more practical than multiple forms. If they are discreet forms, thinking about a task would require applying a critical lens, then a creative lens and finally a collaborative lens. Alternatively, if they are intertwined, we could approach a task concurrently with one composite lens.

- **Greater effectiveness.** A second reason for preferring an integrated conception is effectiveness. If there are, in fact, discreet forms of thinking, then each can be done effectively on its own, without need of the others. Alternatively if they are mutually reinforcing, we could not do one well without mobilizing the others. Consider what happens when each of the forms is absent. Thinking that is missing a critical dimension would be unsupported and thoughtless. Without creativity, thinking is limited to what is already known and predictable. Without collaborative input, thinking is solitary and isolated. To what extent would we be satisfied with someone who thought critically about an interpretation of a text or about solutions to a problem if his conclusions were always predictable? While we want individuals to think for themselves, how effective are critical thinkers who are always thinking by themselves and never drawing on the insights of others? Similar points can be made about creativity. Do we want “creative” solutions that are unsupported and thoughtless? It is said that great innovations are built on the shoulders of giants. If this is true, what are the prospects for creative output if people are consistently isolated from the ideas of others? And finally, who would want collaborative thinking that was entirely predictable and unsupported?

As these examples show, there is nothing incompatible about wanting to be rigorous in one’s thinking, seeking to come up with new or innovative ideas and building on the ideas of others to further our own thinking. This is why we define quality or C3 thinking as *rigorous thinking that is both productive and reactive, done alone and in concert with others*. Each dimension of thinking reinforces and is relied on by the others. When asking students to think, we want them to understand that they are expected to be rigorous, imaginative and collaborative (even if only to consult a resource for greater background knowledge).

Quality thinking is rigorous thinking that is both productive and reactive, done alone and in concert with others.

The interrelation of critical, creative and collaborative thinking

Distinct and opposing modes

If they are distinct and opposing forms of thinking, no one would use all three at once, and different people might typically rely on one form over the others. For example, philosophers might rely most on critical thinking, artists on creative thinking and negotiators on collaborative thinking.

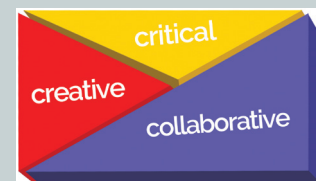
Three separate and very different shapes



Distinct but complementary forms

If they are distinct but complementary forms, all three are helpful, but each serves a discreet function. One form would be used at one time and another in another context. Students would need to be introduced to each form of thinking and helped to figure out when to use each form of thinking.

Three odd shaped pieces that fit into each other shape



Intertwined and mutually reinforcing dimensions of one form

If they are intertwined and mutually reinforcing dimensions of one “form” of thinking, it would be hard to function effectively in any situation without relying on all of them. Students would need to be introduced to each dimension and helped to effectively deploy all three dimensions in almost every situation.

A single shape showing the three C’s



Let us now look in greater detail at each of these dimensions of thinking, and how misconceptions have caused people to view them as discreet, even opposing, forms.

The critical dimension

In our view someone is thinking critically if and only if she is attempting to judge or assess what would be reasonable or sensible to believe or do. And any assessment must always be done in the face of criteria. The close relationship between the terms “critical” thinking and “criteria” is instructive. The word *critical* should be seen as a synonym for *crieterial*. In other words, critical thinking is criterial thinking—thinking in light of or using criteria.¹ The grounding in criteria is what gives our judgments rigour. When thinking critically about a solution to a problem we are not asserting a personal preference (“It’s good simply

because I like it”) or reaching a conclusion based on a dubious set of considerations (“It’s a good solution because it is easy, even if it doesn’t work”). Rather, we are offering a reasoned assessment of the merits of the solution—we are making a judgment based on an ample set of relevant criteria.

Critical thinking involves judging or assessing in light of relevant criteria what would be reasonable or sensible to believe or do.

¹ Lipman, M. (1988). Critical thinking: What can it be? *Education- al Leadership*, 45, 38-43.

