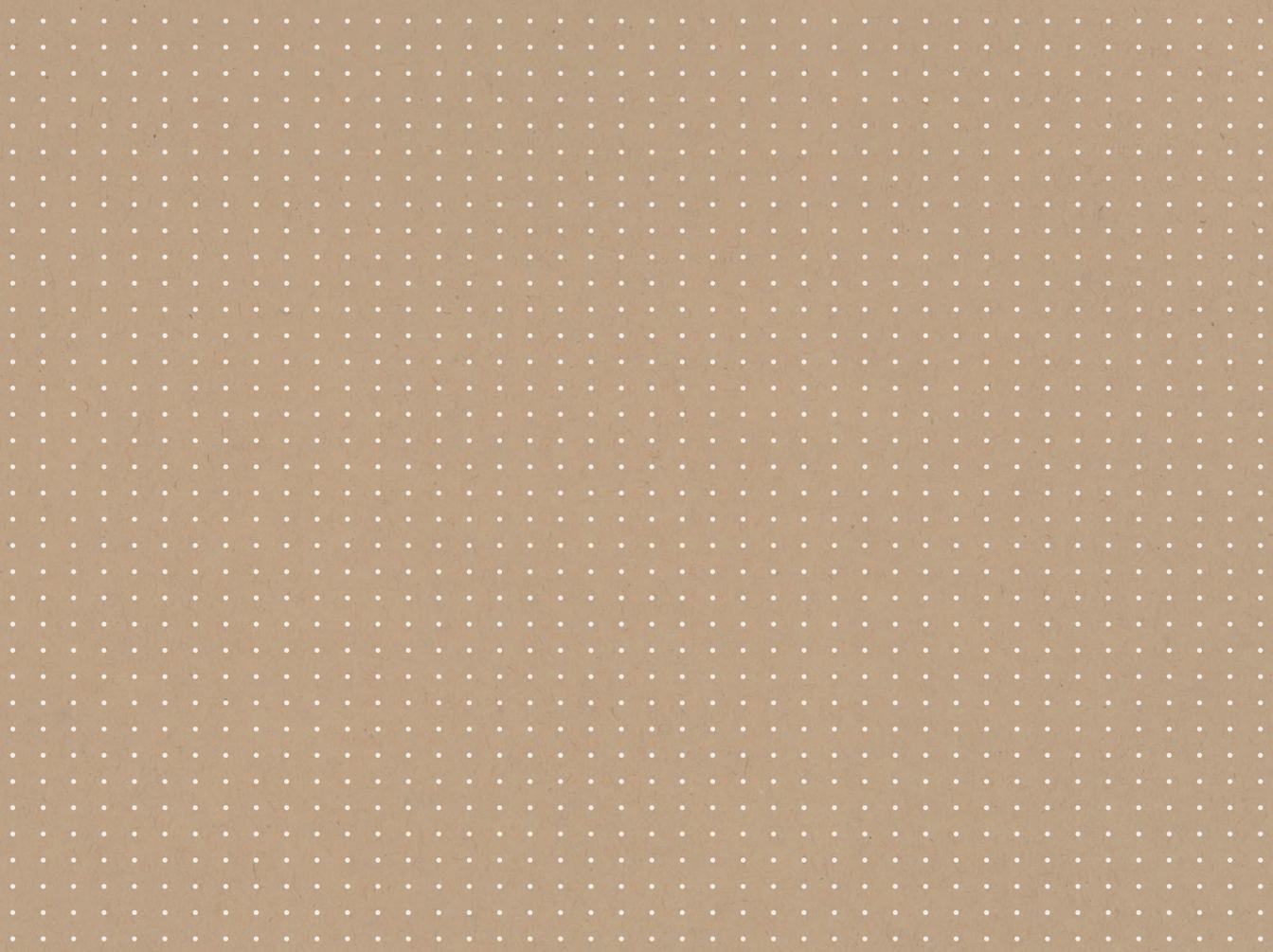


Steelcase Education

**rethinking  
success.  
sparking  
creativity.**



04

## **a revised lesson plan for student success**

22

## **teaching the creative process: think, make, share**

This booklet explores two key issues in education. The first is about stepping back, rethinking old norms and bringing disruptive innovation to learning spaces to help students succeed. The second article focuses on the creative process: helping students find new ways to think, make and ultimately share their ideas.

# a revised lesson plan for student success

**There's growing concern among students, parents, educators, administrators, governments and employers: The return on investment in education needs bolstering, and that requires an updated perspective, new strategies and new metrics for student success.**

For too long, students have been expected to master a defined body of information, mostly through memorization and recall. Student success has long meant coming up with correct answers on tests, getting passing grades, advancing to the next level of coursework and ultimately graduating on time.

