Matching Last Century's Schools *to* 21ST CENTURY NEEDS

by Tomas Jimenez-Eliaeson AIA, CEFPI

LITTLE®
DIVERSIFIED ARCHITECTURAL CONSULTING

LEARNING OBJECTIVES

At the end of this program, participants will be able to...

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1. DESCRIBE 21st Century Learning Needs

2. LIST Key Factors of the Learning Revolution

3. REVIEW Case Studies
   - ***a) Fulton County MS prototype Redesign***
   - ***b) The Immersive LearningScape***

QUESTIONS

QUESTIONS

What skills will be needed to excel as we further move into the 3rd millennium?

QUESTIONS

What will their jobs be like?

10 JOBS THAT DID NOT EXIST 10 YEARS AGO

1. App Developers *(Creative Tech)*
2. Market research Data Miner *(Library science – Info gathering/summarizing)*
3. Millennial Generational Expert *(Social Networks)*
4. Social Media Manger *(Social Networks)*
5. Chief Listening Officer *(Social Spy)*
6. Cloud Computing Services *(Data Storage and Sharing)*
7. Elder Care *(Health and Communication – Baby Boomers)*
8. Sustainability Expert *(Global Warming / Green Economy)*
9. User Experience Design *(Right Brain thinking)*
10. Academic and Admissions Consultant *(Education and Access)*

"10 jobs that did not exist 10 years ago" FORBES MAGAZINE

8 JOBS THAT WILL EXIST IN THE FUTURE

1. Digital Death Manager (“Life-Logging” Expert)
2. Un-Schooling Counselor (Evolution of the Traditional School Counselor)
3. Armchair Explorer (Digital Travelers/Problem Solvers)
4. 3-D Printing Handyman (Future Mr. Fix-it)
5. Microbial Balancer (Feng Shui of the Future)
6. Corporate Disorganizer (Masters of Organized Chaos)
7. Digital Detox Specialist (Fighting the Digital Overload)
8. The Urban Shepherd (Sustainable Infrastructure Maintainers)

“8 New Jobs People will Have in 2025” Fast Company

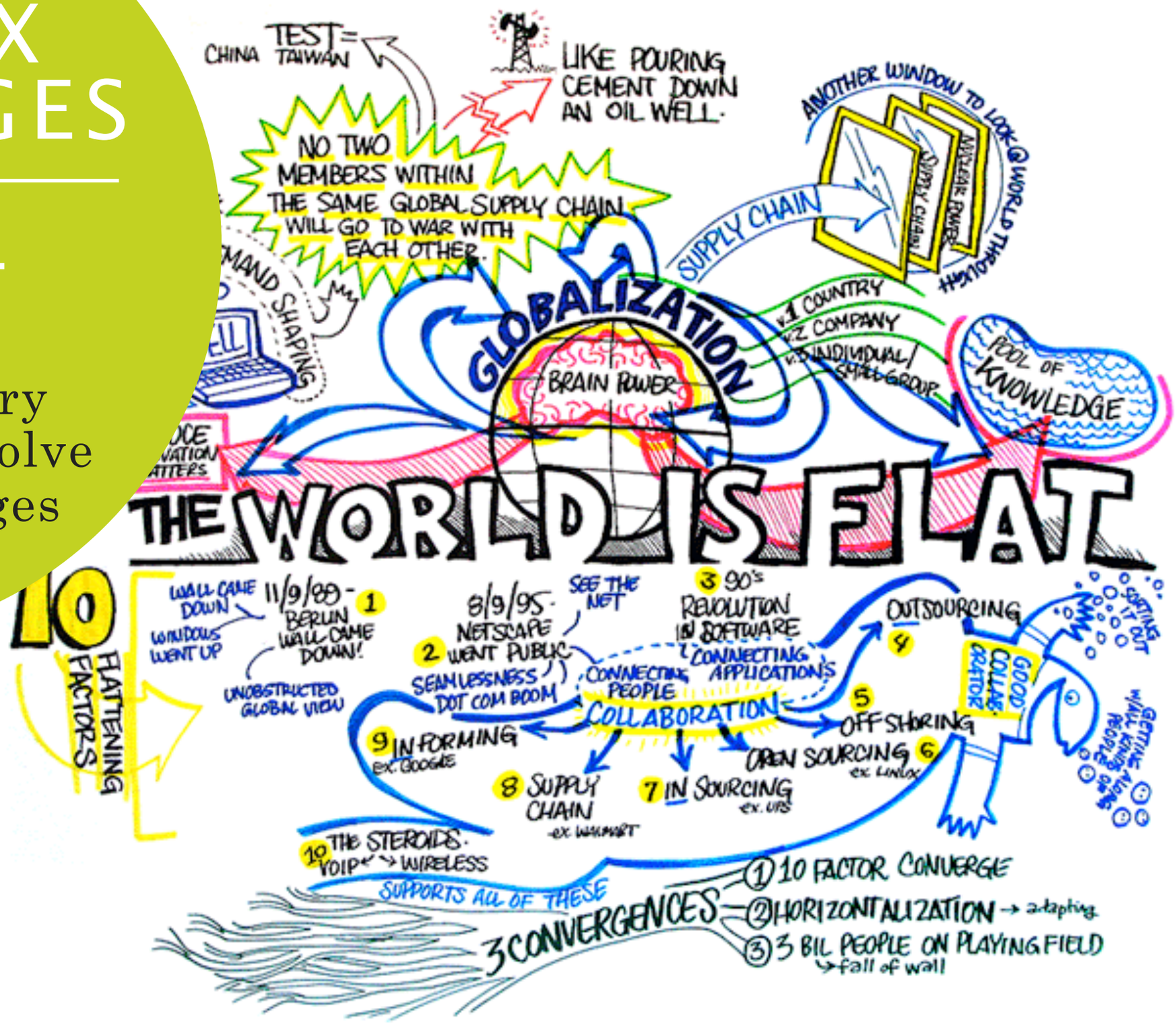
LEARNING OBJECTIVE #1

21ST CENTURY LEARNING NEEDS

As the world flattens, education will heighten.

COMPLEX CHALLENGES IN A GLOBAL WORLD

Multi-disciplinary teams needed to solve complex challenges



Thomas L. Friedman on The Charlie Rose Show discussing his book, "The World is Flat" • 04.05.05
graphic facilitation by Brandy Agerbeck • Loosetooth.com

WE NEED
TO EDUCATE
FOR A

problem solving society

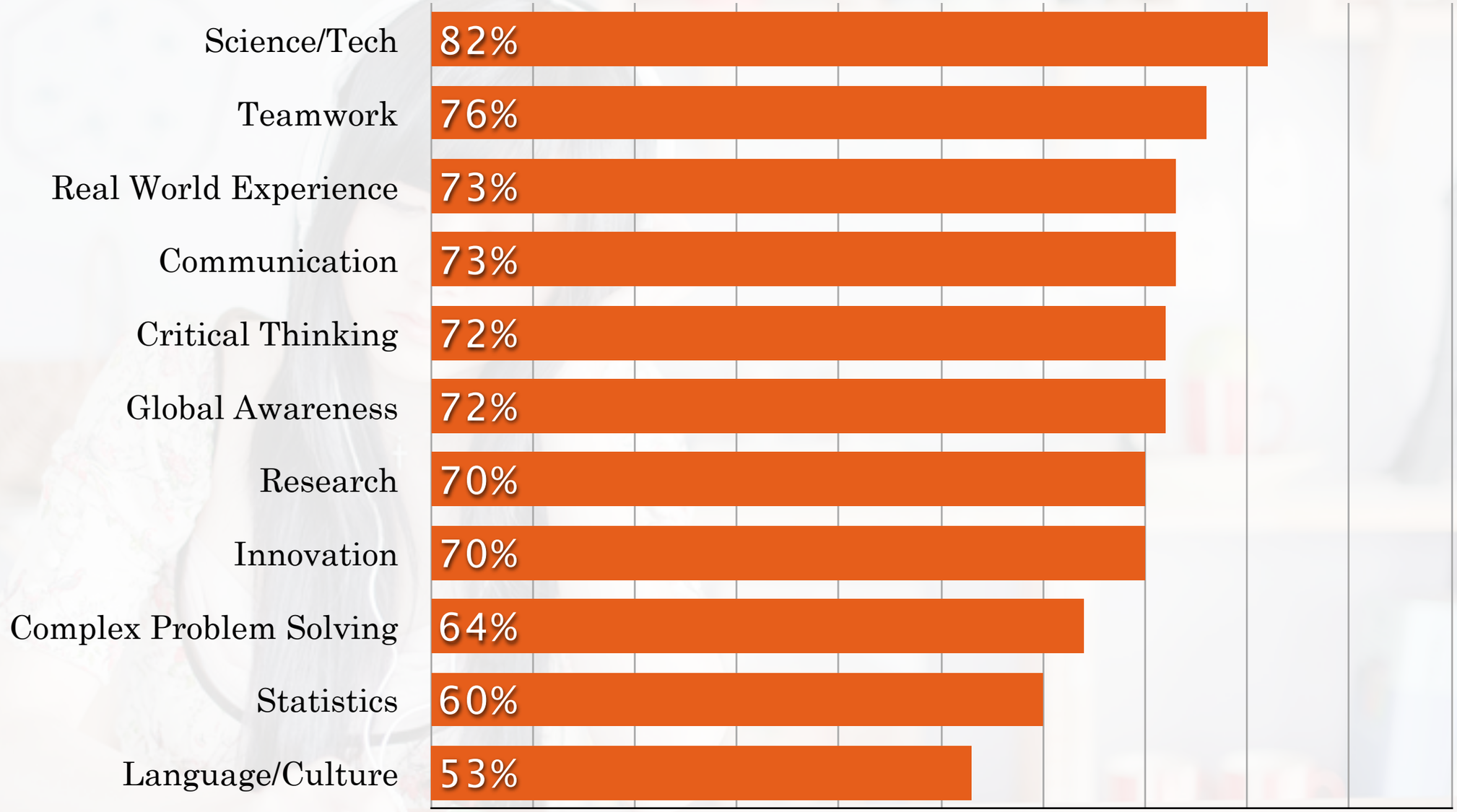
QUALITY OF EDUCATION

What are the skills they will need?

21st CENTURY SKILLS

- ✓ *Problem Solving*
- ✓ *Critical Thinking*
- ✓ *Technology-savviness*
- ✓ *Leadership skills*
- ✓ *Communication Skills*
- ✓ *Collaboration Skills*
- ✓ *Global Knowledge*
- ✓ *Languages*
- ✓ *Interdisciplinary skills*
- ✓ *Creative Skills*

21st CENTURY EMPLOYER NEEDS



"What Employers are Looking for in College Graduates" survey by Association of American Colleges & Universities - 2007

STUDENT VOICES

on engagement

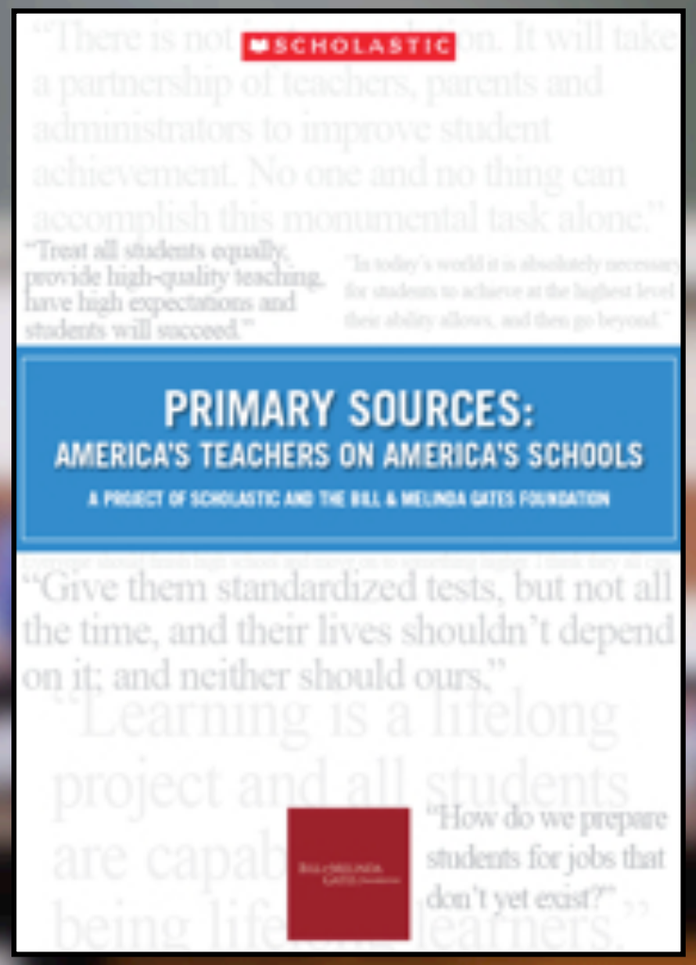
ENGAGE US MORE.

