Innovate, Iterate, Prototype:

How failing fast can generate engaging and effective learning environments.

ABSTRACT:
Our multidisciplinary presentation team of a superintendent, a planner, and two architects will demonstrate a variety of techniques used in design thinking with real world case studies of how these processes produced effective and engaging learning environments for a range of activities and ages; from early childhood through middle school and high school. The first case study will explain how design thinking led to a renovated early childhood center in an elementary school. The second will focus on the creation of a cutting-edge STREAM Lab within the confines of an outdated natatorium at a junior/senior high school. The third will include the design process for visioning and community engagement for a new performing arts and indoor athletic facility for a high school.
Introductions

Carl Baxmeyer
Planner - Wightman

Tony Leininger
Architect – CARMI Design

Greg Monberg
Architect - Wightman

Dave Eichberg
Superintendent
Berrien Springs Public Schools

Learning Objectives

• OBJ #1 Describe how design thinking can lead to improved engagement from a community visioning group.
• OBJ #2 Understand how rapid prototyping can streamline the design process and create unexpected solutions.
• OBJ #3 Define the steps needed for design thinking to be productive in creating an effective and engaging learning environment.
• OBJ #4 Contrast the different paths in design thinking to develop a successful outcome for varying age levels and differing educational programs.
DESIGN THINKING INTRODUCTION

Starting with EMPATHY
EARLY CHILDHOOD CENTER

CASE STUDY ONE

How Children Succeed
Paul Tough

“Non-cognitive Soft Skills”
- GED Study late 1990's by James Heckman, University of Chicago
- Perry Preschool Project Ypsilanti, Michigan, 1960’s 3rd Grade IQ versus Adulthood “Personal Behavior” “Social Development”

The Antidote to highly stressed children
- Human Interaction
- Positive Feedback & Support
- Non-cognitive skills
Effectiveness Factors for Early Care and Education

- Small group sizes and high adult-child ratios
- Qualified and well-compensated personnel
- Warm and responsive adult-child interactions
- Language-rich environment
- Developmentally appropriate “curriculum”
- Safe physical setting
The play deficit
Children today are cosseted and pressured in equal measure. Without the freedom to play they will never truly grow up

by Peter Gray 8,130 words Read later or Kindle

In the country of Lo Grandes Meulesac, children play near the village of Beaudrime, Moray, France. #Note by Alex Webb/Magnum
**Your mission:** Create a **Vision for the ECC from your partner’s point of view**

**First Interview - 5 min (2 sessions x 4 minutes each.)**

<table>
<thead>
<tr>
<th>DEVELOPMENTAL</th>
<th>CULTURE &amp; BEHAVIOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the intended OUTCOMES for the ECC at Trinity Lutheran?</td>
<td>What are the intended CULTURAL OUTCOMES?</td>
</tr>
<tr>
<td>How will the ECC space be used educationally?</td>
<td>How will the ECC space be used socially?</td>
</tr>
</tbody>
</table>

**By Children**
(2 minutes)
- Use it wisely, good stewards
- Child friendly from walk through the doors until they go home
- Fluid/consistent educational from the walk through - no wait, no line

**By Parents & Staff**
(2 minutes)
- Space for them to visit
- Welcoming Reception Area
- Bright, welcoming place they want their children to be