But now, education thought leaders are adopting a different perspective on the issue of student success. Their efforts are fueled by concerns that new discoveries from cognitive and behavioral science aren't being applied, and technology isn't being adequately blended into teaching and learning. They're troubled by student disengagement, which, according to Gallup, increases as students advance from grade to grade. They have growing concerns about the potential irrelevance of required subjects that only a small fraction of people now use in daily life and the amount of focus put on memorizing information that can be easily found online.



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What's more, in higher education, especially in the United States, there's a dropout crisis. While more students are enrolling, more than 40 percent of those who begin at American four-year colleges don't earn a degree in six years, and the dropout rate is even higher among community-college students, according to a report in *The Chronicle of Higher Education*, a major publication focused on higher education globally. In other countries, dropout rates measure lower, but are still high enough to be concerning in many European nations as well as Mexico, Australia and New Zealand, according to data compiled by the Organisation for Economic Co-operation and Development (OECD). (Asia, in contrast, has the world's lowest dropout rates.)

Meanwhile, too many graduates are having trouble finding a job in their chosen fields, and studies show mounting clamor from employers who say that graduates lack the high-value skills needed in their organizations: critical thinking, collaboration, communication and creativity, as well as adaptability, empathy, leadership abilities and cultural sensitivity.

### **Time to Rethink Old Norms**

All of this is leading to awareness of the need for disruptive innovation in education. Old norms are giving way to a deeper, broader and more individualized perspective on what student success is and how to achieve it.

“Student success in today's world is about acquiring and exhibiting the knowledge, skills and personal development needed to achieve multiple personal and education goals. It's a broadened, whole-learner approach that recognizes the importance of motivation, engagement and student wellbeing. It goes beyond success in academics to also include developing interpersonal skills, having experiences that contribute to character growth and enjoying a productive, satisfying life when you leave school,” says Aileen Strickland, a Steelcase education researcher who is part of a team focused on understanding student success and developing new approaches to support it.

Of course, educators know first-hand that the dynamics of learning are complex and extend well beyond the activities and relationships that occur in schools. Families and communities exert tremendous influence, too. At the same time, overall, schools are becoming more aware that they can make a stronger contribution to student success by broadening the focus of their efforts, Strickland reports.

“Gaining knowledge, acquiring practical skills and developing personally—these are three essential and interrelated domains of student success,” she says. “Successful learning shouldn't be narrowly defined. For example, gaining the ability to set priorities or getting better at managing negative emotions can be indicators of learning that are as significant as earning a high grade.”

“Gaining knowledge, acquiring practical skills and developing personally—these are three essential and interrelated domains of student success.”

Aileen Strickland  
Steelcase Education Researcher



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Steelcase's research confirms that forward-thinking approaches can now be found at many levels of education throughout the world:

- The Blue School, a private kindergarten and early elementary school in Manhattan, New York, founded by members of the Blue Man theatrical troupe, started as a playgroup. David Rock, a thought leader in human performance coaching and author of *Your Brain at Work*, is on the board of directors. Incorporating the latest scientific findings about childhood development, Blue School focuses on integrating emotional and academic education by emphasizing a new set of the three Rs—reflection, relationships and resilience—alongside content learning.
- AltSchools, a network of private elementary schools in Silicon Valley and New York City's Brooklyn borough, hopes to help reinvent American education. Each AltSchool offers a highly tailored education by using technology to target each student's needs and passions, recognizing and appreciating diverse abilities, interests and cultural backgrounds. Now six schools strong, within three to five years it plans to provide software to educators and public schools throughout the country.
- Makerversity in London, part of the fast-growing maker movement that promotes do-it-yourself initiative and hands-on learning, is providing alternative and free educational experiences for youngsters. It aims to inspire the next generation of creative minds through work placements and mentoring events plus an education program for teachers focused on learning to incorporate making and hands-on activities into core subjects.
- The University of Vienna offers "Knowledge Creation," a highly interdisciplinary elective program designed to help students learn to think innovatively in preparation for future work in a variety of knowledge- and innovation-intensive professions. Enrollees, whose major fields of study range from science to philosophy to humanities, learn advantageous higher-order metaskills and complete individual and collaborative innovation projects in a studio environment. The applied approach is essential, says Professor Markus F. Peschl, who developed the curriculum and teaches the courses. "Learning is not just transferring knowledge from one brain to another," he notes.
- Minerva Schools at Keck Graduate Institute is offering a uniquely global and blended learning approach to undergraduate education. The school's administration is based in San Francisco, but students learn together in seven world cities during the four years they're enrolled. Instead of attending large lecture classes where they passively absorb information or doing all their coursework independently online, Minerva students, who come from all over the world, live together, have immersive cultural experiences and participate in small virtual seminars that demand the full engagement of professors and classmates alike. Majors are earned in traditional fields, but the overarching goal is to teach students "habits of mind" that empower them to think critically and creatively and to communicate and interact well with others.

