Designed for Learning:

Applying Best Practices from Educational Settings

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Where are we going?

Bridge academic, school-based research with design for learning by considering design needs from multiple perspectives.

What do we know so far about how design and research come together?

• Physical environment is architecturally defined by participants who inhabit the space (Jones)
• Constructivist teaching methods and Active Learning impact the layout of learning spaces
• Possible adaptations/examples of ALCs
• Stakeholders, considerations and barriers
• Three polls are integrated into this presentation
How will we get there?

Extremely brief review of relevant literature

Merging of fields:
- School planning and management
- Architecture and design
- Environmental Psychology
- Early childhood education/child development and
- Teacher education/curriculum and instruction
Teacher influences on school design

According to Jones, the classroom environment is developed with curriculum and instructional methods in mind, which we will see shortly.

However, teacher philosophy also permeates classroom environments

- Teacher habits/layout out of convenience
- Rituals and routines
- Subconscious beliefs; for example teachers as facilitators of math (possibly more experiential) will have different pedagogical approaches than teachers of math as absolutes (possibly more rote, linear)
- What is not in the space is equally important as what is in the space
- All design decisions in classrooms reflect a teacher's values and approach to education
- This is an under-studied yet important element of education because of its impact on design
Jean and Lev

• Constructivist theory and methods of teaching drive teaching and learning and therefore also drive school design
• Constructivism: Learning takes place when students solve issues slightly above their level of ability with guidance from peers and/or instructors
• Humans construct knowledge and meaning from their experiences
• Active Learning Classrooms (ALCs) support experiential learning and dialogue
• Based off of Piaget’s developmental stages & social/cultural theory and Vygotsky’s peer learning & guided discovery
Curriculum and school design: Constructivism and Active Learning

• ALC activities require learners to perform higher order thinking activities
• Group interaction/peer instruction is encouraged to foster negotiation among students
• Value is placed on the process of learning through experience and interaction
• Learning occurs as students gain exposure to a variety of individual perspectives
• Activities allow students to construct knowledge and understanding and connect new ideas to existing ones
• Student-centered learning is the essence; skills over transmission of information
New needs

Architecture needs to evolve its practice to be more flexible and customizable. Some needs may include:

• Space for independent work
• Student team work and sharing spaces; lots of peer-to-peer exchanges
• Ability for presenters/participants join in remotely if needed
• Ability to quickly transition from lecture-small group to large group/debate; mobile furniture and versatility in configuration are key
• Larger tables v. individual desks
• Demonstration/sharing space/flex space
• No central or focal point in ALCs
• Technology; whiteboards/screens
• How can you plan for the future?
Example of change to ALC

“We continue to refine our learning space redesign efforts. We increased bulletin board space, swapped out mobile projector carts for ceiling-mounted models capable of up to 10 simultaneous users, added more lift-capable tables while eliminating smaller desks that seat just two students, provided cushions to teacher’s chairs, changed the size and number of televisions in one middle school building, and recessed ceiling speakers.”

- Kevin Ryan, *Five big takeaways from designing learning spaces*
“Traditional” classroom
Active Learning Classrooms
Vanderbilt’s Center for Teaching, Derek Bruff

Indiana University, fixed tables, individual touchscreens, power in center of tables

Computer science classroom at Wake Forest with small, moveable tables, whiteboards.
Physics class, Boston University, writeable glass, storage space, power source at tables

Penn State, drop screens, multiple projectors, whiteboards
Stakeholder input and holistic design

- Common observation in current literature is that design is top down
- Stakeholders (students, teachers) are often ignored
- Students are experts in their learning communities, which are all diverse
- But…learning spaces no longer have cookie-cutter layout, and spaces are highly customized
- Instead, consider user research-based approaches and design for anticipated future needs
- What makes the learning community unique? What are main intentions of the space?
- What about parents, volunteers, paraprofessionals, TAs, administrators…what other areas of the school do these people use and how does that interface with design?
- Think like a constructivist: where do the process of learning, interaction, knowledge development and negotiation fit in to the design process?
Collaboration is key: stakeholders

• Do you understand your users well? Talk to stakeholders!

• Who are you engaging? Teacher/teacher space, parents, volunteers?
• What are they motivated by?
• What are their behaviors?
• What are their expectations?
Measure twice, cut once: prototyping

- What equipment is needed?
- What tools are needed?
- Do you need a screen, check in area, flexible furniture, tables….SMART boards, open space, computer space, display space?
- Can space be easily reconfigured for peer-to-peer, small group, breakout groups…?
- Pause and test ideas with real users by prototyping the experience
- Space design will be more effective and relationships between stakeholders stronger
- Teachers have little control over what and when they teach; space is precious and can become territorialized
- Helps prepare people for change, creates organizational trust
- Design (eg face-to-face seating) can foster sense of identity and belonging
Things to remember

• Acknowledge and embrace differing perceptions, desires and challenges
• Front and center: who is the work being done for? What is the best fit for this particular, unique community?
• What are primary touch points? For instance, how do people enter, engage and exit the space?
• Due diligence and patience are key to successful process
Things to remember (continued)

- Mixed-methods research and multiple types of data help create a complete picture of the context
- Get feedback early, often and don’t rely only on pre and post-occupancy evaluations
- Use many forms of feedback, for instance 1:1 conversations, surveys, focus groups or observation-based data to inform design decisions
- Keep checking that design aligns with needs/culture
- Stay curious, think bottom-up, avoid seeking evidence to confirm assumptions
Why does this matter?

Life skills are developed during interactions in the classroom if the built environment supports it, including:

- Teamwork
- Problem solving and negotiation
- Metacognition (thinking about one’s thinking)
- Relationship development/management
- Communication skills
- Confidence/speaking up, increased engagement with design-influenced learning
- Users may feel more professionally valued, trusted and respected
Safety considerations:

Guidelines from The National Clearinghouse for Educational Facilities
Natural disaster and emergency procedures

- All parts of the room should be visible from the door; layout of classroom helps teachers surveil and control escape routes
- No obstructed windows; windows enhance surveillance; permanent, lockable niches present for partitions; windows installed in partitions
- Well-lit (natural light does not require power)
- Fire Safety: wall area coverage under 20%, flame-resistant fabrics (classrooms)
- Accommodations for mobility impaired people
- Communications: PA system; intercoms, phones, radios for two-way communication; is there cell phone service?
- Nonstructural Hazards: secured free-standing appliances, computers, hanging plants, cabinets, partitions, gypsum/plaster board ceilings and fixtures
Barriers to Research-Based Approaches

• Post-occupancy evaluations are not the norm, although evidence shows student experience is improved when used (Ganim, 2019). It is important to do both pre and post if you do them and combine with other data
• Budget for data collection and analysis is often deprioritized
• Not much incentive to invest in capturing student experience
• No standardized method of data collection/evaluation for educational space research
• No common platform to share methods or findings – re-creation of the wheel.
Thank you!

We have some Q&A time- any questions?

If any other questions/thoughts arise that you would like to discuss, my email is caitlinlindquist@gmail.com.