Today's students will need such tools to tackle the problems they stand to inherit. Climate change, income inequality, and escalating health-care costs cannot be remedied by technocratic solutions alone, say advocates of teaching creativity. Knowledge will need to be combined across disciplines, and juxtaposed in unorthodox ways.

Deans, provosts, and faculty members are also aware that many of their students will shift careers several times in their lives and work at jobs that do not exist yet. If students can gain some facility with creative thinking now, colleges reason, perhaps they will be more adaptable both as employees and citizens in an uncertain future. This growing appreciation of the practical, societal, and personal value of learning creative skills has prompted colleges both large and small to make creativity a compulsory part of their undergraduate education.

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In Focus

Instructor Susie Thiel leads U. of Kentucky students in an introductory dance class, part of Kentucky’s new focus on creativity in its core curriculum.

Creativity: a Cure for the Common Curriculum

By DAN BERRETT

Einstein was blessed with a rare genius. He also understood the intellectual weight of a flight of fancy.

When he was 16, he wondered what would happen if he were to ride alongside a beam of light.

He turned over the idea in his mind for a decade before concluding that the light beam next to him would appear to be at rest even though it was traveling at the speed of light. Einstein's image eventually helped unlock one of the most-consequential theories in the history of science: his special theory of relativity.

It was not the force of his intellect that was most responsible for bringing the theory into existence, according to Walter Isaacson’s 2007 biography of Einstein. “His success came not from the brute strength of his mental processing power,” he wrote, “but from his imagination and creativity.”

While it may be tempting to focus on Einstein’s cognitive supremacy, it makes more sense, faculty at some colleges believe, to train students in how innovative thinkers like him use the tools of creativity to solve problems.

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which they produce a painting, poem, musical performance, piece of technology, or design an experiment or mathematical proof. And Bryant University requires students to take a first-year seminar in design thinking.

Adrian College, in Michigan, started an Institute for Creativity to weave the subject into the curriculum. The University of Kansas and the City University of New York recently adopted new general-education requirements that students in all disciplines take a course to develop their creative skills.

One of the earliest and most pervasive efforts is at the University of Kentucky, which started in the fall of 2011 to require its undergraduates, who number more than 20,000, to take a three-credit course in creativity.

The goal in developing students’ creative skills, say these institutions, is to train them to look at familiar problems or sets of data and view them from a fresh perspective.

The global pace of change makes creative capacities essential, says Robert J. Sternberg, a professor of psychology and provost at Oklahoma State University, where the Institute for Creativity and Innovation trains faculty members in teaching creativity and sponsors a campuswide creativity challenge.

“How is our society going to compete in a global economy if we’re teaching students how to adapt to yesterday’s world or to today’s world?” asks Mr. Sternberg, who studies creativity. “We’re going to be left behind in the dust.”

To skeptics, who sometimes include students and taxpayers, the notion of teaching creativity conjures images of classrooms full of students laboring in front of easels in a misguided attempt to become the next Picasso. Such assumptions bear little resemblance to what colleges are attempting.

Creativity is not synonymous with art or beauty. The value is in “the thought process itself,” says Thomas R. Fisher, a professor of architecture and dean of the College of Design at the University of Minnesota-Twin Cities, and an expert in design thinking. Such patterns of thinking train people to use metaphor and analogy to reframe problems, break them down to component parts to view them from different perspectives, and work iteratively—that is, revising again and again—to find answers.

The approach can apply to any discipline, he says. “We want to create more creative businessmen, engineers, and mathematicians.”

Creativity, when conceived of as a thought process rather than an inherent attribute or talent, has theoretical roots in psychology and philosophy.

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J.P. Guilford, the psychologist, drew a distinction between two forms of thinking, convergent and divergent. With its frequent use of standardized tests, education today tends to skew heavily toward convergent thinking, which emphasizes the importance of arriving at a single correct answer. Divergent thinking, however, requires coming up with alternative theories and ideas, sometimes many of them, to produce a useful solution.

Guilford devised tests of divergent thinking, including one in which the test taker invents as many uses as possible for a paper clip. Children typically clobber adults on this test, says Mr. Fisher.

“Humans are naturally playful, creative beings,” he says. “We’re doing something to kids in grade school that drags the creativity out of them.”

The philosophical antecedents harken to the late 19th and early 20th centuries, when Charles Sanders Peirce, the American pragmatist, drew on the forms of inductive and deductive logic categorized by Aristotle in his *Prior Analytics*. Peirce added a third strain of logic, which he often called abductive.

Each has its advantages. Deductive reasoning confers a high degree of certainty in its conclusions. Inductive logic works well when data are readily observable. Abductive logic, Peirce posited, relies on inference to make creative leaps in situations in which information is incomplete. It yields a large number of possible answers.

The emphasis in the curriculum on Peirce’s and Guilford’s ideas is particularly notable given the current context. Colleges are weathering criticism that they fail to prepare students to be productive citizens and effective employees. Traditional humanistic disciplines must continually justify their relevance. The rising cost of college is adding urgency to the popular perception that colleges’ main task is to train students in practical skills that will enable them to get jobs.