Critical is not the same as criticize

A common misconception equates critical thinking with criticizing: teaching students to think critically means encouraging them to criticize everything. This concern typically takes two forms: critical thinking teaches students (1) to be disparaging or “judgmental” and (2) to question and reject all authority. Both are misleading characterizations of the purpose and necessary effect of promoting critical thinking

It is understandable, given the connotation of the term “critical,” that some may equate critical thinking with being negative, harsh and mean spirited. However, this connection is not inevitable and in fact distorts the intention behind critical thinking. Although making judgments is essential to critical thinking, making a thoughtful judgment is not identical with being judgmental. In fact, being judgmental implies rash, one-sided conclusions based on inadequate evidence. These qualities are the antithesis of the attributes of a good critical thinker. Thinking critically is essentially engaging in critique. A good critical thinker is like a respected critic. She is not simply disparaging of things but looks fairly at both the merits and shortcomings. In fact, the inclination to belittle and to ‘tear down’ everything mark the absence of key attributes of a good critical thinker.

Another misleading tendency is to equate critical thinking with being cynical—with doubting or discounting everything one reads and hears. This perception may stem from a tendency among some to stress questioning the opinions of others over self-questioning. The cynical student who discounts the opinions of all authority is no less uncritical than the student who accepts whatever any authority says. Or, as one philosopher observed, “there are two ways to slide easily through life: to believe everything or to doubt everything—both ways save us from thinking.”² A trait of a good thinker is an ongoing attitude of self-reflection. Teaching students to think critically includes getting them to question why they disagree with the opinions of others and it does not mean teaching them to discount the opinions of others. The irony of promoting critical thinking, especially among adolescents, is that it may lead them to be less

dismissive of generally accepted views because they may be helped to appreciate that facile rejection of an opinion is no less thoughtless than is facile acceptance.

Thinking critically applies to everything, not just argumentation

Another misperception is that critical thinking is largely focused on logic and argumentation. Properly understood, thinking critically is usefully applied to any task we may want to undertake. Even seemingly rote tasks such as taking notes can be opportunities to think critically (and creatively and collaboratively). Consider, first, thoughtless note taking. This happens when students write down virtually everything the teacher says or when they record ideas unsystematically without consideration of importance, relevance or accuracy. On the other hand, students can be assisted in treating note taking as a thoughtful task by introducing them to the criteria for judging good notes and by suggesting various strategies such as circling key words, paraphrasing and webbing of ideas. Students are thinking critically about their note taking as they judge whether or not their suggested entries are accurate, relevant, comprehensive and concise. Recognizing that critical thinking is a way of engaging in virtually any task is a reason why all teachers—of art to zoology and of arithmetic to woodwork—should care about helping students think critically.

Creative people need to think critically

It is common among writers who espouse different forms of thinking to sharply contrast critical and creative thinking. This division is often painted in terms of the relentless deliberation and technical rationality of the critical thinker versus the intuitive sensitivity, spontaneous impulse and imagination of the creative thinker. Artists, writers, inventors and other “creative” people often deliberate about their work, considering whether or not their creations meet the aesthetic and technical criteria they seek to effect (e.g., Is their work imaginative? balanced? evocative? functional?). Even when following their intuitions, creative thinkers are likely at some point to step back and assess whether or not their hunches or impulses are worth pursuing. Someone once suggested that an intuition is simply a

² Cited in Ruggiero, V.R. (1996). *Becoming a critical thinker*. Boston: Houghton Mifflin, p. 84.

hypothesis that has yet to be tested. The frequency with which writers and other creators discard drafts of their work and start over is a testament to the role of critical introspection in creative endeavors. Conversely, the image of the critical thinker as unimaginative, unfeeling and overly analytic is a stereotype. Critical thinkers need to be creative—they must speculate about potential implications, generate original approaches and view things from novel perspectives.

Creative Intelligence is about tools, not lightbulbs. It's something we do, not something that happens to us. It's about what happens during those moments of insight, but also *after*; it's the hard work and the collaborations that can help bring your idea out of your mind and into the world.

—Bruce Nussbaum³

The creative dimension

The concept of creativity has been even more contested than critical thinking. Until rather recently it was largely relegated to the arts (and to some extent to science). However, growing concerns about rapidly changing global conditions and competitiveness in a knowledge-based economy have increased the perceived importance of design thinking, innovation and creativity. In this section, we define creative thinking and explore some of the misconceptions that surround it.

