Readings on the Cultural Force of "Environment"

Choose 2 articles on Environment from 2 different categories.

Red articles are research or theory based.

Blue articles are written by teachers

- "Children and Place," Strong-Wilson and Ellis (2007) pages
- "The Small Changes in Classroom Environment that Can Improve Learning," Barrett (2013) pages
- "Aesthetic Codes in Early Childhood Classrooms" by Patricia Tarr (2001) 10 pages
- "School Building" from "The School I'd Like" by Burke & Grosvenor (2003) 1 pages
- "Room for Beliefs," Miller (2006) 2 pages
- "Using Archetypes to Match Learning Spaces with Physical and Digital Spaces" by Bianca Hewes (2012) 6 pages

Green articles are written by designers or architects.

- Eight Principles that Define the New School Design Paradigm (2019) 10 pages (pictures)
- "Influence of Design on Learning in the 21st Century" by Peter C. Lippman (2012) 1 pages (pictures)

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Children and Place: Reggio Emilia's Environment As Third Teacher

Education is often understood as the sole responsibility of parents and teachers. Reggio Emilia identifies a 3rd teacher between child, teacher, and parent: the environment. In its attention to how space can be thoughtfully arranged, Reggio Emilia has reconceptualized space as a key source of educational provocation and insight. In what ways does this idea support and challenge existing understandings within early childhood education? The article draws on educational literature on space(s) and early childhood education, including but not confined to Reggio Emilia, as well as classroom-based practice, to pursue the implications of the notion of environment as 3rd teacher to classrooms and teacher education and how both preservice and experienced teachers can use this knowledge to inform their practice.

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THE REGGIO EMILIA approach to education talks about three educators as being in the classroom at any one time: the teacher, the child, and the environment. We do not usually think of the environment as alive, in the way that a person is; instead, we see it as coming about as a result of human imagination and work (Arendt, 1958; Frye, 1963), that is, if we truly see it at all. Maxine Greene, drawing on Virginia Woolf, reminded us of how we become immersed in the "cotton wool of habit" (Woolf, cited in Greene, 1995, p. 115). By seeing the environment as an educator, as the Reggio Emilia approach does, we can begin to notice how our surroundings can take on a life of their own that contributes to children's learning.

Childhood is often the first place where we begin to see and use the environment imaginatively. Kytta (2002) described the affordances that enhance children's environments as what it is possible to do, or imagine to do, due to aspects of a

place that children perceive as valuable. Take swinging, for instance. Swinging is possible where a child can find nonrigid, attached objects, such as a strong rope attached to a tree or pole, or a swing in a park. When one of the authors was teaching elementary school in a First Nations community on the Central Coast of British Columbia, she liked the corner classroom at the end of the hallway. Because it was located where the undergrowth was thickest, the classroom was often enveloped in a greenish light. Topics rich in local anecdote and story, like the sasquatch, could come alive. The filtered greenish light also reminded her of her "deep down" image of the child (Fraser, 2006, p. 20) and those "secret spaces of childhood" (Goodenough, 2004, p. 1) where she used to play hide-and-seek with other children in the neighborhood.

Fraser (2006), in her work with preservice teachers, has identified eight Reggio principles as key to the environment as third teacher: aesthetics, transparency, active learning, flexibility, collaboration, reciprocity, bringing the outdoors in, and relationships. If we interpret these principles in light of research on children and place, we find that a Reggio Emilia approach to the role of the environment in teaching and learning draws deeply on how young children perceive and use space to create meaning. In this article, we explore Reggio Emilia's idea of the environment as a third teacher and consider how teachers (preservice and inservice) can look again at the messages and invitations contained in their classroom surroundings so as to draw more deeply on children's perspectives.

Environment As Third Teacher: What Does That Really Mean?

When we think of the environment, we tend to think of what we can see around us. However, the environment is much more than visual. Tarr (2001, 2004) studied the environments of kindergarten and primary classrooms, imagining not only how they looked but how they felt from a child's perspective:

> From a small chair in a corner, I counted 19 different, decorated, scalloped borders segmenting portions of the bulletin boards lining the walls. The boards were filled with words: a word wall, class rules, a calendar, alphabets, numbers, shapes and colors, and a plethora of cartoon people and animals, each with a message and at least 50 of them with horseshoe-shaped smiles rather like a capital U … St. Patrick's Day mobiles created from brightly painted rainbows and black-line masters hung from the ceiling just above the children's heads. Rainbows, leprechauns, and pots of gold jiggled before my eyes. (Tarr, 2004, p. 88)

Tarr (2004) wondered how this "visual busyness" influences children's concentration (p. 88). She also questioned the implicit messages behind the choice of materials and whether "the mass of commercial stereotyped images silence the actual lived experiences of those individuals learning together" (Tarr, 2004, p. 90).