POINTLESS.

I'M ENGAGED IN TWO OUT OF MY SEVEN CLASSES.

I'M BORED 99 PERCENT OF THE TIME.

WHY AREN'T STUDENTS PREPARED FOR COLLEGE?



Overall, teachers ranked **"Lack of motivation"** as the #1 reason

	TOTAL	ES	MS	HS
Lack of participation in CP	2%	2%	2%	3%
Poor reading and comm. skills	19%	20%	17%	15%
Lack of critical thinking skills	17%	18%	16%	17%
Lack of encouragement	27%	34%	22%	15%
Lack of motivation	**34%**	**25%**	**43%**	**49%**
Not sure	1%	1%	0%	1%

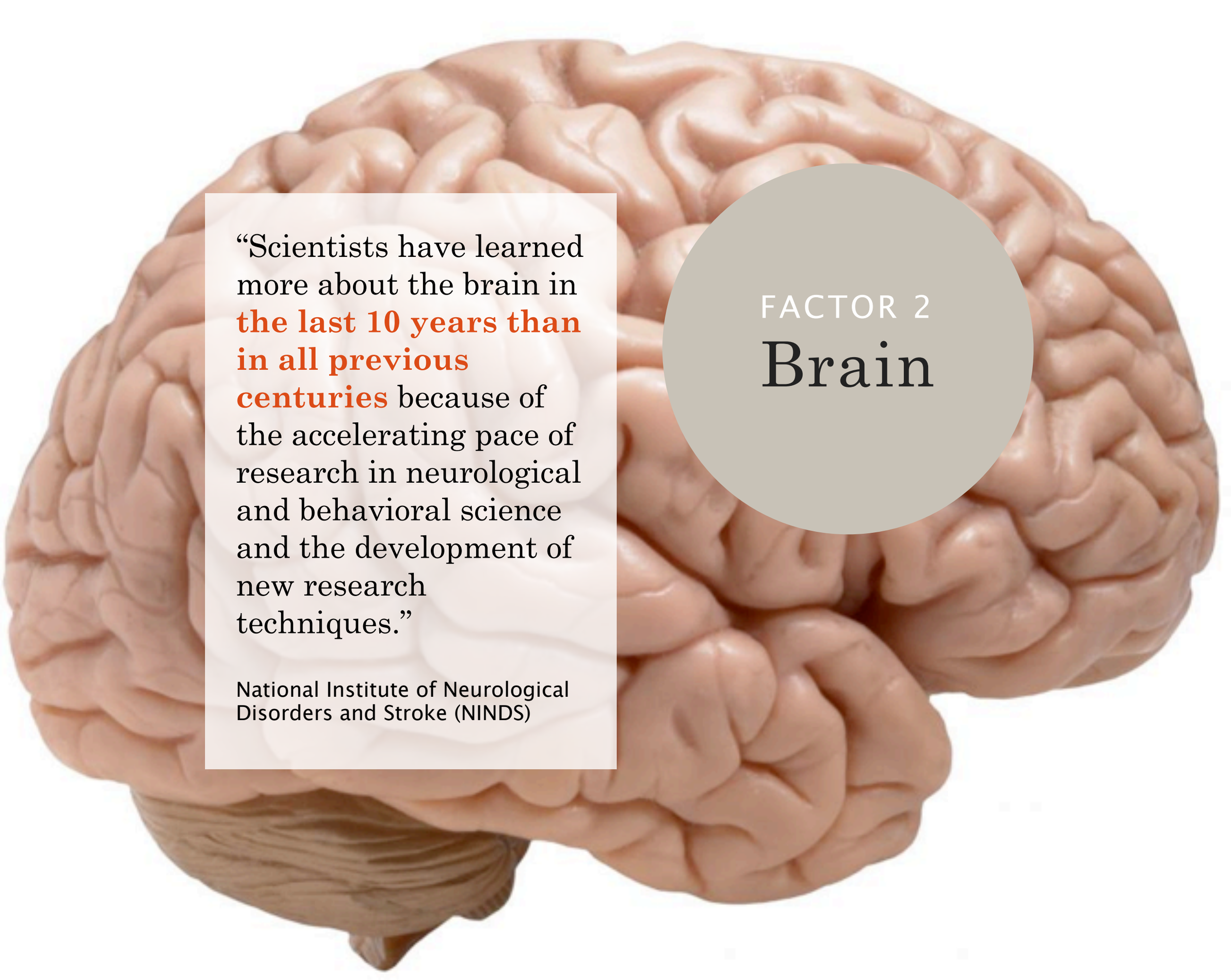
LEARNING OBJECTIVE #2

we are entering a

LEARNING REVOLUTION

FACTOR 1

Technology



FACTOR 2

Brain

"Scientists have learned more about the brain in **the last 10 years than in all previous centuries** because of the accelerating pace of research in neurological and behavioral science and the development of new research techniques."

National Institute of Neurological Disorders and Stroke (NINDS)

FACTOR 3

Customization

FACTOR 4

Active Learning

passive

active

percent remembered

READING	10%
HEARING	20%
LOOKING AT PICS	30%
WATCHING A MOIVE	50%
LOOKING AT AN EXHIBIT	50%
WATCHING A DEMO	50%
SEEING IT DONE ON LOCATION	50%
PARTICIPATING IN A DISCUSSION	70%
GIVING A TALK	70%
DOING A DRAMATIC PRESENTATION	90%
SIMULATING THE REAL EXPERIENCE	90%
DOING THE REAL THING	90%

SOURCE - *Active Learning - Creating excitement in the classroom.* 1991. Bonwell and Eison

FACTOR 5

Paradigm Shift

20TH CENTURY

Industrial Age

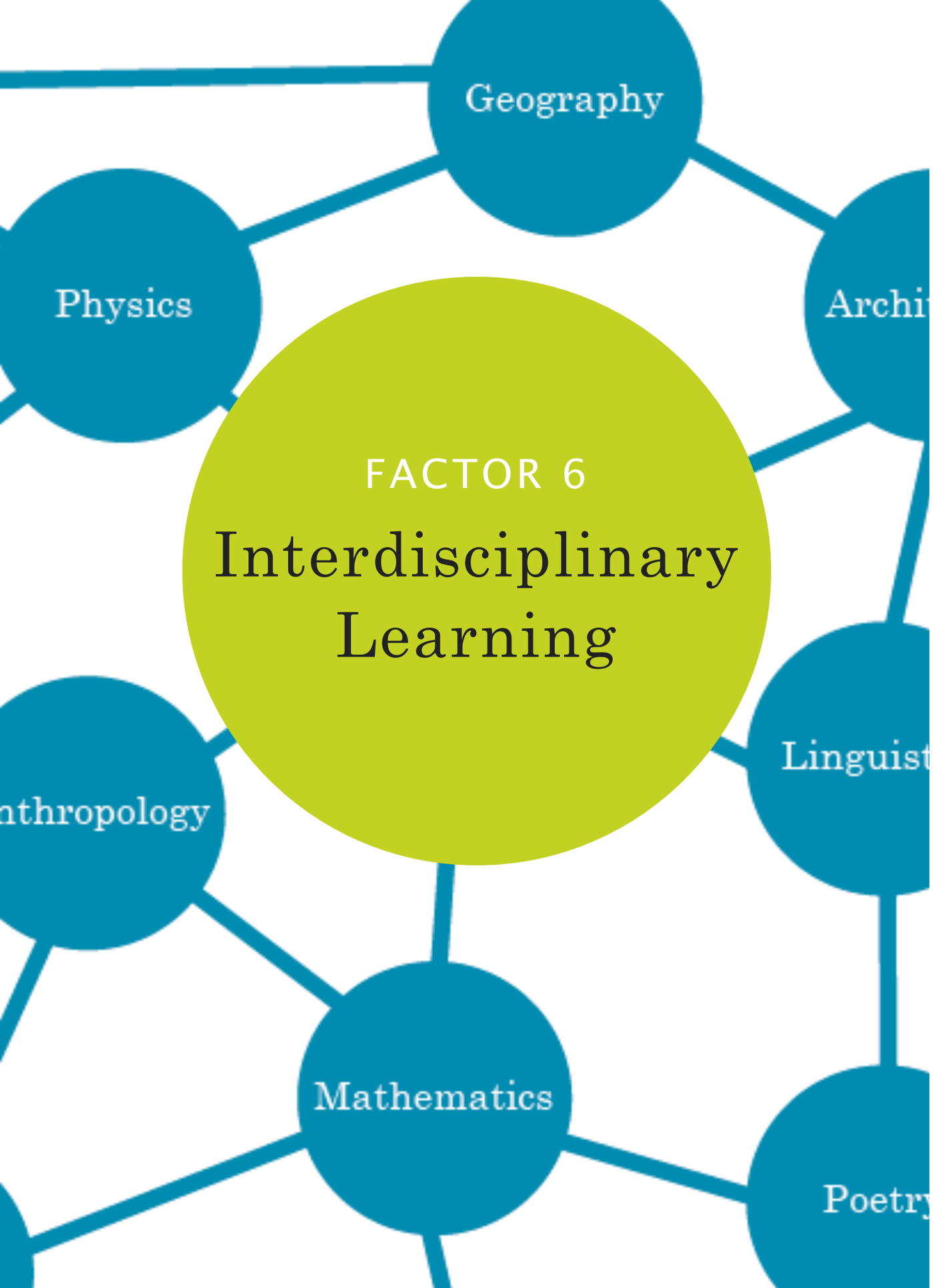
Mechanization & Sequentiality

21ST CENTURY

Conceptual Age

Instant Access to Information & Simultaneity

- Marshall McLuhan



20TH CENTURY

Linear Learning

1 isolated discipline per hour

21ST CENTURY

Asynchronous Cross-Disciplinary Learning

Multiple disciplines simultaneously

FACTOR 7

Relevance

learn here. apply there.

FACTOR 8

Redefining the role of the Teacher

guide, inspire, and troubleshoot

"The problem-solving process cannot be taught; it has to be experienced"

Ben Johnson

FACTOR 9

Experiential Learning

FACTOR 10

Shift in Learning Environments

TECHNOLOGY

Technology

Augmented Reality Technology

Technology

Blended Learning

Technology

1-to-1 learning

Teacher 1-to-1 supervision

Flipped Classroom

WHAT IS THE FLIPPED CLASSROOM?

The flipped classroom inverts traditional teaching methods, delivering instruction online outside of class and moving "homework" into the classroom.