Practically focused programs in business have been among the first to embrace creativity and design thinking in their curricula. Such efforts typically serve these programs’ efforts to teach entrepreneurship and innovation, which are thought to spark new businesses, create jobs, and stimulate the economy.

Established companies understand the value of creativity, too. IBM surveyed 1,500 chief executives in 33 industries around the world in 2010 to gauge how much they valued characteristics like creativity, integrity, management discipline, rigor, and vision in an increasingly volatile, complex, and interconnected world. Creativity topped the list.

The appreciation for creativity is also growing despite lingering cultural baggage. For many, the belief persists that creativity is a rare gift given to a select few. According to this view, artists and creative thinkers are lone geniuses with innate talent who must rely on flashes of inspiration that arrive without warning. These “myths” are ultimately destructive, says R. Keith Sawyer, an associate professor of education at Washington University in St. Louis who studies creativity and learning.

Students express themselves in a U. of Kentucky dance class. Undergraduates there have a creativity requirement as part of the core curriculum.
“It’s a matter of hard work, and a lot of it, and consistently engaging in practices that help you come up with good ideas,” he says. “It’s a series of small sparks over a long period of time.”

Creative courses at the University of Kentucky try several ways to produce those sparks. The university’s creativity requirement came about when its previous general-education curriculum was being revised, dropping from 45 required credits to 30 in four thematic areas. The arts-and-creativity requirement is part of a 12-credit “intellectual inquiry” cluster that also includes one course in the physical and natural sciences, or mathematics; one in a social science; and one in the humanities.

Rather than confine the creativity requirement to arts courses, Kentucky welcomed proposals across a range of disciplines, says Benjamin C. Withers, a professor of art history and interim associate provost for undergraduate education. He shepherded the new creativity requirement into being, and says the decision to allow different types of courses to fulfill the requirement bolstered faculty members’ support for the idea.

The decision also acknowledged that creativity takes many forms, Mr. Withers says, and can be as applicable to the natural, physical, and social sciences as any other discipline. Kentucky students can satisfy their creativity requirement in an art, dance, music, or theater course. Or they can take one in chemical engineering, geography, or landscape architecture.

Faculty members must arrive at their own definition of creativity and build their courses around it. Some seek to develop unconventional thinking in students, encouraging them to try something new or put themselves in positions in which they might fail.

The common thread, no matter the discipline, is that students must produce an original work, be evaluated by their peers, and re-vise their work based on that feedback. “Re-finishing a paper or work is an essential part of learning,” says Mr. Withers.

The value of the process is premised on receiving high-quality feedback from peers and the instructor, but this practice is not easy for students to master. During a session of “Introduction to Digital Art, Space, and Time,” early in the semester, Sarah Wylie A. VanMeter, a junior, projected her student’s “personal symbiosis collages” on a screen. The assignment called on them to create a digital collage, using photographs and found images, to symbolize aspects of their personalities and lives that others do not know about.

Pairs of students took turns standing next to the screen offering critiques of their classmate’s work. Each session lasted about seven minutes. Ms. VanMeter directed their attention to a nearby list of factors to consider, including balance, contrast, flow, movement, repetition, rhythm, and variety.

“This isn’t about what you like and don’t like,” she told the students. “It’s what works and what needs work.”

One student’s image came up. It was of a landscape with three walls in the foreground, and a man and a woman walking toward the horizon opening to a brilliant sky. Alex Mattingly, a freshman, grasped for words as he critiqued it.

“If you can get a mood or a tone off of it? Ms. VanMeter asked.

“I feel it’s surreal,” he said. “I feel, I’ve got a word, I’m trying to fit the word ‘accomplish-ment’ in there.” The feeling he got from the collage, he said, is of walking toward a destination.

Street Phillips, who created the piece, explained that the image represented his religious faith; it was taken during a mission trip to Haiti the previous summer. The brick walls on the lower half of the image represented conformity, “It’s the path of life, really,” he said.

Even though Mr. Mattingly searched for words in front of his classmates, he said after the class that it was refreshing. “Compared to my other classes,” he said, “this is the only one that asks me about myself.”

Reducing students’ fears and inhibitions around art while also getting them to think in new ways is part of what Marty Henton, a senior lecturer in the School of Art and Visual Studies, aims for in her class, “Pathways to Creativity Through the Visual Arts.”

In class, she often invoked a sense of childlike wonder as she explained the assignment. “Even though I show you the path to walk on,” she said, “I want you to jump into the grass and play.” Pairs of students sitting at computers selected a digital image from the Internet and manipulated it in Photoshop at least 30 times, exploring different ways to make it unrecognizable. In other words, they were developing their divergent-thinking skills. Then they had to practice convergent thinking by distilling their batch of 30 to a sequence of 10 images, which were supposed to start from the most recognizable image and finish with the original.

Her other exercises have called on students to perceive the familiar in new ways. Early in the semester, Ms. Henton blindfolded students and handed them household objects. They felt them with their hands and tried to draw them while still blindfolded. Later, they took off the blindfolds and drew their images again, this time using their nondominant hands and a marker attached to a dowel rod. Eventually, they drew it eight times, subtly changing the emphasis and perspective each time. One student’s series of drawings began with an eggbeater and, image by image, transformed into a unicycle.