An important and desirable human activity for young children is interaction with others. Bearne, Dombey, and Grainger (2003) further comment that "interaction should have the dynamic to move thinking and learning" (p. 2). How the configuration and conceptualization of spaces work to invite, hinder, or facilitate interaction has been the subject of study for scholars in early childhood (e.g., Ellis, 2004) as well as scholars in several fields (Jacobs, 1961/1992, 2004; Project for Public Spaces, 2005; Seamon, 1979). Jacobs (2004) explained that "For communities to exist, people must encounter one another in person" (pp. 36–37; cited in Robertson, 2006). Seamon (1979) has drawn on Jacobs's (1961) work to describe *place ballet,* or the bodily regularity of people coming together in time and space. A Reggio Emilia approach involves maintaining a "delicate balance" between providing structure and encouraging children's free exploration (Tarini & White, 1998, p. 379). Seeing the "environment as third teacher" is one way of playing this place ballet, but how?

A Reggio Emilia approach advocates that teachers pay close attention to the myriad of ways that space can be made to "speak" and invite interaction (Cadwell, 2003; Fraser, 2006), such as positioning small mirrors around the classroom or

placing easels close to natural sunlight. Educators can introduce "provocations" meant to surprise children and spark discussion, like a pizza box in the kitchen corner, paper and pencil in the blocks center, or aromatic scents to tantalize the children's noses when they first enter the classroom. Other strategies include bringing in realistic objects for children to use in their play, such as different colors and shapes of pasta in the house corner. By storing colorful objects in transparent containers (markers, buttons, fabrics, wrapping paper), which children can help sort by color or texture, children's curiosity and imagination are piqued. Cadwell (2003) explained how, before seeing the environment as central to learning, children used to dump their blocks on the floor or empty containers of sequins on the light table. Now, the materials are carefully selected and arranged to invite exploration. On low shelves, the child can find "transparent jars of shells, buttons, beads, wires, tiny pine cones, dried rose metals, sequins in the shape of flowers, and spiral shavings from colored pencils," all of which "reflect the light and reveal their enticing contents" (Cadwell, 2003, p. 117). From a child's perspective, such small changes animate the environment, making it feel "electric and alive" (Cadwell, 2003, p. 118). "Life attracts life," Jacobs (1992, cited in Robertson, 2006, p. 26) explained. Children come to care for their surroundings as well as see them in unexpected ways, which becomes part of a planned approach to curriculum and evaluation that is organized around "expecting the unexpected," a favorite Reggio Emilia saying. This approach to curriculum planning is called the *negotiated curriculum.*

Through negotiated curriculum, also called *emergent curriculum* (Jones & Nimmo, 1995), teachers engage in a recursive cycle of design, documentation, and discourse (Forman & Fyfe, 1998; Fraser, 2006). They introduce a provocation. They listen closely to children's conversations as they engage with their surroundings. They document the children's learning using such devices as note-taking, sketches, tape recording, video recording, and photographs, so as to create a visible trace of the learning process. Teachers also reflect and talk with other teachers or with the children. They use what they hear, see, and think about to plan a next activity, one that will build on as well as deepen the children's interest and investigation. A group of teachers described how teachers' views of glue changed when they stopped seeing it as instrumental to creating a collage and instead first created opportunities for children to explore the properties of glue: What did it feel like when wet and dry? How could it be "dripped" and into what shapes? What could be done with glue and a paintbrush, stick, or cotton swab? The teachers observed the children during this exploratory phase and recorded their observations. At one point, the teachers wondered whether they should continue with exploration or challenge the children in a new direction. By reviewing their observation records, they decided that the younger children were still exploring whereas the older ones were ready to move on. Rather than separate the children into two groups, they set out, on different days, bowls of glitter, sequins, and beads. The older children began to construct objects, whereas the younger ones discovered that a paper containing all glitter but no glue needed glue as a necessary adhesive. When the children then moved on to create collages, the teachers observed that they were much more thoughtful and deliberate, rather than "impulsively and randomly" gluing the materials on the paper (Kantor & Whaley, 1998, p. 330).