THE INVERSION

Technology

Prosumer = Producing + Consumer

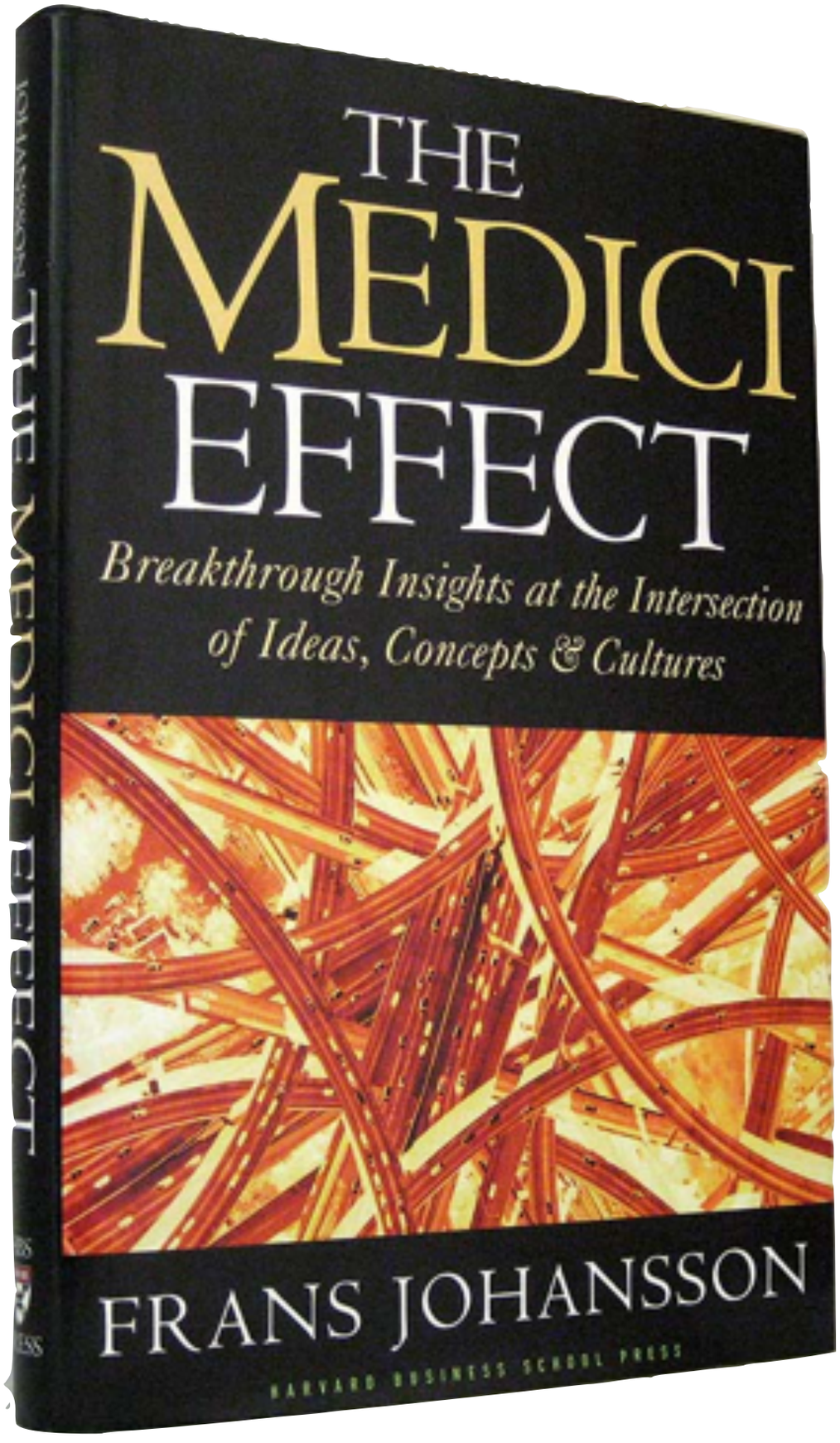
With the proliferation of digital networks the world over, the electronic marketplace has gone from empowering the consumer to supporting a global civic society. Power to the people.

SOURCE: The Third Wave, Alvin Toffler

INTERSECTIONAL IDEAS

FOR A

CONCEPTUAL & INTERSECTIONAL WORLD



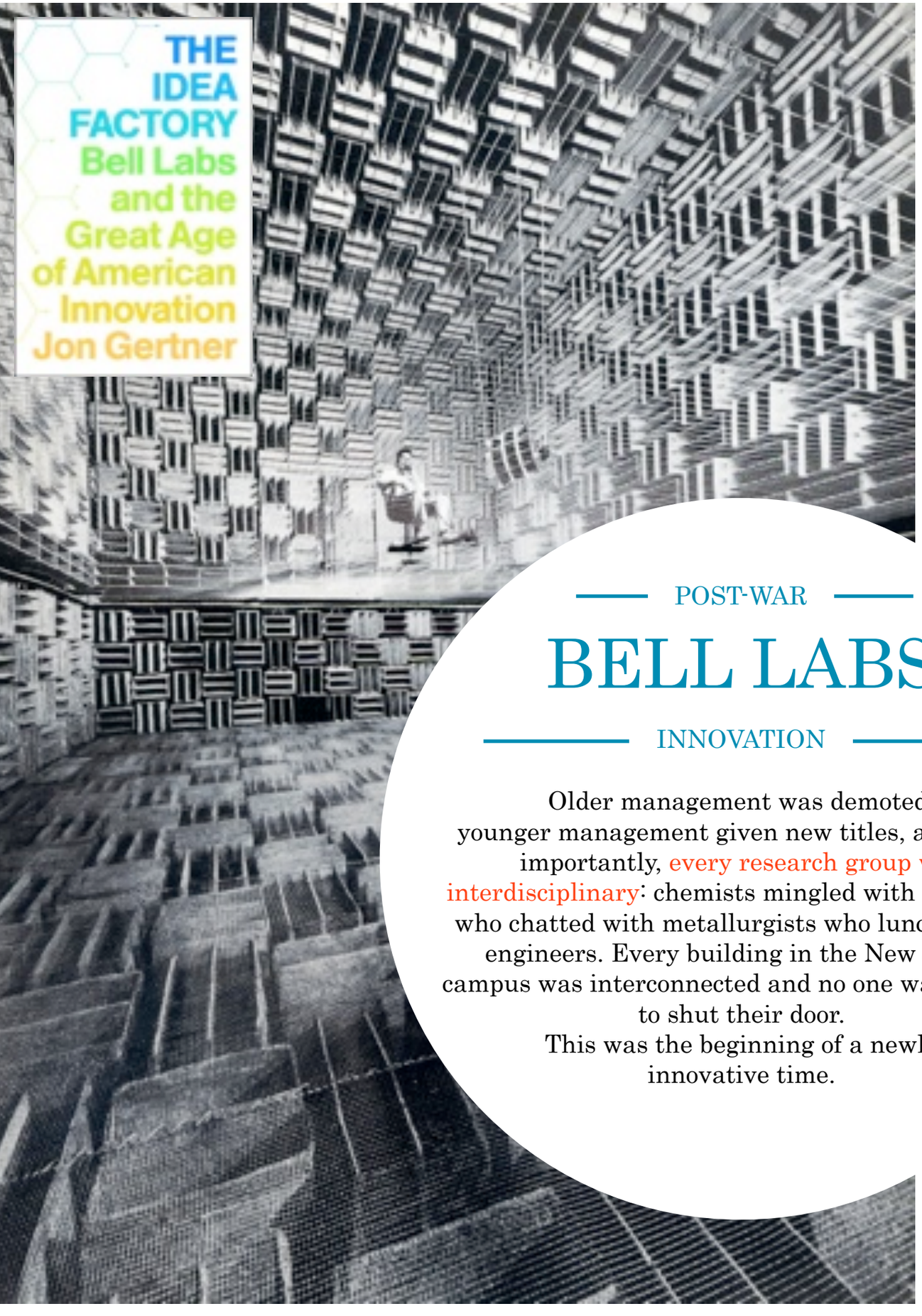
INTERSECTION

AND

INNOVATION

Diverse teams create far more ideas than homogenous teams

Law
Psychology
Geography
Physics
Architecture
Literature
Sociology
History
Linguistics
Anthropology
Biology
Mathematics
Poetry
Art History
Chemistry

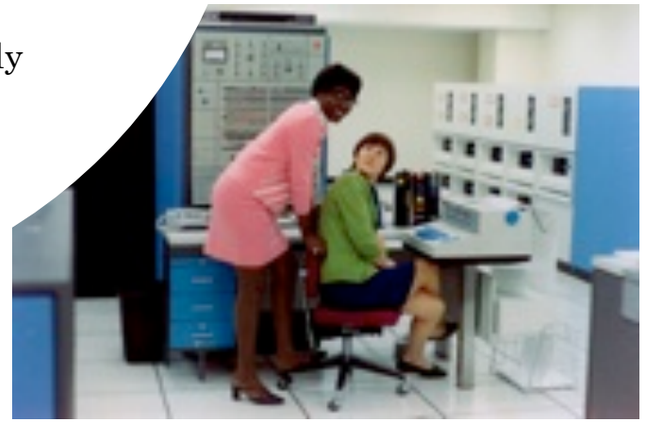


POST-WAR

BELL LABS

INNOVATION

Older management was demoted, younger management given new titles, and, most importantly, every research group was interdisciplinary: chemists mingled with physicists who chatted with metallurgists who lunched with engineers. Every building in the New Jersey campus was interconnected and no one was allowed to shut their door.
This was the beginning of a newly innovative time.



Bell Labs: A Hive of Invention

A selection of its most important innovations in the decades leading up to the breakup of its parent company, AT&T, in 1984, and how they helped lead to some of the latest technologies.

1920s

1925 First high-fidelity sound recording The reproducible sound range is extended by more than an octave at each end of the scale.

1925 Fax service First commercially successful facsimile or telephotography system in the U.S.; an early data network.

1927 Negative feedback amplifier Cuts distortion in long-distance telephony; also aids development of radio and high-fidelity amplifiers.

1927 First long-distance television transmission Live television images of Herbert Hoover are sent via phone lines from Washington to New York.

This building, on West Street in Manhattan, became the home of Bell Labs in 1925.

1930s

1932 Radio astronomy Earliest detection of radio noise coming from the center of the Milky Way galaxy.

1932 Wide-range audio reproduction A speaker system is divided into three bands using bass woofers, midrange horns and tweeters.

1933 First transmission of stereo sound A symphony concert is broadcast live over telephone lines from Philadelphia to Washington.

1937 First electronic speech synthesizer Recreates human speech.

1939 First binary digital computer Mathematical operations performed in binary form, using on-off relays. It took 30 seconds to determine the quotient of two eight-digit numbers.

1940s

1940 First long-distance computing Remote operation of a computer, at Bell Labs in New York, by a teletypewriter in New Hampshire.

1946 First commercial mobile phone service At most, three subscribers per city could make calls at one time; each caller's phone apparatus weighed almost 80 pounds.

1947 The transistor A landmark invention. Replaced vacuum tubes and mechanical relays; transformed electronics.

1947 Cellular telephone technology A Bell Labs paper was the first to propose a network of small interlocking cell sites tracking users as they move, passing their calls from one site to another without dropping the connection.

1948 Information theory Calculates maximum capacity for any communications system and shows how to send digital messages essentially error-free. Enabled data compression and cryptography.

The Murray Hill, N.J., buildings opened in 1941.

1950s

1951 Direct-distance dialing No operator necessary for long-distance calls.

1954 Solar cells First use of the sun's energy to create a practical level of electricity.

1956 First transatlantic telephone cable Designed and implemented by Bell Labs; could carry up to 36 simultaneous calls.

1957 Digitized music First demonstrations of digitized and computer-synthesized music.

1958 The laser "Light Amplification by Stimulated Emission of Radiation" was described in a Bell Labs paper. It is crucial for communications, surgical and DVD technologies.

1960s

1960-62 First communications satellites Echo is first to reflect a voice signal from coast to coast; Telstar I shows an orbiting relay can amplify and resend multiple phone and TV transmissions.

1962 Digital transmission, switching First digital transmission of multiple voice signals.

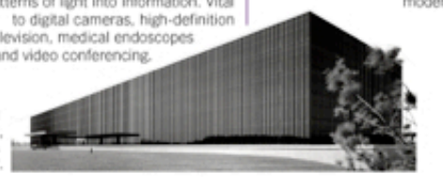
1962 Paging system Bellboy pager is introduced at the Seattle World's Fair.

1963 Touch-tone telephone Enables voice mail and call centers.

1965 Evidence of the Big Bang Discovery of cosmic background radiation from beyond the Milky Way.

1969 Charge-coupled device A solid-state chip that transforms patterns of light into information. Vital to digital cameras, high-definition television, medical endoscopes and video conferencing.

Bell Labs opened in Holmdel, N.J., in 1962. It was vacated in 2007.



1970s and '80s

1969-72 UNIX operating system and C programming language Makes large-scale networking of varied computing systems, and the Internet, practical.

1976 Fiber-optic network The first test of Bell Labs' experimental lightwave communication system begins in Atlanta. Information is carried by pulses of light.

1978 First commercial cellular network Installed by Bell Labs in Chicago.

1979 Digital signal processor An essential component of cellphones, modems, PCs and video game systems.

1980 Digital cellular phone Better sound quality, greater channel capacity, lower cost.

1982 Fractional quantum hall effect Discovery of a new state of subatomic matter that wins the Nobel Prize.

PHONES

SPACE

INTERNET

MUSIC

CELLPHONES

RADIO

TELEVISION

Source: Alcatel-Lucent

BILL MARSH/THE NEW YORK TIMES

LEFT AND CENTER PHOTOS COURTESY OF ALCATEL-LUCENT USA INC. AND THE AT&T ARCHIVES AND HISTORY CENTER, RIGHT PHOTO: EZRA STOLLER/ESTO

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the breakup of its parent company, AT&T, in 1984, and how they helped lead to some of the latest technologies.