Creativity is purposeful, unique and significant

We believe that creativity involves purposeful creation of ideas or products that are novel or unique and have value or significance. Let's consider what each of these terms mean and why they are relevant to understanding creativity.

Creativity involves purposeful creation that is novel or unique and has value or significance.

³ Cited in Thinker in residence: Bruce Nussbaum, author of *Creative Intelligence*. Available at: <http://inthebooks.800ceoread.com/news/articles/thinker-in-residence-bruce-nussbaum-author-of-creative-intelligence>.

- **Creativity requires purposeful creation.** Creativity is something that people do intentionally. The root of “creative” is to “create” meaning that the purpose is produce something—whether it is an idea, a novel argument against a position, a work of art, a new dance move or an original solution to a problem. If creativity is intentional, how can we account for famous inventive accidents such as Archimedes’ discovery of the displacement of objects while sitting in his bath tub? Saying that Archimedes’ principle—which he had been exploring for years—was a great creative advance is not incompatible with saying that the insight which triggered his discovery was a fluke accident. This is because creativity is attached to the ideas, actions and things we create and not to how we got there. Countless others have sat in their baths observing objects—there is nothing inherently creative here. The Archimedes incident became creative only because of the nature of the product that emerged, not because of any special type of activity—one may be creating while sitting at their desk, experiencing the sensations as they walk in the woods or meditating. Often people will perform certain tasks such as listening to music, brainstorming with others and thinking through “what if” scenarios with the explicit hope of producing original ideas. But it is not the inherent nature of the thinking that makes any of these activities creative. A designation as creative depends on the qualities of the product that emerges.

- **Creations must be original or unique.** Only things that are novel or unique in some way can be considered to be creative. We do not use the term creative when the “creation” is indistinguishable from what already exists or is widely known. There must be some novelty to justify use of the term.

- **Creations must have value or significance.** Not every unique idea, thing or action is creative. It is generally thought insufficient to warrant designating something as “creative” merely if it had never happened before. The novelty must have value or contribute something that is in some way or in some circles deemed useful or significant. For example, we don’t characterize the configuration of scattered pieces created by dropping a glass on the floor as creative. It may be a “unique”

design—broken glass may never previously have been distributed in exactly this array—but it has no particular value or merit. The significance may be very tangible, such as curing a devastating illness or designing a cutting edge mobile device but it can also be ethereal such as producing something of great beauty or insight. Debates in the art world over controversial paintings or performance art are very much a question of the aesthetic merits of a work. Typically they are unusual pieces, but that is not a sufficient reason to warrant placing them in gallery. Although conclusions about the value of an original work may be subjective, the fact that the debate occurs is proof that providing value is an aspect of creativity. The concern that creative efforts have some value or significance—even if only in a modest way—is particularly important for educators. There is little point in devoting educational resources to encourage students to think differently if nothing of value is expected to emerge from it.

Creativity doesn't imply genius

There is a perception that something must be truly original and of profound value before it qualifies as creative. Contemporary talk about the importance of creativity and innovation is often accompanied with stories of the Steve Jobs' and Bill Gates' of the world who transformed the lives of billions of people. So too teachers often discuss creativity in the context of scientific and artistic geniuses who radically changed the world. If our goal is to nurture the critical, creative and collaborative dimensions of thinkers, focusing on the creative giants is akin to setting expectations for students in physical education classes to become world-class athletes and students in English classes to be Nobel winning writers. Clearly this is an unrealistic expectation for the vast majority of students. Is creativity to be understood as an elitist goal that applies only to the best and the brightest? What place, if any, does creativity have in the lives of the vast majority of students?