**forward-thinking  
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throughout the  
world**

**“Student success is an essential indicator that shows educational organizations understand their students and their needs and aspirations. It’s also a way for institutions to create new value for themselves in order to meet their organizational goals.”**

**Sudhaker Lahade**  
**Senior Steelcase**  
**Applied Research Consultant**



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Most schools aren't yet adopting approaches as radically different as these examples, but many are rethinking their teaching methods, curricula, support services and technologies, all with the aim of developing a more relevant and strategic approach and a broader definition of student success. The list of activities to advance student success is already extensive, ranging from adding more technology to classrooms, to offering stepped-up coaching and counseling services, to using predictive data analytics that look beyond grades to proactively identify at-risk students—flagging those with high rates of absenteeism, for example. By intervening early and appropriately, it's often possible to help disengaged students become more engaged.

Engagement and wellbeing are powerful predictors of student success. For example, Gallup's 2014 study of American 5th-12th grade public school students shows that hopefulness, engagement and wellbeing are key factors that drive students' grades, achievement scores, retention and future employment. Similarly, a study conducted by the Department of Education in England shows that students with higher levels of emotional, behavioral and social wellbeing have higher levels of academic achievement and are more engaged in learning, both while they're in school and in later years. Another study, conducted jointly by McKinsey & Company and Texas A&M University, reveals that mindset and engagement account for more than 50 percent of a student's likelihood to graduate. Clearly, nurturing the pillars of wellbeing is foundational to student success.

"Schools are investing in a broader approach to student success because it's complex and critically important to both students and educational organizations," says Sudhaker Lahade, a senior Steelcase applied research consultant who works with educational institutions. "Student success is an essential indicator that shows educational organizations understand their students and their needs and aspirations. It's also a way for institutions to create new value for themselves in order to meet their organizational goals. Student success isn't just about individual success; it's also about collective success—from every stakeholder's perspective. It is also about learning experiences that students want to live and share and it is about building a strong brand. Brand reputation that is based on student success and learning experiences ensures that schools can attract quality students and faculty, plus win the loyalty and support of alumni and other stakeholders."



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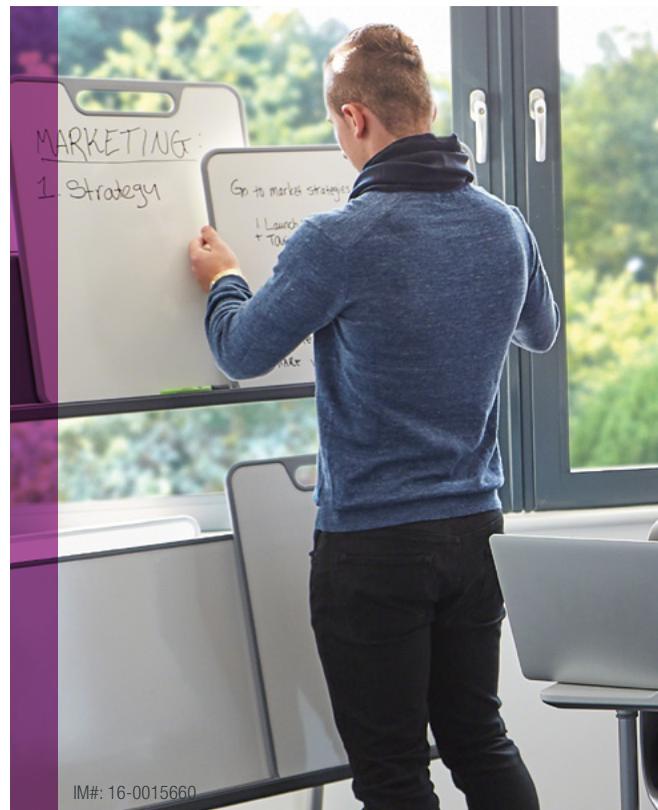
## **Successful Learning, Campus-Wide**

A more expansive view of student success puts different demands on a school's physical space. As part of a high-impact student success strategy, it's important to assess the campus as a connected system of innovative active learning spaces, all working together to support student success.

"We know that environment can profoundly augment engagement and a mindset of wellbeing, and these attributes are foundational to student success," says Strickland. "So, as we think about the various domains of student success—acquiring knowledge, gaining skills and personal development—it's important to recognize that learning can, and does, happen anywhere. And it involves informal collaboration and socializing, as well as formal learning in a classroom."

