From Large Scale to Human Scale: Learning from Neuroscience to Enhance School Experiences for All Users

Page Dettmann, PhD, ALEP; MeTEOR Education, Chief Education Evangelist

Boris Srdar, FAIA; NAC Architecture

Abbreviated Presentation Version
Enhancing the School Experience

Vision for Learning

Link neuroscience research to Learning and Environments
How do three components help the brain develop better

- Learning and teaching process
- Built environment – macro: space
- Built environment – micro: furniture
Strategic Vision for Learning

Learners will be empowered as *collaborate problem solvers* to *explore curiosities, pursue passions, and build resiliency in humanized, learner-centered spaces.*
The Future of Learning
The roles of the teacher and student are changing.
Shift the Focus of Learning

Teach one another

Collaborative Problem Solving

Lecture 5%
Reading 10%
Audio/Visual 20%
Demonstration 30%
Practice by Doing 75%
90% Activity and Average Retention Rate
Student needs are changing

Construction of Memories
Learning experiences and environments support developing brains
<table>
<thead>
<tr>
<th>SCHOOL NAME</th>
<th>ORIGINAL SCHOOL SIZE</th>
<th>NEW SCHOOL SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bennett ES</td>
<td>48,000sf</td>
<td>96,000sf</td>
</tr>
<tr>
<td>Tillicum MS</td>
<td>92,000sf</td>
<td>181,000sf</td>
</tr>
<tr>
<td>Mount Si HS</td>
<td>230,000sf</td>
<td>355,000sf</td>
</tr>
</tbody>
</table>

Exacerbated Challenge:
We can achieve what we can imagine.

What was your most “meaningful and engaging” K-12 learning experience?

- What made it meaningful and engaging?
- What were characteristics of the space where it occurred?
“Research that shows that when we habituate to something, whether it’s an environment or a pattern of buying, we tend to prefer that pattern, even if we’d be better off with something else.”

Sarah Williams Goldhagen
Bodily Cognition of Space

- Volume
- Depth
- Distance
- Space Flow
- Peripheral Vision
Bodily Cognition of Space

- Volume
- Depth
- Distance
- Space Flow
- Peripheral Vision
Environment sends messages

Brain-body cognition in reacting to environment:

Henry the VIII
Environments send messages

Brain-body cognition in reacting to environment:

King Arthur and the Knights of the Round Table
Environments send messages

Brain-body cognition in reacting to environment:

Activity Expectations
Environments send messages

Brain-body cognition in reacting to environment: Activity Expectations
“Classroom ecosystems which mirror real-world collaboration were found to increase student learning by 20%.”
BIOPHILIC DESIGN

An innovative approach that emphasizes the necessity of maintaining, enhancing, and restoring the beneficial experience of nature in the built environment

Biophilic Design

Access to nature – mental and emotional restoration (ADD)
Improves attendance and test scores
So what does it look like if space is designed to help varying activities and to spark curiosity? Design is not just what it looks like and feels like. Design is how it works. S. Jobs
The environment is never neutral – it either hinders or enables the Vision for Learning
What kind of environment can reflect such a vision?

How do we bring all stakeholders to embrace that THIS KNOWLEDGE is important

- Why we must develop a word picture and mental image of our target
  - *Intellectually and emotionally*

So what does it look like if space is designed to help varying activities and to spark curiosity?
Learning from Nature and Outdoor Spaces

- Personalization of space (space “ownership”)
- Space agency: choices for a variety of student needs

Novelty
Activity Expectations

Space role in construction of memories

• Collaborative and learner centered spaces
• Personalization of space (space “ownership”)
• Institutional planning versus space choices
Intertwining learner-centered experiences with environment supports

- **Social Brain** – spaces for collaboration
- **Inquiry and challenge** – spaces for investigation with a variety of resources
- **Novel experiences** – the entire school invites learner-centered tasks
- **Curiosity** – spaces for students to explore and report the results of their curiosities
- **Humanized spaces** – learner sized, cozy, comfortable spaces and furniture (high/low)
- **Learner Movement** – ubiquitous throughout
- **Making memories** – sensory design
Mitigating the challenge and fear of large scale

<table>
<thead>
<tr>
<th>SCHOOL NAME</th>
<th>ORIGINAL SCHOOL SIZE</th>
<th>NEW SCHOOL SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bennett ES</td>
<td>48,000sf</td>
<td>96,000sf (2 x old school size)</td>
</tr>
<tr>
<td>Tillicum MS</td>
<td>92,000sf</td>
<td>181,000sf (2 x old school size)</td>
</tr>
<tr>
<td>Mount Si HS</td>
<td>230,000sf</td>
<td>355,000sf (1.5 x old school size)</td>
</tr>
</tbody>
</table>
Bennett ES  Old 48,000sf  New 96,000sf (2 x old school size)

Client: “Make it cozy”
Bennett ES  Old 48,000sf  New 96,000sf (2 x old school size)

Client: “Make it cozy”
Bennett ES  
Old 48,000sf  
New 96,000sf (2 x old school size)  

Client: “Make it cozy”
Tillicum MS  (2x Bennett)  Old 92,000sf  New 181,000sf (2 x old school size)
Tillicum MS  (2x Bennett)  Old 92,000sf  New 181,000sf (2 x old school size)
Tillicum MS  (2x Bennett)  Old 92,000sf  New 181,000sf  (2 x old school size)
Mount Si HS *(2x Tillicum)*

- Old 230,000sf
- New 355,000sf
  *(1.5 x old school size)*

An Elevated Campus
Mount Si HS (2x Tillicum)
Old 230,000sf
New 355,000sf (1.5 x old school size)

Distribution of Informal spaces – enhancing student relationships
Macro and micro Nodes – 5th day of school occupancy
Mount Si HS *(2x Tillicum)*  
Old 230,000sf  
New 355,000sf

Prospect and refuge spaces – enhancing student relationships
Mount Si HS (2x Tillicum)  Old 230,000sf  New 355,000sf

Distribution of informal spaces – enhancing student relationships
“Learning is the Residue of Experience.”

Melina Uncapher, Cognitive Neuroscientist
Schools referenced:

**ELEMENTARY SCHOOLS**
- Ardmore
- Bennett
- Riverview
- Cherry Crest
- Little Cedars
- Lake Stevens
- Happy Valley

**MIDDLE SCHOOLS**
- Hazel Wolf K-8
- Tillicum MS

**HIGH SCHOOLS**
- Wilson High School
- Mount Si High School
- TEAL Center (interior)
From Large Scale to Human Scale:
Learning from Neuroscience to
Enhance School Experiences for All Users

Page Dettmann, PhD, ALEP; MeTEOR Education, Chief Education Evangelist
pdettmann@meteoreducation.com

Boris Srdar, FAIA; NAC Architecture
bsrdar@nacarchitecture.com

Thank you