We can better understand the sense in which creativity is an achievable goal for all students by distinguishing two categories of creativity:

- **“Big C” creativity.** This term indicates that the product must represent a significant departure from what existed before anywhere in the world or have huge value or merit on a very broad scale. “Big C” creativity innovations are the ones that get described in books on the history of business, science and art, and that enrich the lives of millions of people. We typically refer to “big C” creators as geniuses. Certainly schools should do everything they can to nurture these individuals, but this is not a realistic goal for most of us. Nor is it what we have in mind by the creative dimension of a thinking classroom.
- **“Little c” creativity.** This term indicates that the product must represent a departure from what the individual or local circle has been doing and have value or merit for the person or group. It refers to the ways in which people solve everyday problems by going beyond what they have typically done to bring about useful or insightful solutions. These “little c” creative moments arise when parents find imaginative ways to prepare a tasty meal using leftovers; or children invent new playground games with whatever is at their disposal; or the stranded driver rigs a twig to temporarily fix the engine of her car until she can get to a service station. While these achievements may seem modest on a grand scale they are essential to functioning in the world around us. Think of the countless situations our students encounter each day that could be solved with a little bit of creativity. This includes deciding what to do when they have lost their pencil and no one is around to provide one, or when their zipper is stuck and pulling hard doesn't seem to work, or when their best friend won't talk to them and they have asked three times why not. In school, “little c” opportunities arise within almost every learning situation such as when students are asked to think of possible explanations beyond the obvious reasons, to generate an interesting title for their paragraph or to figure out how to solve a math problem when the conventional approach isn't working. While their solutions won't transform the world, they will enrich almost every idea or product students create in school and beyond.

Nurturing creativity is about tools, not light bulbs

For centuries it was suggested that creativity arises from the possession of a unique mind or a mysterious spark of inspiration, often divinely sent. While there is no doubt that some individuals are imbued with a natural ability to generate creative ideas, it is equally true that schools can cultivate “little c” creative capacity within every student. We readily acknowledge that some students are inherently more intelligent thinkers than others, and will likely be much better students than most. This does not mean that we do not try our best to raise everyone’s ability. The same can be said about creativity—while some individuals will be naturally more gifted, creatively speaking, all of us can be improved with support.

At the heart of creativity is the ability to see the unusual in the ordinary, to reconfigure accepted ideas into new and fresh combinations. This requires two things: a steady supply of new ideas that may stimulate our thinking and mechanisms for juggling the possibilities in unique ways. Naturally creative people instinctively are disposed to see the world differently. Or to put it another way, they are hard-wired to generate new ways of seeing the familiar. It is suggested that the downside of naturally creative individuals is a difficulty in seeing the world in conventional ways. They may struggle to “see” the world as the majority of us do. The rest of us—the more “conventional thinkers”—can leverage our limited naturally creative instincts by employing idea-generating strategies. Talking to others, especially people who are dissimilar to us, brainstorming alone or with others, reading widely and even travel are ways in which each of us can access new ideas to think about. We can also employ strategies to help us reconfigure the ideas we have. These strategies include looking at an idea or object from different physical and intellectual points of view, physically reconfiguring elements or components in different ways, exaggerating features or sometimes simply putting things aside and coming back later with a fresh pair of eyes. The point is that creativity is not simply a matter of being “inspired,” it can be nurtured. What is worth noting is that many of these so-called creative strategies are also useful in thinking collaboratively and critically.

The collaborative dimension

Collective intelligence will always trump individual intelligence.

—Albert Einstein

It has never been more important than the present that students learn to think for themselves but not by themselves. This means being open to seriously engage with and build on the ideas of others but also being able to filter and assess these ideas in light of the student’s own values and beliefs. The fruitful interchange of ideas is the essence of collaborative thinking.

Collaborative thinking involves seriously engaging with and building on the ideas of others for mutual benefit.

Collaborative thinking is different from cooperative learning

There are important points of connection between cooperation, cooperative learning and collaborative thinking. All are concerned with increasing people’s ability to function effectively together. Cooperation is the most general of the three terms and is concerned with enriching how people work and live together. Cooperative learning is less broad with its concern for enriching how students learn together. Collaborative thinking is the narrowest of the three in its concern for enriching how people think together. Thinking together is and should be a part of the other two, but it is not always the case. In discussion, students may simply offer their opinions without building on anyone else’s ideas, and while they may be listening, no one may actually be thinking seriously about what the others are saying. In other words, students may be highly cooperative without thinking collaboratively. A focus on collaborative thinking calls attention to a gap between cooperating and thinking together. Consider the following examples:

Class debates. One of the hallmarks of a cooperative group is the ability to respectfully disagree with each other. Nowhere is this more in evidence than in the conventional class debate. While debates are useful activities, they may not support students in learning to think effectively with others. The implied messages in debates are threefold:

- issues are ‘black and white’ (you are either for or against the issue and the other side is the enemy)
- the objective is to win the argument
- students are discouraged from changing their minds (they can’t switch sides half way through the debate).