Because physical environments reflect an organization's intentions and shape perceptions and behaviors, investing in a range of learning environments can help create a favorable overall context for student success. Throughout an ecosystem of learning environments, it's important to support students' cognitive, physical and emotional needs. Study after study shows that people perform better when their pressing needs are met, and this finding has broad implications for successful learning.

Most campuses present abundant opportunities to rethink spaces in terms of how well they help students gain knowledge, acquire skills and develop personally. Although spaces are usually designated for a specific type of learning, it's a big advantage when they're intentionally designed to support holistic learning. The result is a different kind of educational environment, one that nourishes student success.



## **Building Knowledge**

Regardless of the grade level, subject matter or class size, today's best classrooms are designed for participative, active and engaging learning experiences that help students function at their best—cognitively, physically and emotionally. Person-to-person connections and the ability to easily interact with teachers and peers are essential.

At the same time, effectively integrated and leveraged technology presents tremendous opportunities to enhance teaching and learning by offering new ways to access and share information, freeing teachers to focus on richer interactions and higher-level cognitive learning. Moveable furniture and seating options support multiple modes of learning—discussion, small group and lecture. They also give students permission to assume alternative postures, making classrooms more human-centered than the rigid “row by column” classrooms of the past.

Outside the classroom, wide hallways and open areas function as much more than just transition spaces. Instead, they're designed for multiple active learning situations and interactions—before, during and after class sessions.

## **Acquiring Skills**

Makerspaces, hacker spaces, project rooms, collaboration hubs, innovation labs, virtual reality environments—the portfolio of learning spaces keeps expanding as hands-on experiences are progressively celebrated as integral components of education. “Doing spaces”—environments designed for thinking through problems, fabricating solutions and sharing ideas—help to develop practical skills. As important, they also cultivate curiosity, persistence and confidence, plus the ability to integrate information from various sources and consider multiple solutions—critically important mindsets for students' long-term success.

**today's best  
classrooms are  
designed for  
participative,  
active and  
engaging learning  
experiences**

## **Personal Development**

For holistic learning, social spaces—commons, community hubs, cafes, lounges, in-between spaces, etc.—are essential. It's often through informal interactions with teachers and peers that students expand their thinking, gain emotional maturity and develop deeply meaningful relationships that often continue to exert a positive influence throughout life after school. Whether it's for mentoring, digging deeper into a meaningful topic or simply socializing to give the mind a rest—easy access to others helps students develop as individuals. Even faculty and counselors' offices become more welcoming and approachable when discussions can occur side-by-side instead of across the barrier of a desk. When students can choose from a range of learning experiences and a variety of settings, they gain self-awareness, decision-making skills and confidence.

## **Developing a Strategy**

Supporting student success is a complex, multifaceted undertaking. There are multiple definitions and dimensions, but all are becoming more holistic. Achieving the goals requires aligned organizational willpower to make changes that matter. Although space alone can't ensure student success, in combination with inspiring teachers and effectively deployed technologies, it can help drive improved outcomes.

Environments can help students think better by supporting the natural capacity and constraints of the brain. Environments can help students be healthier by supporting active behaviors, which alleviate problems from head to toe. As important, spaces can help students feel better by providing a strong sense of belonging, optimism and community. More often than not, this leads to engagement. And more often than not, engagement leads to success—while students are in school, and in the years beyond.



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# teaching the creative process: think, make, share

**Story problems have been a teaching staple since ancient times, but now they're ancient history at Beaver Country Day School.**

“The answer to every story problem is the same: who cares?! There are enough real world problems out there in the world. We don’t have to make them up,” says Peter Hutton, head of the Boston area, sixth-to-twelfth grade school. “Creativity develops by doing real work rather than realistic work.”

Beaver Country Day is one of an increasing number of schools taking new approaches to teaching students creative skills. Along with critical thinking, collaboration and communication, creativity rounds out the 4 Cs, the skill set students need in the 21st century.

Employers seek creative capability because companies succeed in direct proportion to their ability to innovate and differentiate themselves. “Graduates need a depth of expertise in not just one or two areas, but also the ability to apply knowledge from areas other than their own, collaborate across disciplines and approach problems in new ways,” says Sean Corcorran, general manager of Steelcase Education.



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Corcorran and others in the field say creativity must be more than an idea-generating exercise; it must lead to solutions for real problems. Véronique Hillen, founder and dean of Paris d. school, a school that prepares students for innovation, says "brainstorming to develop a lot of ideas in different directions is not enough. You need appropriate ideas that are going to be delivered, and you also have to use creativity on how you're going to make it happen. Creativity isn't a single moment in the process, it's used until the very end, when the project is implemented in a real context."