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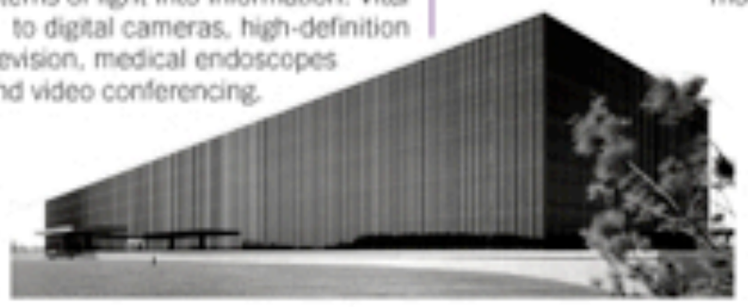

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Interdisciplinary thinking for solving challenges

Volvo and Locusts

Interdisciplinary thinking for solving challenges

Volvo and Locusts

3M

A CULTURE OF SHARING

55,000 Patents a 1-to-1 ratio to employees

Sharing Among Scientists core tenet of their culture, **15% rule** pursue speculative new ideas and share with the group, **Conceptual Blending**, **Employee Rotation**, **Horizontal Sharing** inventing new products by transplanting same concepts into different domains, **Tech Forum Event** each researcher shares findings with the company

"Flexible Attention Policy" take a walk outside, sit by a sunny window, daydream

Spend 8% of gross revenue on research

HOW CAN WE CREATE A LEARNING ENVIRONMENT THAT SUPPORTS A CULTURE OF INNOVATION ?

LEARNING OBJECTIVE #3

8 IMMERSIVE LEARNINGSCAPE PATTERNS

the learning revolution's impact
on educational environments

Pattern 1: Sketch-Scape

Sharing Knowledge

Cross-Pollination of Ideas

Creative Space

Pattern 4: Immersive-Scape

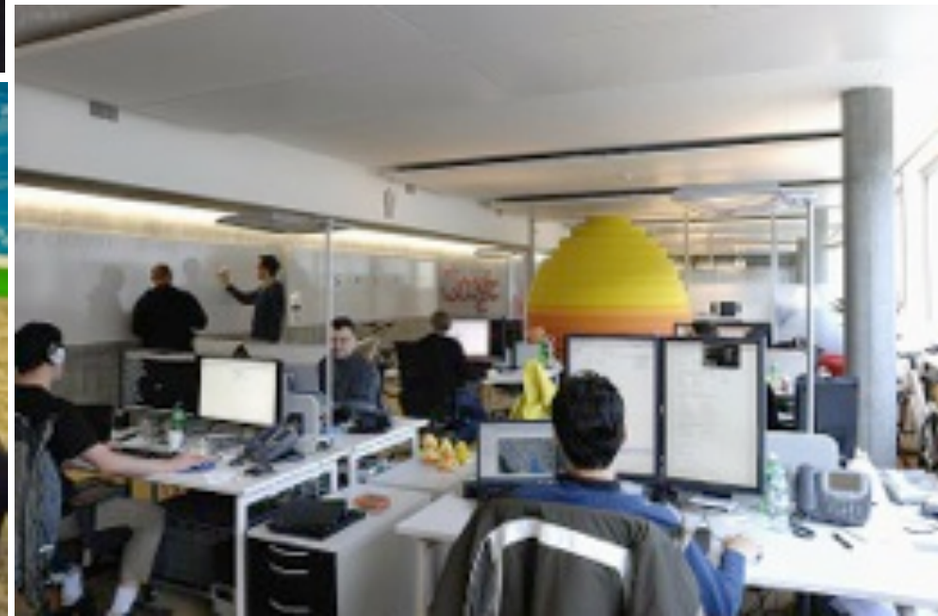
Relevance of Knowledge

Pattern 5: Unifying Space

Collaboration

Pattern 6: Play-Scape

Fun-scape



Pattern 7: Adaptability

Flexibility

Pattern 8: Technology-infused Learning

Active & Engaging Tools

How can we create a Learning Environment that supports a culture of innovation ?

ITEEA Recommendations

INTERNATIONAL TECHNOLOGY AND ENGINEERING EDUCATORS ASSOCIATION

"The current mainstream school facility models restrict the teaching of science, math, technology and engineering subjects to individual rooms designed around isolated topics"

"The existing core curriculum, which is divided into silos and focuses on traditional math and science is irrelevant and boring to today's students"

ITEEA (International Technology and Engineering Educators Association) report, a May 3, 2011

Teacher Development is Key

Furniture Solutions

Flexibility vs. specificity


Learning
Happens
Everywhere

methodologies of
TEACHING VS LEARNING
typologies of

methodologies of

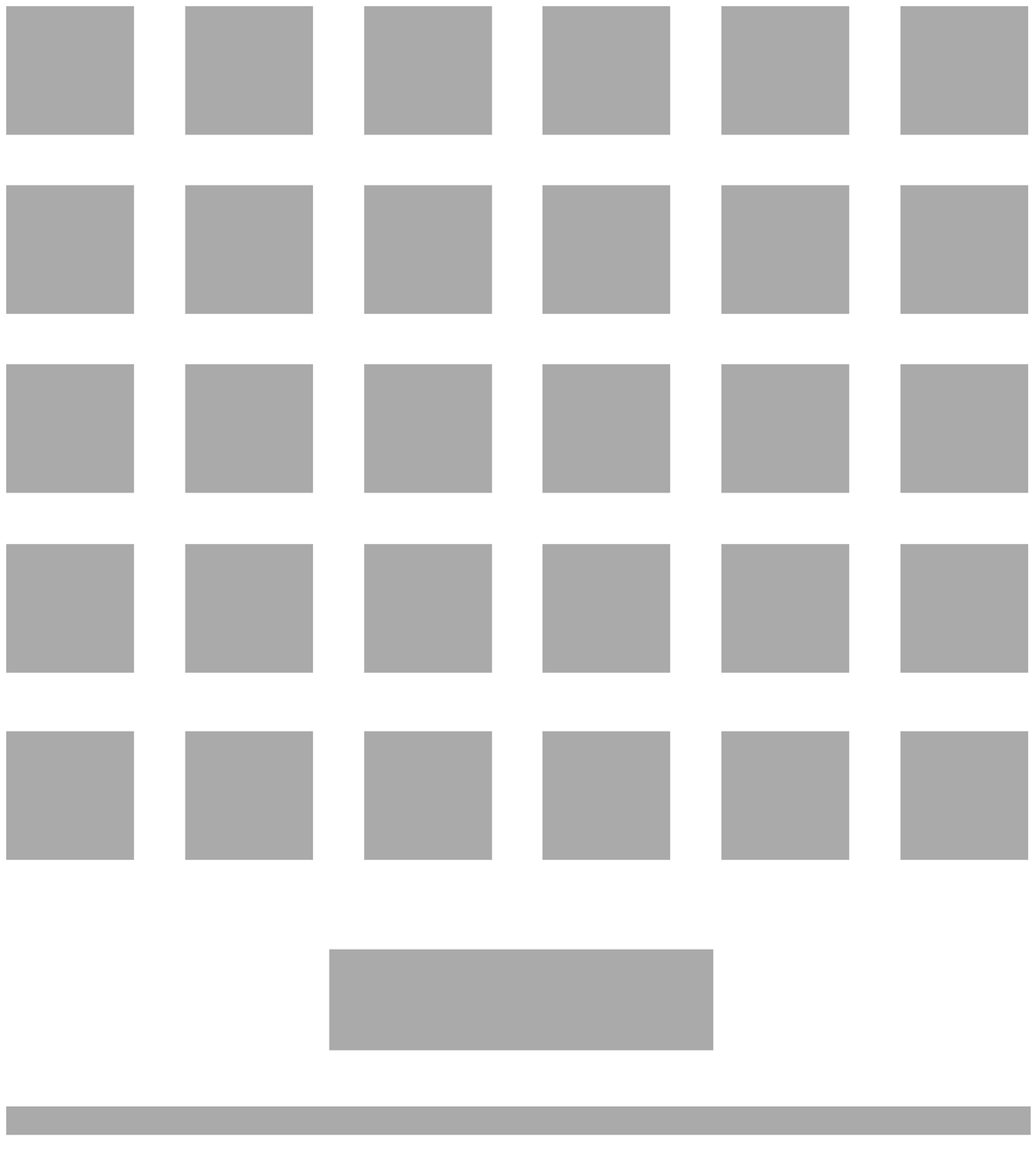
TEACHING

VS

typologies of

LEARNING

classROOM



vslearningSCAPE

typologies of

LEARNING · SPACE

typologies of

LEARNING • SPACE

1 THINK

2 CREATE

3 DISCOVER

4 IMPART

5 EXCHANGE

LEARNING OBJECTIVE #3

CASE STUDIES

Re-Thinking the Knowledge Community

Re-thinking the

KNOWLEDGE COMMUNITY

Immersive - Medium Scale - Low Impact - Applicability To All Schools

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE RE_DESIGN

Atlanta, Ga

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

Existing Prototype

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

New Prototype

New Prototype

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

Immersive LearningScape

NEIGHBORHOOD

5 teachers / 120 students

Think-scape
Create-scape
Discovery-scape
Impart-scape
Exchange-scape

typologies of

LEARNING • SPACE

1 THINK

2 CREATE

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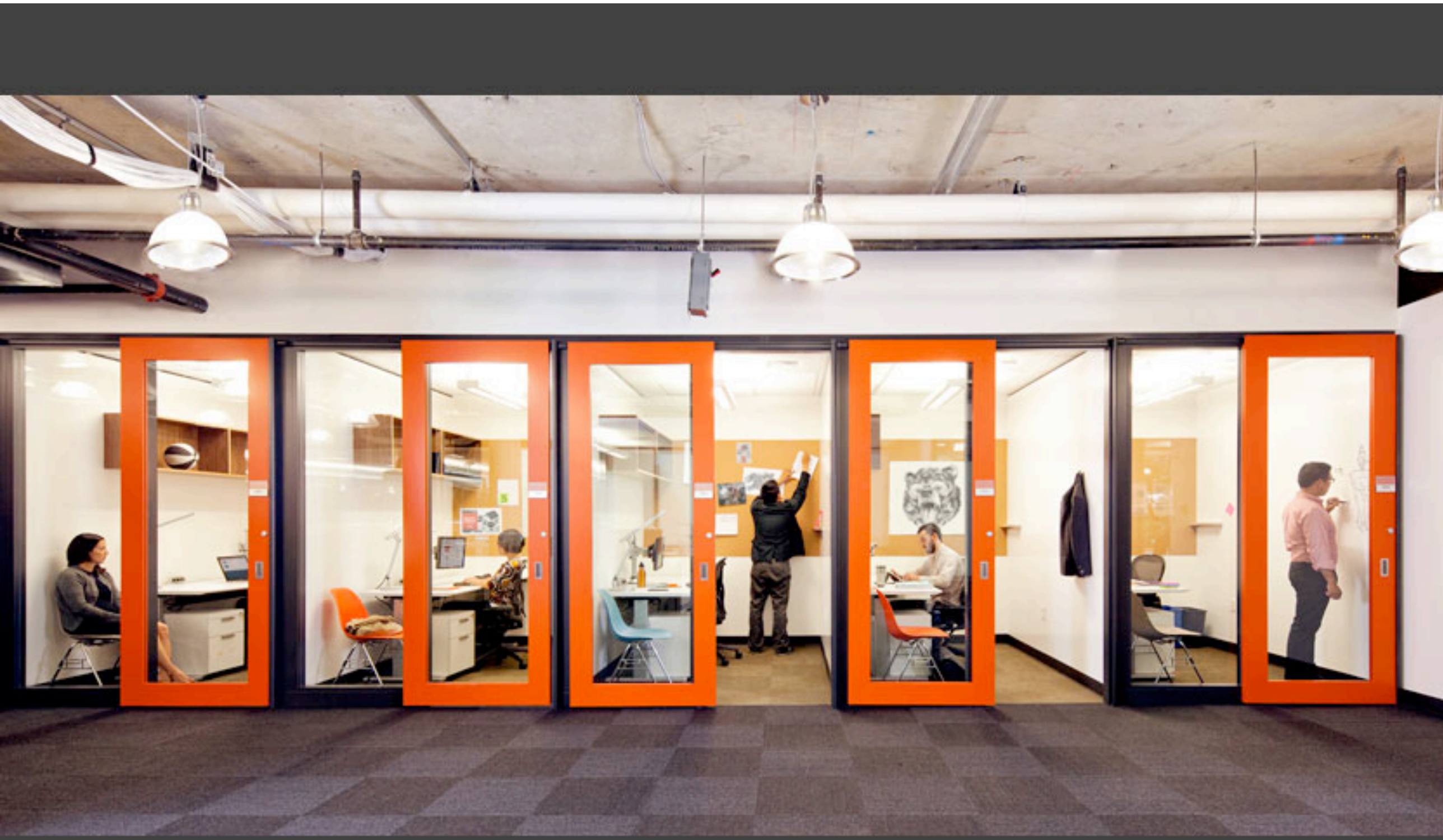
5 EXCHANGE