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**1. Start with Empathy**

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<table>
<thead>
<tr>
<th>CHILDREN</th>
<th>PARENTS AND STAFF</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEVELOPMENT</strong></td>
<td><strong>CULTURE &amp; BEHAVIOR</strong></td>
</tr>
<tr>
<td>Play socially, literacy-rich</td>
<td>All children are valued and seen themselves as children of GOD</td>
</tr>
<tr>
<td>Teaching social skills, developmental skills</td>
<td>Provide Christian education</td>
</tr>
<tr>
<td>Learn to play</td>
<td>To learn and live in a Christian environment, place to be</td>
</tr>
<tr>
<td>Sufficient equipment and manipulatives to reach milestones, diverse spaces, flexibility</td>
<td>Interactive play space, need to feel safe/secure</td>
</tr>
<tr>
<td>Use it wisely, consistency, educational</td>
<td>Should be able to be kids, safe and secure</td>
</tr>
<tr>
<td>Developmentally appropriate, intentional design of the room</td>
<td>Space to play both indoor and outdoor</td>
</tr>
<tr>
<td>Ready to advance to next level</td>
<td>Ways to broaden students outlook, different than home</td>
</tr>
<tr>
<td>Creative, hands on</td>
<td>Interaction between students, safe area where students can be inspired</td>
</tr>
<tr>
<td>Inviting, colorful</td>
<td>Water skill development, interaction between peers, safe</td>
</tr>
</tbody>
</table>
### A DAY IN THE LIFE OF A TYPICAL TRINITY LUTHERAN EARLY CHILDHOOD CENTER STUDENT

<table>
<thead>
<tr>
<th>Before School?</th>
<th>During School?</th>
<th>After School?</th>
</tr>
</thead>
<tbody>
<tr>
<td>破晓</td>
<td>Art projects, clean up, recess</td>
<td>Need one way in/one way out, need communication</td>
</tr>
<tr>
<td>Parents bring them in, leave them with staff</td>
<td>Play, learning projects, colors, shapes, nap-time</td>
<td>Staff help them get ready to go home, coats</td>
</tr>
<tr>
<td>Make lunch choice, check in for the day, table top activities, greeted by teacher</td>
<td>Activities, snack, Jesus time, explore time, stories, recess, lunch, nap, free play/ outside</td>
<td>Pickup/sign out, clean out locker/cubbies, take nap stuff home on Friday</td>
</tr>
<tr>
<td>Mom/dad sometimes come into room, lunch choice, cold lunches in fridge</td>
<td>Table top activities, free play, gym, outside/walks, lunch, nap, snack, free-play, gross motor skills</td>
<td>Parents pickup, gather items, go home</td>
</tr>
<tr>
<td>Parents sign children in, coats, boots</td>
<td>Table top activities, free play, gym, outside/walks, lunch, nap, snack, free-play, gross motor skills</td>
<td>Communication</td>
</tr>
<tr>
<td>Transportation, check in</td>
<td>Jesus time, activities, recess, gym/ interactive, group, music, chapel, lunch, snack</td>
<td>Gather belongings, check out, consistent communication</td>
</tr>
<tr>
<td>Inviting, colorful</td>
<td>Motor skill development, interaction between peers, safe</td>
<td>Bright and clean, open environment</td>
</tr>
</tbody>
</table>
Spaces that Inspire

Fourth Interview - 6 min (2 sessions x 3 minutes each.)

Map the activities of effective learning spaces. What things should change about your existing Early Childhood Center?

What is your favorite place for children? These are the characteristics of effective learning spaces...
- Multi purpose Central Space (from pics)
- Inviting Hallway
- Reception area
- Interactive walls for the kids
- Different seating options - not just chairs.

These are spaces I LOVE!
(activities, spaces, physical characteristics, etc.)

To make the ECC more like my favorite child friendly places, I wish it had...
- Walls - Separation
- Storage
- Own Classroom
- Sound proofing
- More accessible bathrooms
- Cubbies instead of lockers
- Not accessible by other classes (big kids use the bathrooms in ECC)

This is my WISH LIST!
(activities, spaces, physical characteristics, etc.)