Individuals equipped with these skills are often called by different metaphors, such as a 'T-shaped' employee, or a 'broken comb' person. "Some educators say it's the original concept of the liberal arts education. Whatever the label, the goal is to be able to integrate information and ideas from different sources and apply creative problem solving skills to produce new solutions," say Corcorran.

Creativity is something anyone can develop. "Everyone has the capacity to think creatively, to have an enquiring mind, to be inventive and resourceful," says Andrew Kim, an education researcher with Steelcase who studies creativity and how it's taught in schools. The Steelcase research team has articulated a model for teaching creativity, a three-part process they call Think, Make, Share, with space recommendations for each of the three steps.

## Myth Busting

The first challenge in teaching creativity is changing the perception that it's purely an artistic endeavor. This is a creativity myth, say Tom and David Kelley, partners at design firm IDEO and authors of *Creative Confidence*. "Creativity is much broader and more universal than what people typically consider the 'artistic' fields. We think of creativity as using your imagination to create something new in the world. Creativity comes into play wherever you have the opportunity to generate new ideas, solutions or approaches."

Historically, schools have taught students convergent thinking, the ability to arrive at a single correct answer. Traditional intelligence tests require convergent thinking, and measure how well students can deduce a correct answer from a list of options.

Divergent thinking is different. It moves in various directions to develop alternative ideas to form innovative solutions. This ability to think not just in linear or convergent ways but to see multiple answers, is essential to creativity.

In this sense, traditional pedagogies are almost the antithesis of creativity. They developed in the 19th and 20th centuries and mimicked the structure of manufacturing systems. These pedagogies, still in use today, require students to sit in highly regimented, row-by-column classrooms (think assembly line) and emphasize absorbing (memorizing) information rather than creating new knowledge.

Fortunately, young people are naturally divergent thinkers. "Kids are very curious, they are very open minded. They are so open that it's easy to encourage them to think out of the box. Give the kids information about a certain aspect, and they find a new way or a new perspective. They cannot do anything else," says Henning Beck, a neuroscientist and author based in Frankfurt, Germany, who consults with global companies on fostering creativity.

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**“Creative work is most effective in learning spaces that support team work flow and sharing of information.”**

**Andrew Kim**  
**Steelcase Education Researcher**



IM#: 15-0011972

## Think

Creativity begins with thinking—specifically, acquiring knowledge. "You need knowledge to come up with new knowledge. It's never the case that somebody who doesn't know anything about a certain problem or issue has a eureka moment out of nowhere. The brain disrupts information and then puts it together in different ways. So a new thought is comprised of other thoughts recombined in a new way," says Beck.

In practice, a student often begins the creative process by studying exemplars, acquiring insights and ideas from them, thinking about the information and subtly modifying it.

This process sometimes happens alone, but it's increasingly done with others. Creativity often flourishes in groups. Great creative achievements, from landing a man on the moon to the latest blockbuster movie, are nearly always group efforts, with team members distributed far and wide.

This is central to design thinking, as practiced at IDEO, Beaver Country Day School, Paris d.school and other organizations. The popular maker movement promotes group creativity. So does software development by coders who share ideas and inspiration in online forums. Businesses know that it takes a team to innovate, so they don't depend on individuals for new products; they hire collaborative individuals to work together to develop new products and services.

Thinking—with a team, another person, or on one's own—is central to the creative process. To nurture the work, instructors and students need both psychological space (permission, encouragement) and the appropriate physical spaces in which to do it.

For example, cph:learning, a business school in Copenhagen, uses space as both a locale for the work and as a way to signal to students that they have the freedom to think and work as needed. "Through the environment, students understand that everyone owns the process, everyone is equal. All the furniture is moveable so the physical learning space can be tailored by the students and the instructor to the subject at hand," says managing director Dr. Claus Nygaard.

Steelcase researchers found similar approaches in other programs for teaching creative skills, says Kim. "Creative work is most effective in learning spaces that support team work flow and sharing of information. Non-hierarchical spaces, such as classrooms that users can rearrange to support different groups and the various modes of the creative process, allow for a better flow of ideas. Students report that learning spaces that are flexible help them think more creatively."