THINK–SCAPE

A Space that **Supports a "Thinking Curriculum"**

THINK–SCAPE

A Space for **Research**



THINK–SCAPE

A Space for **Critical Thinking**

THINK–SCAPE

A Space for **Assessment**

THINK-SCAPE

A Space for **Visual and Audio Recording**

THINK–SCAPE

A Space for **Individual Distance Learning**

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

Immersive LearningScape

NEIGHBORHOOD

5 teachers / 120 students

Think-scape

Create-scape

Discovery-scape

Impart-scape

Exchange-scape

THINK-SCAPE


Design and Capabilities of the Commercial Space Station (CS
Minimum 15 Year Life
SPACE

typologies of

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CREATE-SCAPE

A Space for **Teamwork**

CREATE-SCAPE

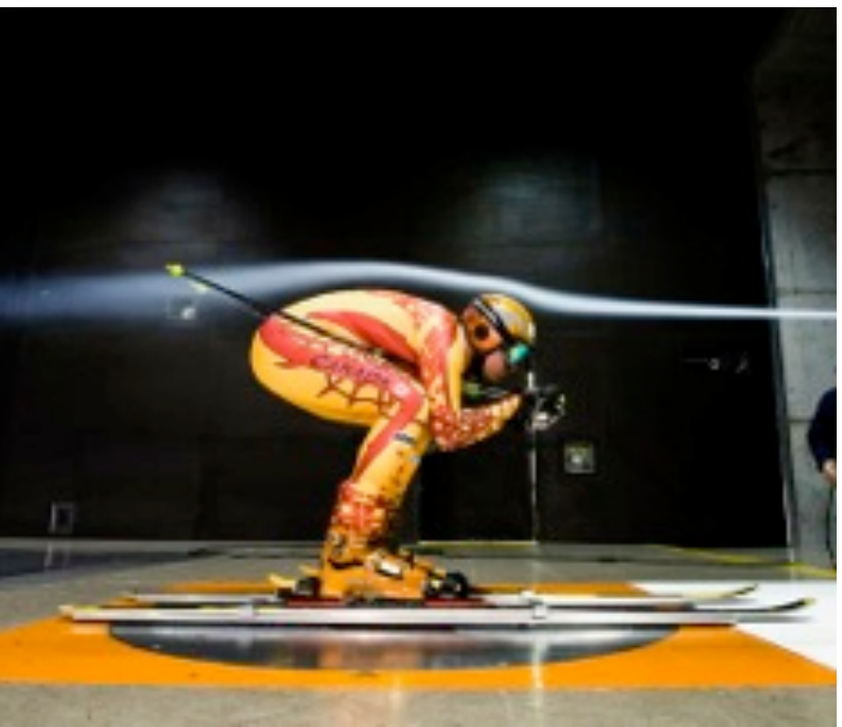
A Space for **Collaboration**

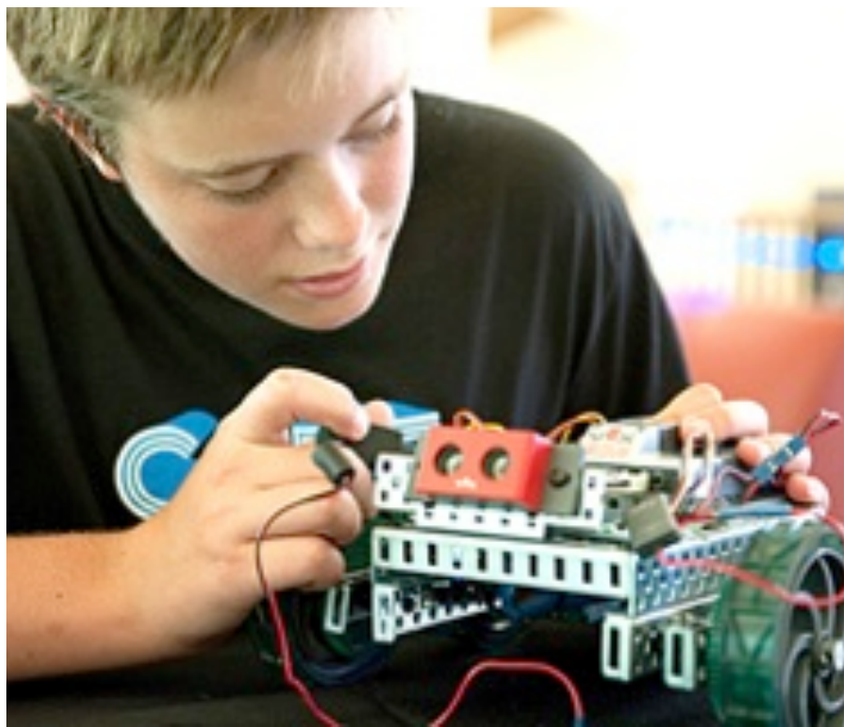
CREATE-SCAPE

A Space that **Supports Communication**

CREATE-SCAPE

A Space that **Supports STEM & STEAM Education**





CREATE-SCAPE

Case Study: Sarasota's Classroom of Tomorrow

CREATE–SCAPE

A Space that **Supports Project-Based Learning**

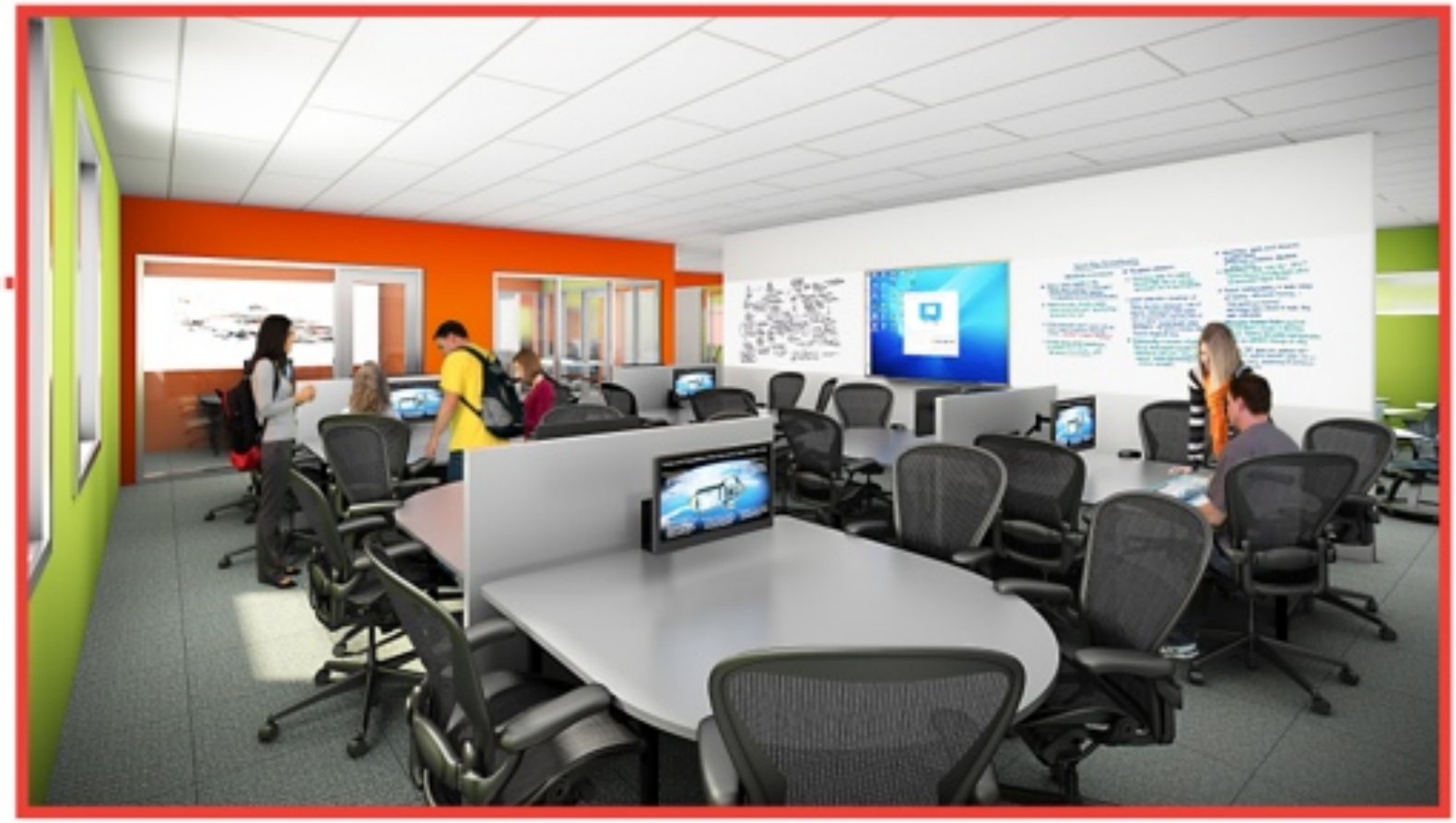
FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

Immersive LearningScape

NEIGHBORHOOD

5 teachers / 120 students

Think-scape
Create-scape
Discovery-scape
Impart-scape
Exchange-scape



CREATE-SCAPE

Project-Based Learning

CREATE-SCAPE

CREATE-SCAPE

typologies of

LEARNING • SPACE

1 THINK

2 CREATE

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4 IMPART

5 EXCHANGE

DISCOVER–SCAPE

A Space for **Hands On Investigative Learning**

DISCOVER–SCAPE

A Space for **Tinkering**

DISCOVER–SCAPE

A Space for **Production**

DISCOVER–SCAPE

A Space for **Idea Application**

DISCOVER–SCAPE

A Space for **Specificity**

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

Immersive LearningScape

3 DISCOVER

NEIGHBORHOOD

5 teachers / 120 students

Think-scape
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typologies of

LEARNING • SPACE

1 THINK

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4 IMPART

5 EXCHANGE

IMPART–SCAPE

A Space for **Sharing**

IMPART–SCAPE

A Space for **Teaching**

IMPART–SCAPE

A Space for **Quick Lessons**

IMPART–SCAPE

A Space for **Group Distance Learning**

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

Immersive LearningScape

4 IMPART

NEIGHBORHOOD

5 teachers / 120 students

Think-scape
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Exchange-scape

IMPART–SCAPE

IMPART–SCAPE

typologies of

LEARNING • SPACE

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EXCHANGE–SCAPE

A Space for **Specificity**

EXCHANGE–SCAPE

A Space for **Co-Planning & Co-Teaching**

EXCHANGE–SCAPE

A Space for **Informal Conversation**

EXCHANGE–SCAPE

A Space for **Exhibiting**

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

Immersive LearningScape

5 EXCHANGE

NEIGHBORHOOD

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EXCHANGE-SCAPE

EXCHANGE-SCAPE

FULTON COUNTY MIDDLE SCHOOL PROTOTYPE *Atlanta, Ga*

Multi-media

MULTIMEDIA

Think-scape
Create-scape
Discovery-scape
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Exchange-scape