4. Capture Findings
<table>
<thead>
<tr>
<th><strong>WHAT IS YOUR FAVORITE PLACE FOR CHILDREN?</strong></th>
<th><strong>TO MAKE THE ECC MORE LIKE MY FAVORITE CHILD FRIENDLY PLACE, I WISH IT HAD...</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative play areas, pretend/imagine areas, theme related</td>
<td>Brighter, cleaner, better environment, no temporary walls</td>
</tr>
<tr>
<td>Interactive walls, movable furniture, creative play areas</td>
<td>Better temp control, personal spaces, soft, child friendly</td>
</tr>
<tr>
<td>Places that encourage imagination</td>
<td>HVAC, lighting, temp control, storage, manipulatives, adequate resources</td>
</tr>
<tr>
<td>Wall manipulatives, reaction area, cohesiveness throughout, intentional use of space</td>
<td>Walls, sound proofing, more accessible bathrooms, cubbies instead of lockers</td>
</tr>
<tr>
<td>Windows</td>
<td>Better gross motor skills space, indoor play, HVAC, lighting, remove clutter</td>
</tr>
<tr>
<td>Open, clean, non-cluttered, storage for staff, child level</td>
<td>Natural lighting, movable furniture and walls</td>
</tr>
<tr>
<td>Art space, sensory area, science area</td>
<td>Lighting, child sized everything, space for their creations, professionalism</td>
</tr>
</tbody>
</table>
Spaces that Inspire

Define the problem statement - 5 minutes

What does your partner define as being the biggest areas of need for the ECC at Temple Betham?

The Early Childhood Center...

needs a way to ... improve HVAC, temp controls, lighting

needs a way to ... greener water of the play areas

needs a way to ... interactive manipulatives & foster imagination

Surprisingly // because // but... (circle one)

- Remove clutter from halls + rooms - eliminate + better utilize existing storage
- Need for adult private conversation space

(Insights)

5. Define the Problem

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Core Visioning Goals

The following Core Visioning Goals were identified throughout the project:

- Space needs to reflect the quality of what we are doing
- Need adequate space for indoor play
- Provide additional storage
- Need to improve thermal comfort and controls
- Need to improve lighting
- Provide an open and inviting environment
- Address acoustic issues in the adventures and explores preschool rooms

Visioning Workshop

During the visioning workshops, a photo sort activity was conducted. During the time, participants discussed the wants and needs for interior spaces in the Early Childhood Center. Below is an breakdown of those spaces and the benefits they provide:

Main Entry - Welcome Center - ECC Office

The main entrance should support safety and security for the Early Childhood Center. Providing a visual connection and a consistent point of entry to the center provides a better organization and unity for parents, staff, and children. Some discussion during the visioning process supported the notion of the existing ECC office near the main entrance and providing a visual connection to support security. The immediate impression that a guest, employee, or child should feel from initial entry of the center shall be safe, warm, and welcoming.

Classrooms

All classrooms shall be cohesive and support flexibility. By providing a cohesive overall look to all the classrooms, a unified center is portrayed. Each individual classroom shall be unique in supporting the children's age group that it is serving. A variety of activities and manipulatives shall be provided to support differing developmental needs.

Infant - Toddler Spaces

Classrooms serve the infant and toddler age groups. Infant and toddler-sized storage spaces shall be inviting and supportive towards developmental milestones. Providing adequate storage between sitting and seating areas is preferred as well as adequate sized storage spaces to become a variety of toy box as well as storage for changing and dressing needs.
**Existing Conditions**

**Visioning Outcome**

**Preschool Classrooms:**
Classrooms for preschool age children shall be supportive towards building independence and providing an environment that is fun, safe, and engaging. Each classroom will have a variety of activities that promote learning, development, and social interaction.

**Grass Motor Play:**
A dedicated motor play space provides children with an opportunity to explore and play outside of their classrooms. This space should provide a large area for children to engage in gross motor activities that promote physical development and coordination.