Profit = (Sales - Variable expenses) - Fixed expenses

Sales = selling price per unit x quantity sold = P x Q

Variable expenses = variable expenses



### MANUFACTURING OVERHEAD

|            |            |
|------------|------------|
| (2) 2,000  | (3) 90,000 |
| 15,000     |            |
| 10,000     |            |
| 20,000     |            |
| 18,000     |            |
| 95,000     | 90,000     |
| Bal. 5,000 |            |

### Work in Process

|             |         |
|-------------|---------|
| Bal. 7,000  | 158,000 |
| 50,000      |         |
| 60,000      |         |
| 90,000      |         |
| Bal. 72,000 |         |

### Finished Goods

|             |         |
|-------------|---------|
| Bal. 10,000 | 118,500 |
| 158,000     |         |

Net in and equi

Net in ca and equi

### Financial Statement ANALYSIS

|      | SALES | NET INCOME |
|------|-------|------------|
| 2002 | 100%  | 100%       |
| 2003 | 111%  | 166%       |
| 2004 | 123%  | 258%       |
| 2005 | 132%  | 291%       |
| 2006 | 144%  | 397%       |
| 2007 | 167%  | 2,68%      |
| 2008 | 182%  | 483%       |
| 2009 | 157%  | 610%       |
| 2010 | 166%  | 559%       |
| 2011 | 186%  | 616%       |

TOTAL ASSE

MS

VAR

AST

EAR

TOTAL ASSE

MS

VAR

AST

EAR

## Make

Creative work involves frequent mistakes. "Sometimes the only way to create something new is to make mistakes, which the brain uses to come up with new solutions," says Beck.

Yet most people fear making mistakes: We dread being wrong and embarrassed, wasting time and effort.

Failure is best when it comes early in the process. "When you fail early it doesn't cost as much in time or other resources to adjust, to take feedback and apply what you've learned to develop alternative solutions," says Beck.

Space can help. Makerspaces encourage students to build and tinker with things, to see what works and what doesn't. Also called fab labs, hacker spaces, model shops or innovation labs, makerspaces typically have raw materials for building mock-ups and prototypes, various tools, 3D printers and room to make a mess. So important is a place to quickly make ideas tangible, the Paris d.school makes sure a workshop is never more than seven seconds from any project area.

Makerspaces are one of the hottest trends in learning space design and "they range from rooms with a few tools to full blown workshops," says Gabriela Scarritt, a Steelcase education researcher. Although many schools offer shop-like facilities for clubs and after-school programs, makerspaces are integral parts of a school curriculum.

Scarritt says the spaces are trending for several reasons: "The push against standardized testing and to make learning more of a hands-on experience, the desire to teach the 4 Cs and to incorporate design thinking and project-based learning. Maker events and the whole maker movement are also having an impact, and schools are picking up on them."

Makerspaces also encourage student engagement, especially in STEM subjects that lose students as they get older and the concepts become more theoretical and less practical.

One caveat about makerspaces: they've become so popular they sometimes overshadow the time and space needed for the rest of the creative process. Hillen says "sometimes there's an idea or concept that shouldn't reach the making step. Sometimes a prototype is made, but it never goes anywhere, never gets implemented. Making is important, but be very careful about what happens before inspiration and what happens after making."



## Share

Sharing information, seeking opinions and collecting and providing feedback follow the making stage. Sharing requires student time and attention and appropriate space, in every sense of the word.

"No matter how brilliant your idea, you have to convince people or your idea dies," notes Scarritt. Most often an idea is "sold" only after it is shaped and reshaped through communication and collaboration.

Sharing takes place in different ways: student-to-student (sharing information and ideas, building on each other's work), student-to-class (presenting projects, practicing communication skills), and student-to-community (project fairs, community events with faculty and family, etc.). Sharing also involves putting concepts and projects on display, which can help students develop necessary non-verbal communication skills.

At the Krause Innovation Studio in the School of Education at Penn State University (PSU), sharing takes place in a mix of different collaborative spaces, in private study rooms and in a LearnLab, a classroom designed to democratize how people access and share information.