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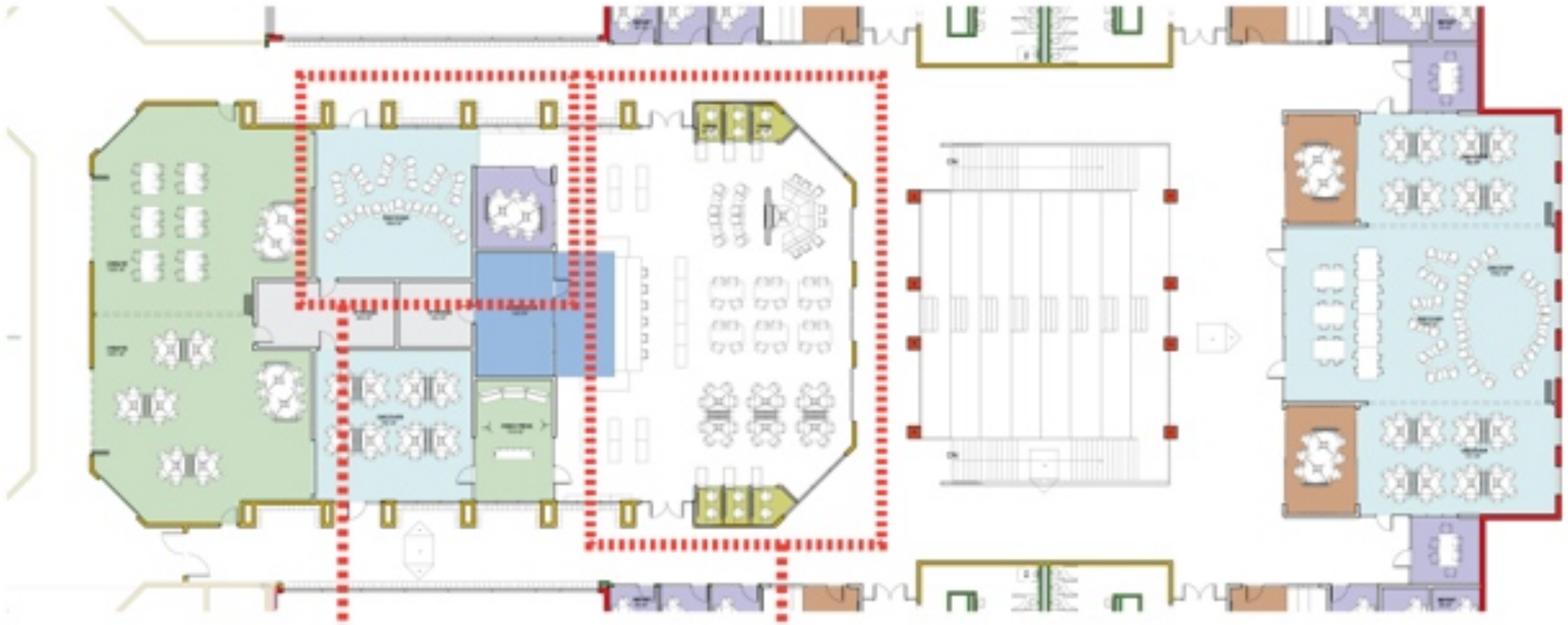
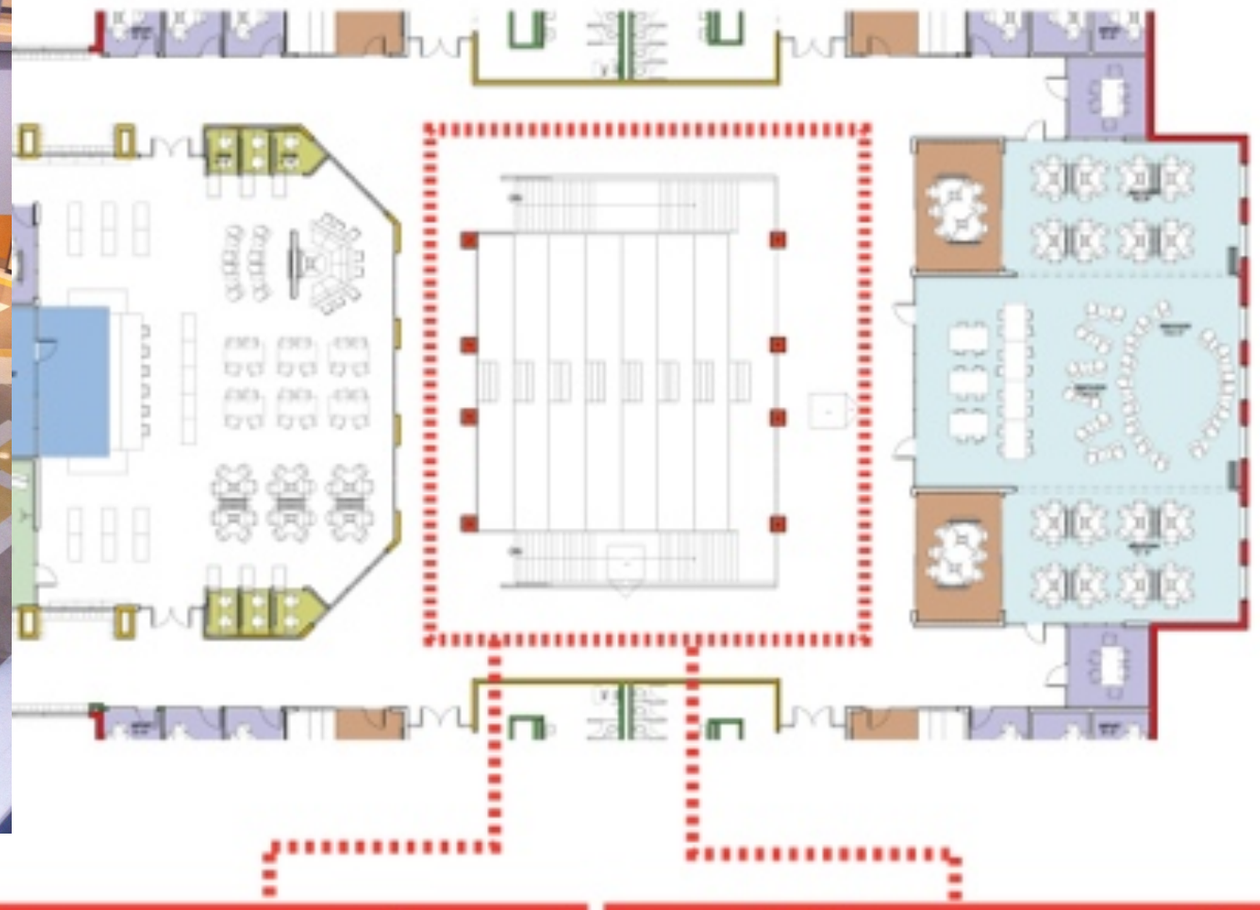