**Corridors:**
Entrances to the entry corridor should be the first impression on children and parents. Corridors should be engaging and provide a safe and inviting space for children to explore and socialize with their peers.
STREAM LAB SPACES

CASE STUDY TWO
FUNDAMENTAL EXPERIENCES FOR MAKER SPACES
PROGRAM SPACE SUMMARY

1. LEARNING STUDIO
   - Classroom, Direct Instruction
2. DESIGN STUDIO
   - Computers at perimeter
3. MAKERSPACE – “Messy Projects”
   - Art, Electronics, Robotics, Sinks
4. PROTOTYPE STUDIO
   - Wood working equipment – Loud/Dusty
5. TEACHER WORK SPACE
   - Teacher’s desk, computer, files
6. STORAGE
   - Materials, tools, student projects
7. KILN – Art Projects
   - Clay traps at sinks, Exhaust
8. SECURITY VESTIBULE
   - After hours access
9. SMALL GROUP WORK AREA
   - Technology and furniture
10. INDEPENDENT STUDY AREA
    - Quiet, focused work
11. STUDENT PROJECT DISPLAY
    - Celebrate student work, promote program

PROTOTYPING STUDIO

- Machines for a variety of project types
- Dust collector
- Project storage under tables
- Variation of available tools
- Easy access to tools for display
- Tools
- Tall Tables
- Heavy Equipment for Building
- No Carpet

Group One Findings
From Workshop One
1. IT IS IMPORTANT TO PROVIDE A LEARNING STUDIO IN THE STREAM LAB.

1. Strongly Agree
2. Agree
3. Somewhat Agree
4. Neutral
5. Somewhat Disagree
6. Disagree
7. Strongly Disagree
9. IT IS IMPORTANT TO PROVIDE SMALL GROUP WORK SPACE IN THE STREAM LAB.

1. Strongly Agree
2. Agree
3. Somewhat Agree
4. Neutral
5. Somewhat Disagree
6. Disagree
7. Strongly Disagree

10. IT IS IMPORTANT TO PROVIDE INDEPENDENT FOCUSED WORK SPACE IN THE STREAM LAB.

1. Strongly Agree
2. Agree
3. Somewhat Agree
4. Neutral
5. Somewhat Disagree
6. Disagree
7. Strongly Disagree
PERFORMING ARTS & ATHLETICS

CASE STUDY THREE
Berrien Springs HS PAC/IAC

• Expectations
• Process
• Outcomes

• What were the expectations for a successful project, from the district’s / designer’s point of view?
• What did we learn?
• What would we do differently?
• What would we do again?
Berrien Springs HS IAC/PAC

• Process during Visioning
  • What did we do?
  • What did we learn?
  • What would we do differently?
  • What would we do again?
Process
Educational Visioning
Understand - Tours

Process
Educational Visioning
Empathize - One on One Interviews
### Spaces that Teach

<table>
<thead>
<tr>
<th>Describe the places where you LOVE to learn.</th>
<th>Describe the places you try to AVOID.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pleasant, clean, comfortable environment (temperature), open to light, quiet and peaceful.</td>
<td>Lack of windows, boring colors - white, sterile environment, spaces that echo, feeling of confinement, columns and rows of seats, don’t like a lot of metal - steel.</td>
</tr>
<tr>
<td>Natural light, outdoor learning studio space, minimal distractions to maintain focus, comfortable seating, calm, natural colors</td>
<td>Loud, dirty, dark, not maintained, poor temperature and air quality</td>
</tr>
<tr>
<td>Group and individual spaces, technology use - easy access</td>
<td>Crowded</td>
</tr>
</tbody>
</table>
### Review Workshop #1