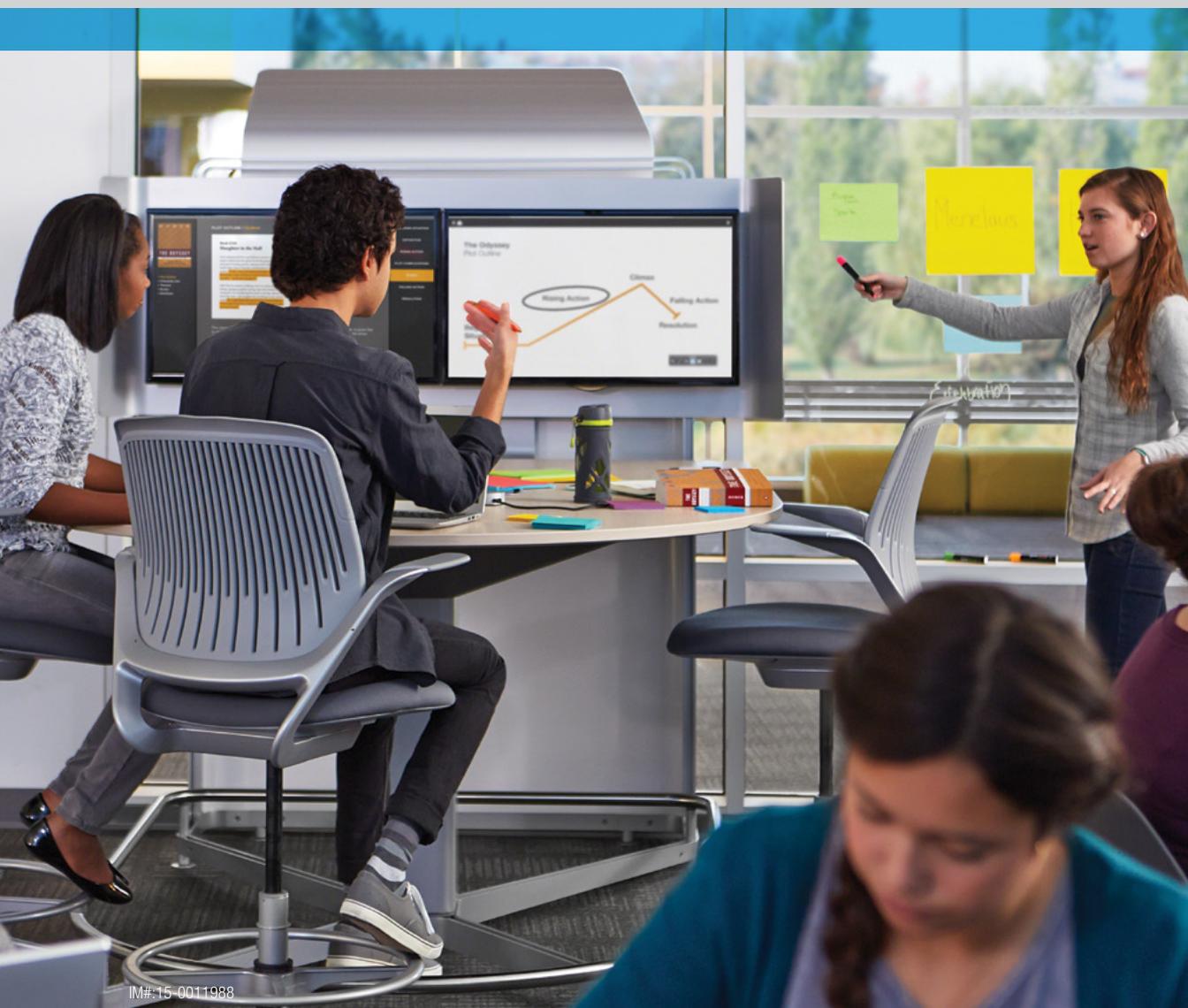
The LearnLab has no "front"; instructors can teach from anywhere. A triangular projection room design supports a variety of teaching and learning styles.

PSU professor Scott McDonald calls the LearnLab "an R&D classroom that helps teachers think in new ways about their teaching" by supporting new pedagogies and alternative ways for students and instructors to interact.

The spaces in the Innovation Studio, its tools, even its name, signal to users that this is a place for creative work. "The purpose of a university education is less about acquiring a canon of knowledge and more about learning how to work with others to create new things. Krause represents how we're thinking about the structure of the university and the curriculum, and how they can best support students as developers of new things," says McDonald.

“No matter how brilliant your idea, you have to convince people or your idea dies.”

Gabriela Scarritt  
Steelcase Education Researcher



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## The Creative Process in Action

Like the creative process itself, spaces for teaching creativity should be organic and flexible, non-linear, and support the process of creative work. Think, make, share spaces often look different than traditional classrooms.

"When you walk into a room and you see it's set up like that you know you're going to do something real. It's a much more dynamic learning environment. We haven't used student desks in almost 20 years," says Hutton of Beaver Country Day. In fact, the school has no traditional column-by-row classrooms at all, preferring mobile tables and chairs. "Everything is on wheels. It's very important that if kids are going to be learning and different kinds of modes are going on actively, you should be able to set up the learning environment in an appropriate way as quickly as possible."

"We ask the students to make some spaces theirs," says Hillen of Paris d.school. "The customization of space by students is important in order to increase the level of emotional commitment that they have in projects."