Unfortunately, these lessons are antithetical to collaborative thinking. To think collaboratively, students need to appreciate that:

- most issues involve many shades of grey spanning a spectrum of legitimate perspectives
- the goal is to arrive at the most sensible position for the person on the issue
- being open to others means changing one’s mind in the face of new ideas and evidence.

In short, while class debates encourage cooperation, they do necessarily promote collaborative thinking. A more productive alternative that teaches about collaborative thinking, called the U-shaped discussion, is described in the shaded box.

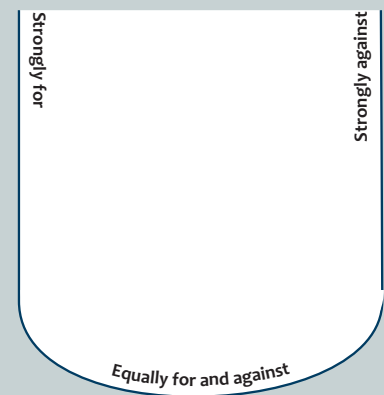
U-shaped discussion

The U-shaped discussion strategy can be used with students and adults to help them appreciate the spectrum of views on an issue and to encourage a genuine exchange of ideas.

Instructions

- Arrange the chairs in a U-shape.
- Ask the participants to situate themselves along the “U” based on their initial position of the issue. Participants with polar views (i.e., strongly agreeing or strongly disagreeing) would seat themselves at either tip of the “U”. Individuals with mixed opinions would sit at appropriate spots along the rounded part of the “U”.
- Begin by inviting individuals at each tip of the “u” to state their opinion and offer a few reasons only (if there is an imbalance in strong support for one side or the other, locate yourself temporarily in a polar position to get the discussion going).
- Alternate from side to side, as participants from all parts of the “U” offer their views.
- Encourage participants to physically move along the spectrum if they have heard reasons that cause them to want to shift their thinking on the issue.

Afterwards, debrief the discussion: What comments made you think the most? Did the discussion cause you to change your position? Do they now think differently in any way about the issue?



Assigned group roles. A popular cooperative learning strategies involves assigning students to play a specific role in a group assignment—say, as a checker, note-taker, encourager and so on. While each student’s role complements the work of the others, they are not supported in putting their minds together. In fact, it is more likely that they will be distracted from the thoughtful exchange of ideas because of a preoccupation with fulfilling their primary role. In short, each group member may do their job effectively and still the “give and take” of ideas could be rather low and of poor quality. Collaborative thinking would be enhanced if overlaid on their assigned roles was a structure to encourage students to engage with each other’s ideas. The placemat structure, described in the box, is an example of an activity that reinforces collaborative thinking.

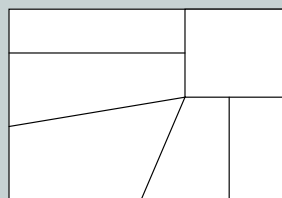
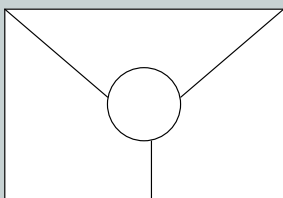
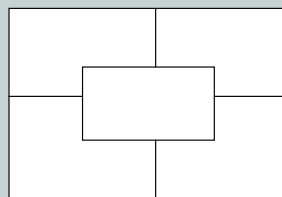
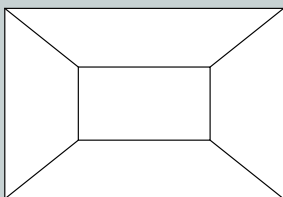
Placemat discussion structure

The placemat structure can be used with students and adults to help formulate their own ideas before discussing with others and then to encourage a genuine exchange of ideas when they share with others.