MULTIMEDIA

Think-scape
Create-scape
Discovery-scape
Impart-scape
Exchange-scape

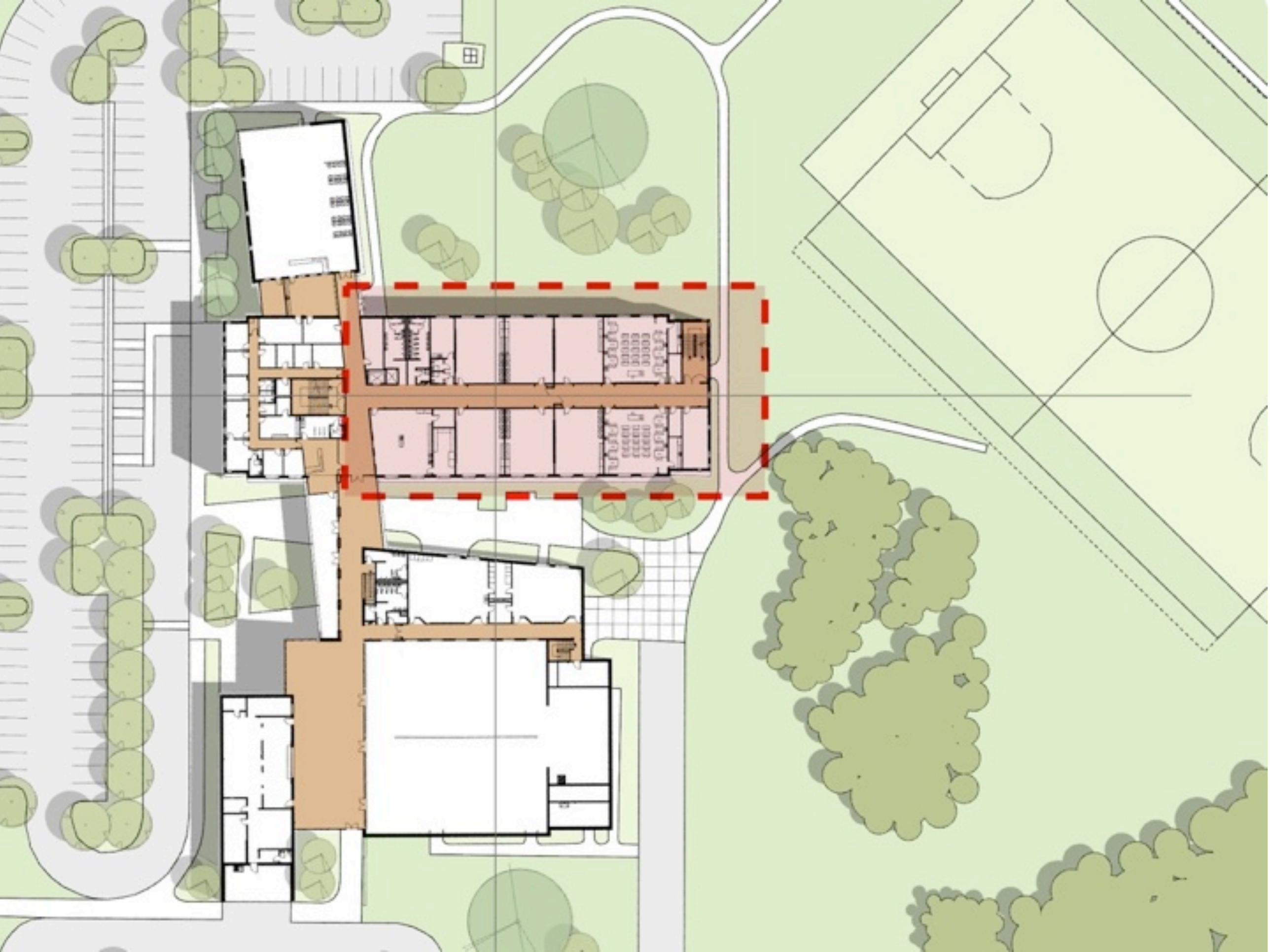
Multi-media

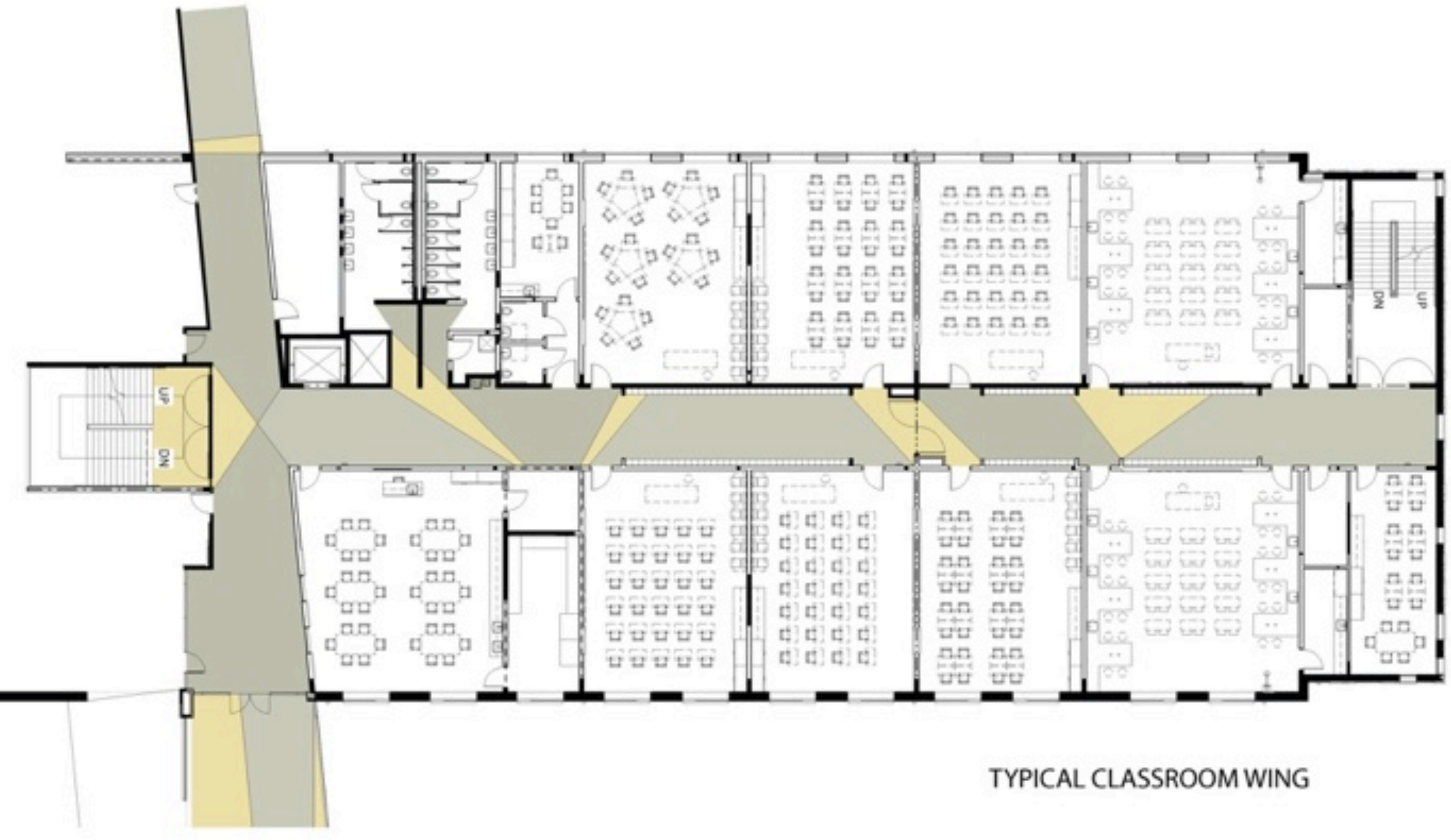


FORUM

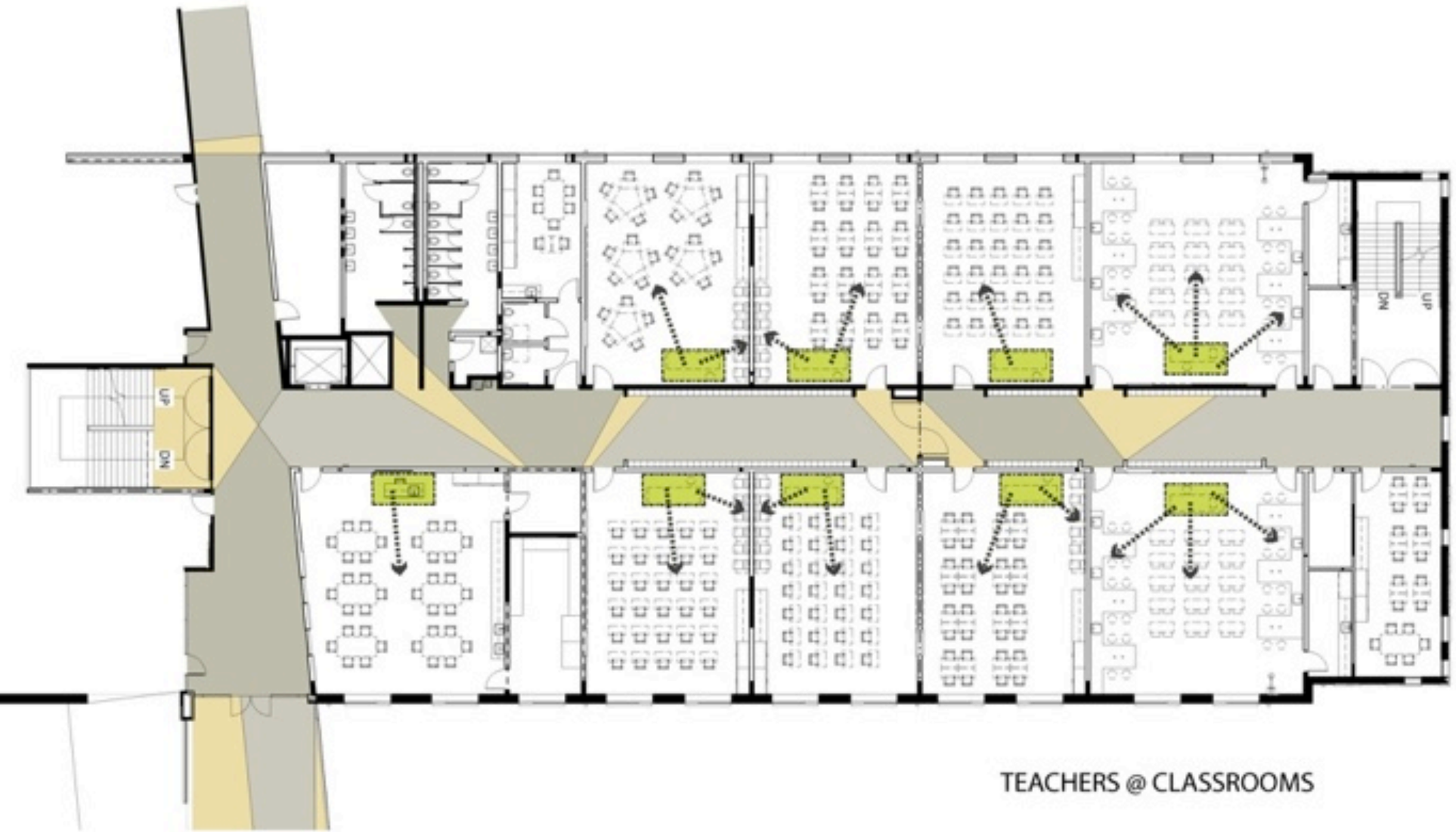
Think-scape
Create-scape
Discovery-scape
Impart-scape
Exchange-scape