At the Krause Innovation Studio, "our education professionals think about creating experiences for other people, and the Studio gives them the freedom and space to think about and plan those interactions," says McDonald. "It's an ongoing intellectual community."

cph:learning's Claus Nygaard says that in their new spaces for teaching creativity, student progress is more evident. "In the old lecture paradigm, you have no clue what students are learning until the final exam. It's all one-way communication.

"The creative process shows results immediately. You see how students are creating knowledge and expressing it through articles, videos, presentations, uploaded information. You also know if students can't follow the process because they feel comfortable asking for help."

Steelcase research shows that teaching creativity involves creative approaches to curricula, learning spaces, tools and technology. It calls for spaces that support individual and group thinking, building and presenting. Give students and teachers the authority and ability to reconfigure their learning space to the work at hand.

Teaching creativity is a story problem with multiple solutions. Innovation builds through a process of thinking, making things, sharing, listening, trying again. It requires an open mind and a willingness to fail.

One Penn State professor, explaining the objectives for his course, touches on an essential quality for anyone who wants to teach creativity: "One of my goals is, when they get out there in the world, they will be fearless."

**teaching  
creativity is a  
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with multiple  
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## Learning Spaces Where Creativity Flourishes

Based on extensive research at schools, colleges and universities, Steelcase has developed design considerations for creating learning environments that meet the various needs of the Think, Make, Share model.

“Many of our recommendations around the creative process can be applied to any course that requires creative problem solving,” says Scarritt.

### Overall Considerations

Define goals for the space. Will it support Think, Make, Share, or just making only? Makerspaces are trending but creativity is more than building models and prototypes; thinking and sharing are equally important.

Make it inspiring. Prime the brain for creativity through ambient stimuli: color, light, views of nature, etc.

Design for the process. Creativity is not a linear activity. Allow for flexibility in the space and adjacencies between different zones which support each part of the process.

“We have to give the learning process back to the students. Redesigning space is a start.”

Dr. Claus Nygaard  
cph:learning, Copenhagen





## Think

Provide varied spaces. Students need group spaces for working in pairs and small groups, project areas and spaces for quiet, individual focus.

Accommodate focused and diffused attention. Sometimes we need a distraction-free environment, but sometimes we want diffused attention in a stimulating environment. Provide spaces that help users find the right amount of ambient distraction; it helps keep them open to new ways of thinking.

Allow content immersion. Creativity is not one idea but many ideas built upon each other. Visible content helps people connect with information and build on it.

1. Students can break away from the nearby collaboration spaces to Brody WorkLounges, where they can reflect and allow their ideas to converge.

2. An informal niche along the circulation path encourages generative thinking—the first step in the creative process.

3. Students can further manifest their ideas in project garages adjacent to open maker tables. Video creation is supported in this garage with a video camera and green screen.

4. Making space is adjacent to thinking space and storage is within reach.

# Make

Express permission. Use space to signal to users they have permission to try new things, make a mess, make mistakes. A trophy case of flopped projects? Rough, unpolished surface materials? Let users know they're free to experiment.

Storage should be organized and intuitive. Innovation spaces ideally encourage both making messes and cleaning up. Store materials and tools in a logical, easy-to-understand way to encourage users to keep the space tidy.

Support both physical and digital. Making is a physical process, but often needs digital support (displays, digital photography, etc.). Provide for both.

1. Share expensive equipment and help minimize noise by placing specialized tools like a 3D printer or drill press in project garages adjacent to the making area.
2. Allow for informal sharing by providing a window into the makerspace so passersby can see projects in progress or the making happen.
3. Support physical making and the building of ideas by providing standing-height tables, access to power and convenient storage to easily organize materials.
4. Provide thinking areas, such as a lounge setting, for a quiet place to contemplate, away from makerspaces.





## Share

Support formal and informal sharing. The creative process needs space for informal sharing, such as conversations between classmates and between student and teacher, as well as places for formal sharing via critiques, design reviews and presentations.

Create space that scales. Sometimes it's one student sharing with a small group; other times it's a presentation to the entire class or a school assembly. Create learning spaces that work hard and quickly scale to the audience size.

Encourage continual sharing. Objects can speak louder than words. Provide space for works in progress and finished work; this allows students to access and view work, so sharing occurs continuously. Users can also share news, suggestions and ideas through video, whiteboards or work samples, even when they're not present.

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1. Activate walls with integrated technology and vertical writing surfaces to provide spaces to think, create and share.

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2. In-between spaces outside the classroom provide informal opportunities to think, generate and share ideas.

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3. This multipurpose space supports formal and informal sharing in a very flexible way, with the ability to easily change focus from stage to stage. Students can hold fair-like events or use as a Think space to capture ideas and inspire creative thinking.

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EDUCATION