Instructions

- Students organize into groups of 3–5 with a large piece of chart paper at each table. Groups draw a placemat on the chart paper with one section for each group member and a common section for a collaborative response.
- Students write quietly on their own for several minutes in a section of the placemat immediately in front of where they are seated.
- Students listen as they share one-by-one what they have recorded in their respective sections of the placemat.
- The group tries to agree on shared concerns, concepts and ideas, and records these in the common section of the placemat.

Afterwards, debrief the discussion: What comments made you think the most? Did the activity alter your thinking in any way about the topic?



Sample placemat formats

There are several ways to draw a placemat depending on the number of group members and their seating arrangement.

Thinking collaboratively is not simply conferring with others

One of the most powerful means for thinking collaboratively is the exchange of ideas with others in direct conversation. But one can think collaboratively without talking to anyone. In fact, thinking collaboratively can occur, metaphorically speaking, with someone who has been dead for centuries. These “conversations with the past” are typical of what scholars do when they probe the views of great thinkers: What would Einstein have said about a particular issue if he were alive today? How does Plato’s view differ from mine? While we cannot expect the same level of analysis from students, the reality of the so-called “information age” is that students are accessing the ideas of countless historical and contemporary people they will never meet. The popular impression of the Internet is that the answers to all of our questions are simply out there waiting to be retrieved. Rather than treating information from digital sources as static entities, students can engage with the ideas they access digitally: Do I really understand what it says? Are these ideas consistent with my own experiences and beliefs? What implications might this new information have on my other beliefs? What questions might I have about the ideas expressed? It is worth noting that none of these questions invite an overt critical assessment of the views, they simply seek to explore their meaning and implications. In short they seek to establish a conversation in one’s own mind with the author. This is not fanciful expectation but rather it is what, for example, teachers of literacy do when they encourage their students to read between and beyond the lines.

Collaborative thinking is an important method of learning

Collaborative thinking, along with critical and creative thinking, are fundamental engines of learning. Students need to learn how to think collaboratively so they can learn effectively with and from others. This is why it needs to be at the centre of a thinking classroom.

- Understanding requires multiple perspectives. The importance of sharing perspectives in building understanding is famously captured in the story of the six blind men who each encounter a different part of an elephant. The person touching the tail thinks the object is a vine, the man touching the leg thinks it is a tree trunk, and so on. Although

there is an independent reality world, our ability to make sense of and interpret that world, illustrated by the partial view held by each man in the story, is limited by our perspective. To a logger a tree is an economic resource, to a squirrel a tree is a home, to a spiritualist it is a living entity whose life is as sacred as any person’s. No one has to accept everyone else’s view of the world, but it is impossible to understand the world—to understand why some people will risk their lives to cut down a tree and others will risk their lives to save a tree—without some understanding of each other’s perspectives. Learning to understand the world includes learning how others see the world and informing our own perspective by those of others.

- Innovation occurs by building on the shoulders of giants. As was seen in the previous discussion, one of the myths of creativity is that great creators simply invent their discoveries out of the blue. Virtually even significant achievement has been arrived at because a number of individuals have been able to build on the ideas and experiences of their predecessors and peers. Collaborative thinking is the engine of creativity. But we must be careful to recognize that, in a didactic classroom, the ideas of others, especially those in authority, may undermine creativity if they are accepted without question or modification. In a thinking classroom, the intention is to learn from others but not be limited by the views of others. Developing the capacity for collaborative thinking is key to learning to think for oneself, but not by oneself. Creativity can develop only in such an environment.

Concluding thoughts

We have suggested that critical, creative and collaborative thinking are profoundly interrelated. Considerable creativity is required for good thinking, considerable critical reflection is involved in being creative, and both are aided by building collaboratively on the ideas of others. Our interest in these dimensions of good thinking is not exclusively because they are important 21st century competencies. They are, as well, an orientation through which students can approach all learning: When asking students to think as they work through the curriculum, we want them to understand that they are expected to be rigorous, imaginative and collaborative in this pursuit.