#### Spaces that Inspire

<table>
<thead>
<tr>
<th>What are things you would like to do educationally that are difficult or impossible due to the existing space available?</th>
<th>What spaces need to be provided to allow you to do things you want to do?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choir classroom, larger band classroom, rehearsal rooms, robotics, eliminate early and late night team practices, host tournaments, innovative technology learning experiences</td>
<td>Choir and band performance, practice and classroom space</td>
</tr>
<tr>
<td>Large events (performing arts)</td>
<td>Multiple athletic team practices at some times</td>
</tr>
<tr>
<td>Entire band or choir in one room, recording large groups at one time</td>
<td>Larger strength and fitness rooms</td>
</tr>
<tr>
<td>Provide gym space for Sylvester students, adequate instruction space for performing arts programs</td>
<td>Space for school performances - musicals, concerts, etc.</td>
</tr>
<tr>
<td>Phy. Ed specialty class, lack of equipment or space to accommodate all class/activities, ability to run indoors</td>
<td>Extra classrooms and rehearsal space, recording technology in larger rehearsal rooms, spaces with adequate music storage and instrument storage</td>
</tr>
<tr>
<td>Practice at normal times</td>
<td></td>
</tr>
<tr>
<td>Add orchestra, robotics?</td>
<td></td>
</tr>
<tr>
<td>Add Family and Consumer Science (FAC) - formerly called Home Economics</td>
<td></td>
</tr>
</tbody>
</table>

#### Define the Challenge

<table>
<thead>
<tr>
<th>What does your partner define as being the biggest area of need for the built environment at Berrien Springs?</th>
<th>needs a way to...</th>
<th>needs a way to...</th>
<th>needs a way to...</th>
<th>Surprisingly/because/but</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide individual spaces, dedicated spaces for wrestling and competitive cheer</td>
<td>Provide space for students to fully develop their skills in performing arts</td>
<td>Integrate learning experiences with performances and competitions</td>
<td>Accommodate for future growth / flexible spaces</td>
<td></td>
</tr>
<tr>
<td>Be a wise investment and promoting of community goals</td>
<td>Build a facility that is attractive, operational and functional</td>
<td>Make space available for multiple sports to practice and compete at the same time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accommodate present needs and plan for future changes</td>
<td>Design space to meet the needs of students and generate community pride</td>
<td>Provide easy access for students and staff to the facilities</td>
<td>Berrien Springs needs a functional, inspiring place that students can learn without creating a space that will be deemed over the top from the community</td>
<td></td>
</tr>
<tr>
<td>Education is valued in Berrien Springs</td>
<td></td>
<td></td>
<td>This facility needs to be flexible to fit the needs of all programs using it, as well as the entire staff/student body</td>
<td></td>
</tr>
</tbody>
</table>
Process
Educational Visioning
Synthesize

Process
Educational Visioning
Prototype - Charrette
Review Workshop #3

Liked Features for Each Main Space - Gymnasium

- Walking/running track
- Curtains to divide into three courts
- Hardwood floor
- Natural light
- LED Lighting
- Space for chairs in front of bleachers

Reviewed Workshop #3

Liked Features for Each Main Space – Fitness Center

- Turf but on the outside of the space not the middle
- Natural light
- Cardio/Fitness as well as weight equipment
- Mirrors
- Audio system
- Larger space
Review Workshop #3

Liked Features for Each Main Space – **Auditorium**

- Flexible seating in place of the pit
- Shell/Sound panels
- Sound control in the auditorium
- Good sound system
- Access to stage from seating area
- Full fly loft stage

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Review Workshop #3

Liked Features for Each Main Space – **Band Room**

- No risers
- Instrument storage in the room
- Carpet
- Natural light
- Clouds for acoustic control
- High ceiling
- Recording capability
Review Workshop #3
Liked Features for Each Main Space – Choir Room
- Portable risers
- Natural light
- High ceiling
- Hard surface flooring not carpet
- One small practice room
- One group room (shared)
- Space for uniforms and music
- Staff and regular whiteboards

Review Workshop #3
Liked Features for Each Main Space – Lobby
- Some flexible seating (limited)
- Standing tables
- Good signage
- Storage for tables and seating
- Low and high ceiling
- Built-in display cases
- Concessions
Materialize - Test Prototype - Fail Fast

Program Review
Berrien Springs HS IAC/PAC

• Outcomes
  • What aligned with the original expectations?
  • What surprised us?
  • What would we do differently?
  • What would we do again?

DESIGN THINKING BENEFITS

• It is fast
• It educates
• It is creative
• It is collaborative
• It builds consensus
• It creates a sense of ownership
THANK YOU!

Q & A