Ms. Henton likes to explain in class that she wants students to “get out of their comfort zone” and return to a 3-year-old’s sense of wonder, openness, and experimentation. “I’m trying to get them back to where they were free.”

Such playfulness has a way of arousing ire. After a local newspaper ran an article in 2011 about the new core, for example, a few readers complained that the creativity requirement was a rip-off; students, one wrote, were paying to learn “finger painting.”

At least a small portion of students may agree. On course evaluations completed by that minority, says Mr. Withers, the associate provost, there’s a common refrain: “Why are you making me take this worthless, do-nothing class?”

Teachers of creativity say their courses require rigor, but it’s deceptive. Creative tasks are, by their nature, ambiguous, with no clear right or wrong answer, they say. Such tasks require taking intellectual risks, trying, evaluating, and discarding ideas, and making connections. To check whether these mental processes are actually happening, students at Kentucky must complete writing assignments for each project; faculty and administrators collect samples of finished works and use rubrics to assess them.

The landscape-architecture course, “Living on the Right Side of the Brain,” puts students through exercises that call on their ability to construct metaphors and analogies and make cognitive leaps from one context to another.

Ryan Hargrove, an assistant professor of landscape architecture, described a simple exercise based on similarities. Start with a simple question: How are an apple and orange similar? One might begin with the obvious. Both are fruits, have peels and seeds, and are found at the grocery store. Keep going and the associations start to become more unusual and personal: Perhaps you recall the time that an apple peel got stuck between your teeth, or the morning when you drank orange juice and the acid hit the blister on your tongue and...
Achallenges students to use metaphor and analogy in their thinking.

Ryan Hargrove, an assistant professor of landscape architecture at Kentucky, challenges students to use metaphor and analogy in their thinking.

**“The key to creative problem solving is making connections that are unique.”**

In class, he told his students that they were toy developers for Mattel. He gave each pair of students a 36-inch cardboard tube, a ping-pong ball, and a roll of duct tape. Using these ingredients, metaphor and analogy, and an image (such as fishing, bowling, pogo sticks, or an apple), they had to come up with an original game in 25 minutes.

The students could not simply make a game that was directly connected to their image using their materials. They needed to make leaps, and identify them.

They might start from an image of an apple, Mr. Hargrove told them. Then they might make a jump to Apple computers, then to apps like Angry Birds. Their game might involve knocking objects over.

In Mr. Palmer’s game, one player picked up cardboard rings spread on the floor while his opponent started from a photo of a baseball bat made him think of the Harry Potter stories and the game Quidditch, specifically the position of the beaters, whose job it is to hit a ball with a small club. The bat made him think of the Harry Potter stories and the game Quidditch, specifically the position of the beaters, whose job it is to hit a ball with a small club. He walked around the classroom as students sawed at their cardboard tubes, bounced ping-pong balls off tables, and taped sections of tubes to the brick walls. “A combination of beer pong and jai alai?” he said to two women. “That ought to be interesting.” He suggested that two others try their blow-dart idea.

When the time elapsed, a few pairs of students offered their proposals for review.

Keenan Palmer, a sophomore majoring in landscape architecture, explained how he and his partner started from a photo of a baseball player. The hat made him think of the Harry Potter stories and the game Quidditch, specifically the position of the beaters, whose job it is to hit a ball with a small club. In Mr. Palmer’s game, one player picked up cardboard rings spread on the floor while his opponent tried to pelt him with the ping-pong ball. The one picking up the rings used a short section of tube to defend himself from the ball. “You can see the layering of the analogies here,” Mr. Hargrove told Mr. Palmer, and smiled. “You made those leaps we talked about.”

As satisfying as such moments may be for professors who teach creativity, their ultimate effectiveness may be limited. Teaching an entirely new way of thinking to students is a tough job, especially if it’s expected to take root after a single class.

For his dissertation, which he completed in 2007, Mr. Hargrove analyzed a group of more than 120 design majors at North Carolina State University, where he earned his Ph.D. Some of the students took courses in which they were explicitly trained in the theory and practice of design and creativity. Those receiving the explicit training showed continually higher levels of creativity on assessments than the control group did.

If it takes such explicit training to raise creativity levels among would-be designers, what hope does a student majoring in, say, social or natural sciences have in adopting divergent ways of thinking after one course?

The question leads Mr. Sternberg, of Oklahoma State, to see efforts at Kentucky and other institutions as an encouraging step, but ultimately insufficient.

When colleges encourage students to be creative in their creativity class, but nowhere else, it confines this style of thinking and prevents students from taking risks and making intuitive leaps.

“They get mixed signals,” he says. “We set them up.”

Creativity should instead be infused across the curriculum and assessments, Mr. Sternberg adds, and be part of how students are screened and admitted. Otherwise, “there’s a mismatch in what we want to teach and what we’re assessing,” he says, “and that’s a bad situation.”