PILOT MOUNTAIN MIDDLE SCHOOL *Pilot Mountain, NC*



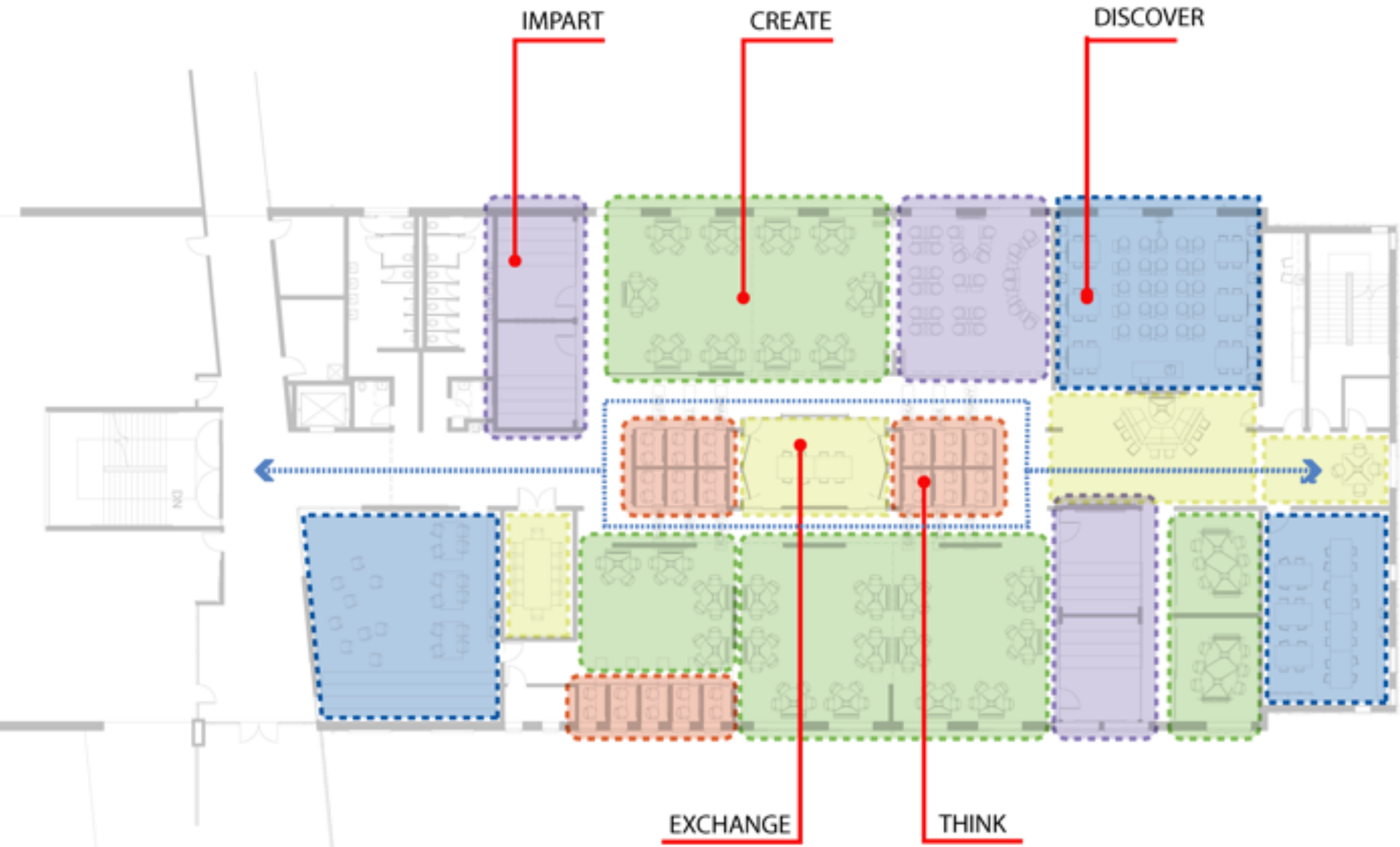


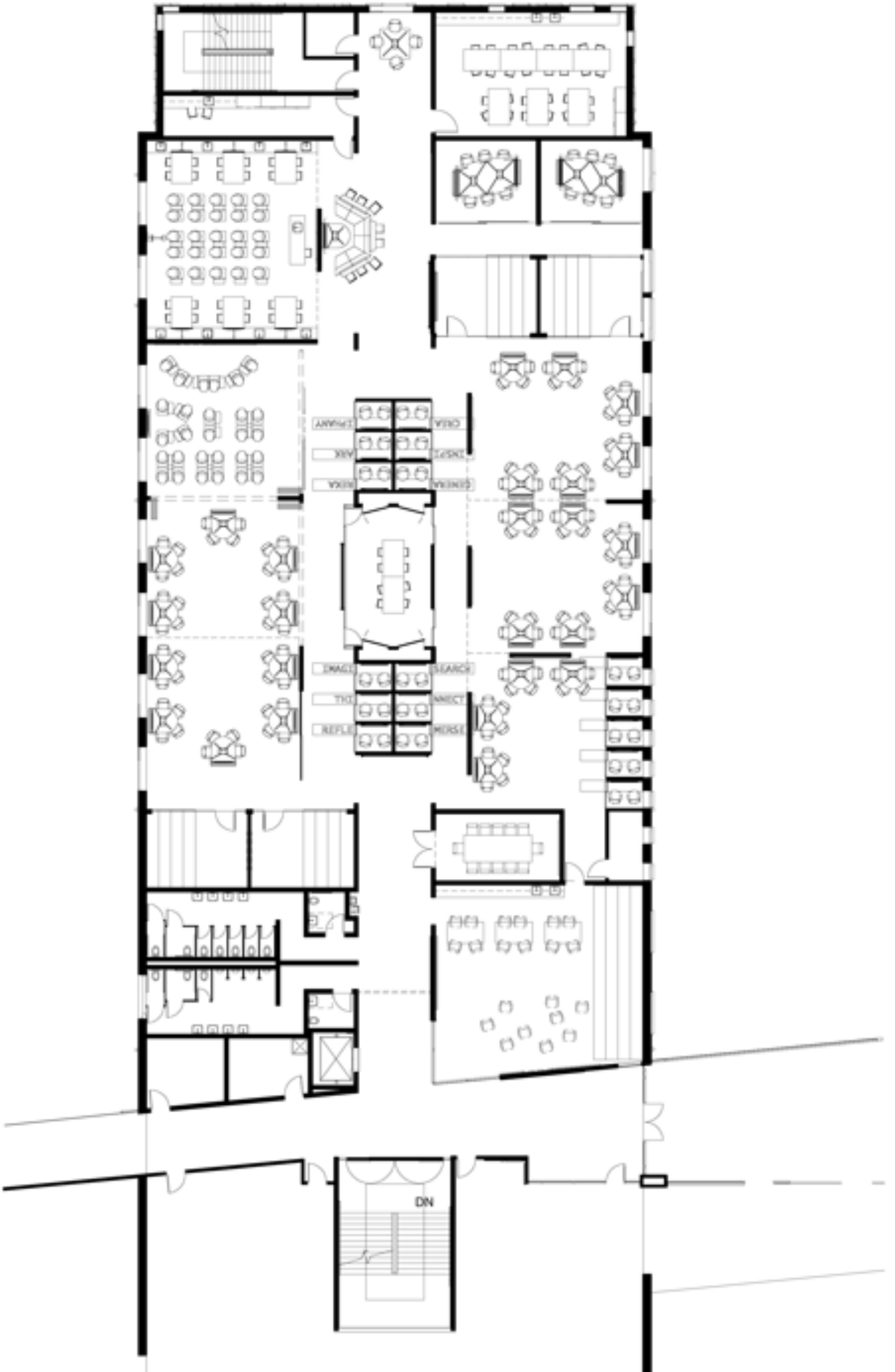
TYPICAL CLASSROOM WING



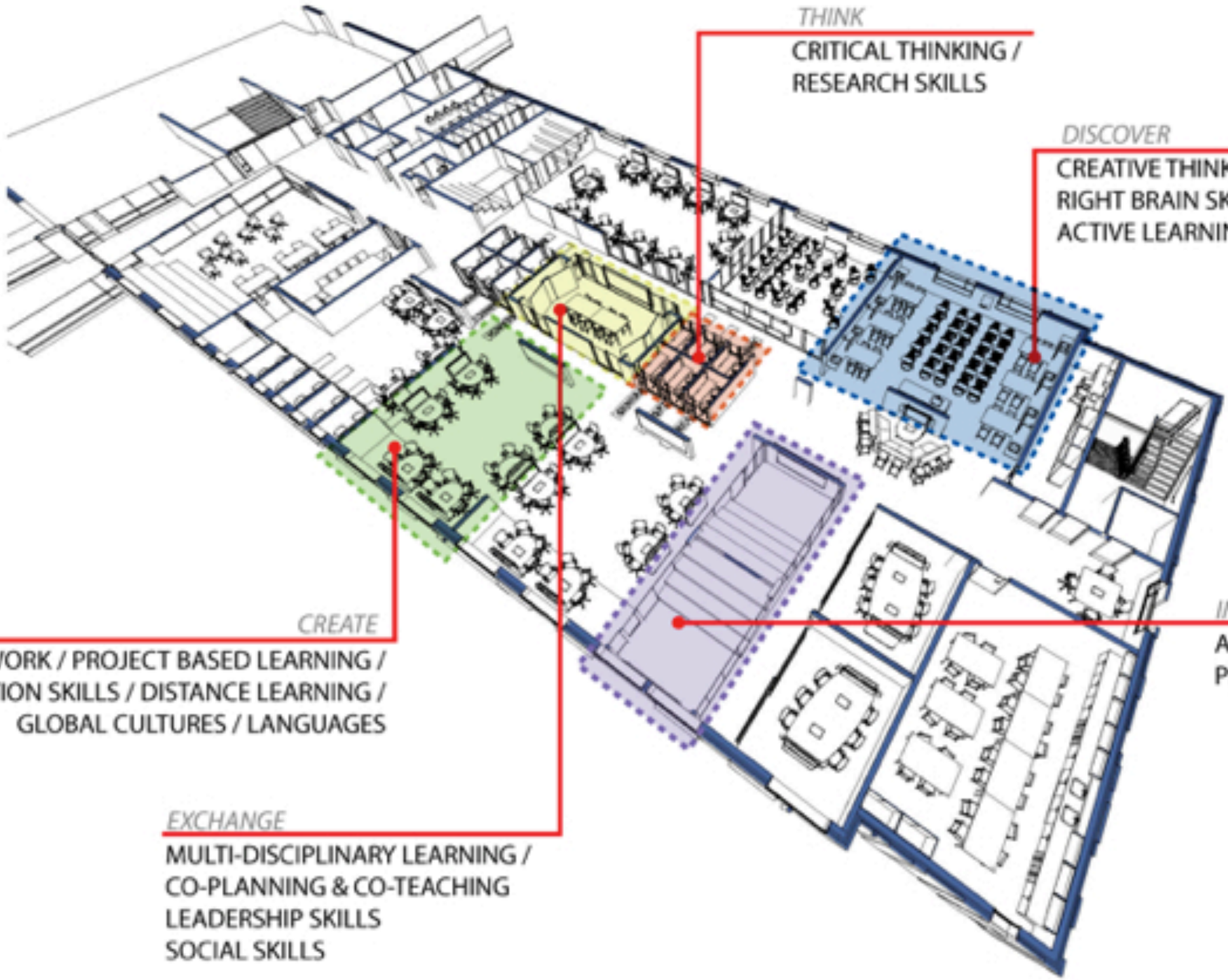
TEACHERS @ CLASSROOMS

STUDENTS @ CLASSROOMS


IMPART
CREATE
DISCOVER
EXCHANGE
THINK


DN

21st CENTURY SKILLS IN THE IMMERSIVE LEARNINGSCAPE



THINK

CRITICAL THINKING /
RESEARCH SKILLS

DISCOVER

CREATIVE THINKING /
RIGHT BRAIN SKILLS
ACTIVE LEARNING

CREATE

TEAMWORK / PROJECT BASED LEARNING /
COMMUNICATION SKILLS / DISTANCE LEARNING /
GLOBAL CULTURES / LANGUAGES

IMPART

AUDITORY SKILLS /
PRESENTATION SKILLS

EXCHANGE

MULTI-DISCIPLINARY LEARNING /
CO-PLANNING & CO-TEACHING
LEADERSHIP SKILLS
SOCIAL SKILLS

GARY COMER YOUTH CENTER & CHARTER SCHOOL

Chicago, Ill.


GARY
CORNER


OF THE


SOUTH SHORE DRILL


ET CHARTER SCHOOL
TO • DISCIPLINA • VENERATIO
1999
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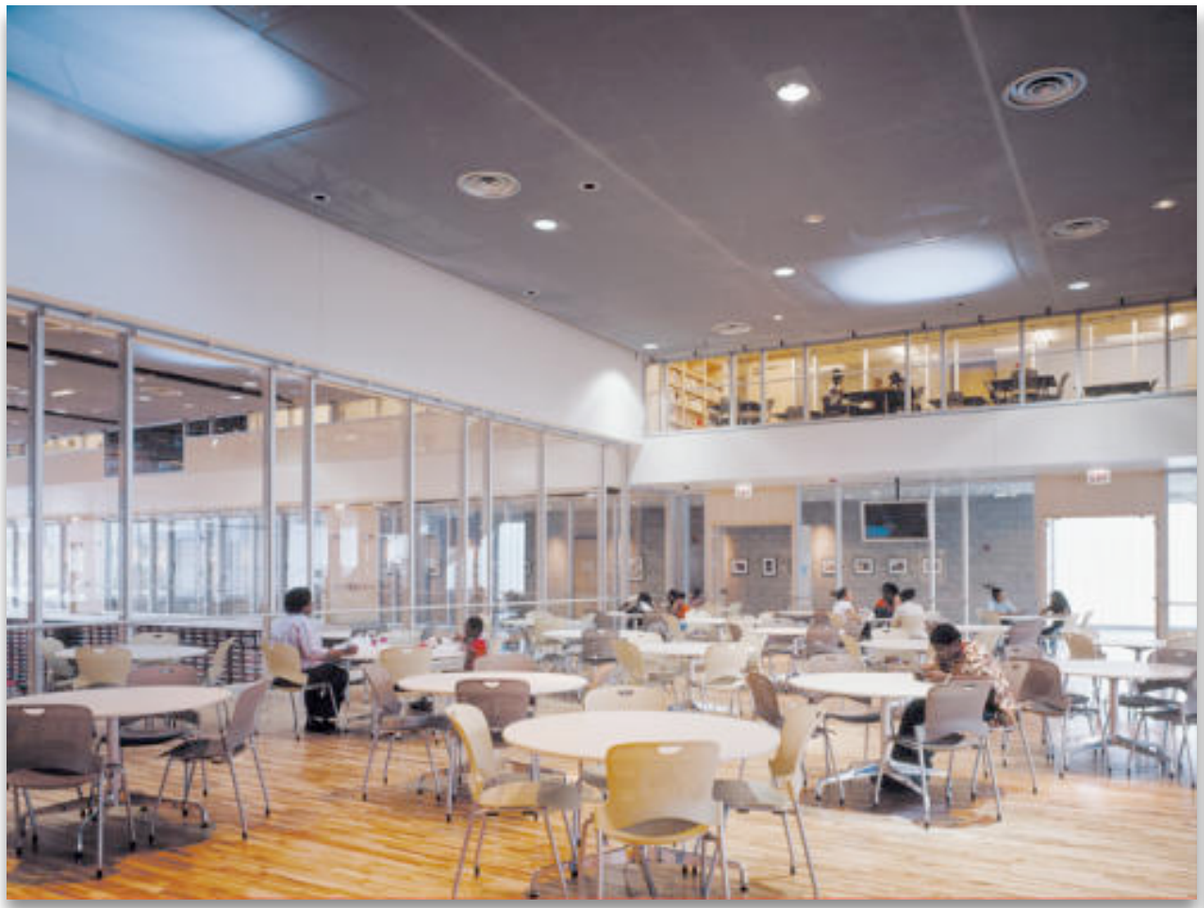
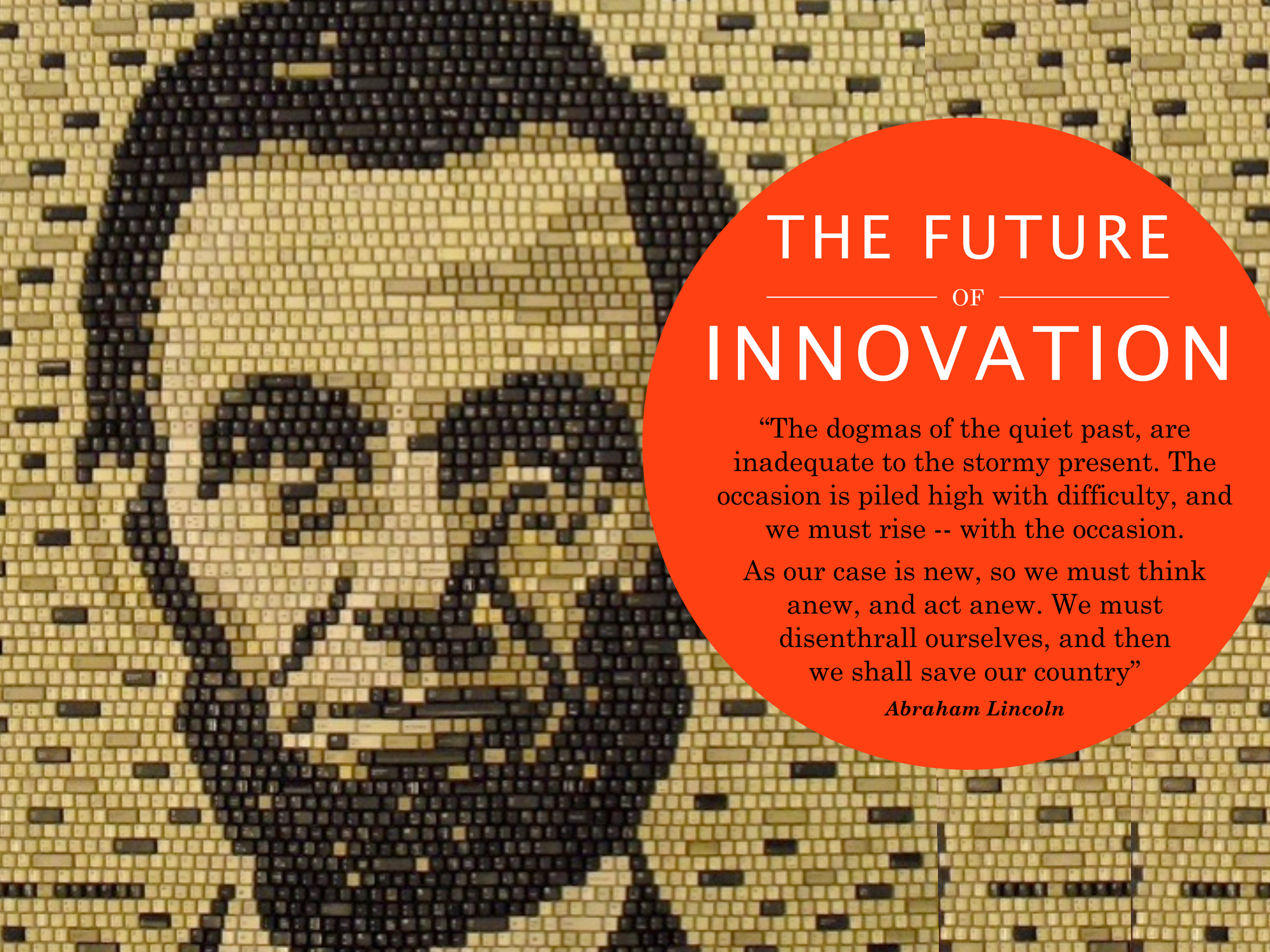
SOUTH SHORE DRIVE
EXIT




Winter
WINTER
Winter
Winter
Winter
Winter
Winter


Spring
SPRING
Spring
Spring
Spring



THE FUTURE OF INNOVATION

"The dogmas of the quiet past, are inadequate to the stormy present. The occasion is piled high with difficulty, and we must rise -- with the occasion.

As our case is new, so we must think anew, and act anew. We must disenthrall ourselves, and then we shall save our country"

Abraham Lincoln

Educate for Disenthrallment

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by Tomas Jimenez-Eliaeson AIA, CEFPI

teliaeson@littleonline.com

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WHAT OBSTACLES

will your school encounter when adapting to 21st Century Needs?

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