Huyssen (2003) reminded us that "lived memory is active, alive, embodied in the social" (p. 28). Documentation is a living testimony to interactions that happen within a social space. Their story can be told through children's portfolios, drawings, three-dimensional structures, words, photographs, videos, and documentation panels. Cadwell (2003) described how classroom shelves became a living archive of the interactions that had happened in that space: a matching game made of clay shapes, stones from a visit to a beach, a carved wooden puzzle donated by a family, and a paper sculpture of "Girl Land" with movable parts (pp. 109–110). Behind each is a story. Further, the objects invite other children to take them out and play with them. If prefabricated commercial images serve to silence children's voices (Tarr, 2004, p. 115), documentation gives voice to the "in-

dividual and group histories" (Gandini, 1998, p. 168) of those who inhabit the space, creating a community memory. By making the walls "speak" with the children's learning, parents and other adults are also invited into a dialogue so that messages do not "bounce away" (Malaguzzi, 1998, p. 176) into empty or overly cluttered space. The practice of making the walls "speak" draws on the idea of creating "places for children."

Children's Places Versus Places for Children

From a child's point of view, an environment is what the child can make of it. Children will often find uses for objects and spaces that adults do not anticipate or intend. For instance, Armitage (2001) has documented that one of the most popular spots where he observed children playing marbles on school grounds was on metal drains. During "marbles season," "the whole feature [of the drain] disappears under a crowd of people [namely, children] playing marbles along the metal slots that run across its length" (p. 46). Another popular spot was the drain cover. Children considered some drain covers as more challenging than others, depending on how the ridges were dispersed in the maze of lines surrounding the center. Rasmussen (2004) invited children to use disposable cameras to take pictures of the places where they most often played and that had meaning for them. One enclosed courtyard flanked by apartment buildings shows play apparatus that adults had installed for children: swings, a slide, a sandbox, a basketball post, and net. While mentioning all of these places, Line (one young girl with a camera) focused on the tree, which was actually off limits to the children, as was a green box covering electricity cables. Nevertheless, the children climbed in and around both of these places when "the caretaker" was "not looking" (p. 161). Rasmussen wryly commented as follows: "The last two spaces are places that children take to be very important, at the same time as using them gives rise to conflict between children and adults" (p. 161). She distinguished between the structured places that adults create for children and the places where children invest imaginative energy; she called the latter, "children's spaces."

Children, Place, and the Classroom

Children love to create their own worlds at their own scale in any environment they can manipulate or modify. Young children also like novel objects to explore and interesting events to witness. What children also value most in favorite places are opportunities for social affiliation and creative exploration or self-development. As Ellis (2002, 2003, 2004) has reviewed, place is a source of meaning, belonging, and identity largely due to the relationships facilitated by bonds to place. In his research with children, Moore (1986) concluded that exploration of the natural environment intensifies friendships just as friendships prompt exploration of the environment. Langhout (2003) has reported consistent findings that autonomy, social support, and positive feelings are associated with children's place attachment or sense of place. Reviewing research related to the greening of schoolyards—a movement to replace some of the barren grass, asphalt, or wood chips areas with naturalized environments for children's exploration and play—White (2004) pointed out that natural environments stimulate social interaction between children, are important to children's development of independence and autonomy, buffer the impact of life stress on children and help them deal with adversity, and improve children's cognitive development by heightening their awareness, reasoning, and observational skills.

Because children's experiences are limited by the places they inhabit, it is vitally important that we pay attention to those places (Chawla, 1992, 2002; Holloway & Valentine, 2000). Ellis (2005) argued that thinking about planning for teaching as "planning for place-making" can productively support children's development of community, positive identities, and successful learning. By using a Reggio-inspired assignment called the "Marketplace," preservice teachers became excited about perceiving the world through the eyes of a child.

The Marketplace of Learning

> You'll know where you are because of the people with bulging white plastic bags heading in the opposite direction, bags that if opened would spill out with color, life, and the week's groceries: apples, strawberries, lettuce, red peppers, figs, a brown loaf of bread studded with seeds. We are within the vicinity of the Jean Talon market. The sounds grow louder as we approach a large square crisscrossed by rows of stalls and throngs of people. Each stall features fruit, vegetables, pies, maple sugar, or flowers, laid out in a feast of multi-colors, rich and layered, a sight bewildering at first until you learn to discriminate by color, texture, and of course, price. Meanwhile, there are also sounds to take in (people jostling, laughing, speaking in a number of languages; merchants hovering, poised to discourse on the value of their produce) as well as the smells, with the expectation of taste, whetting the palate.

This is a short account that Strong-Wilson wrote based on her impressions of a popular fruit and vegetable market in Montreal. For 3 years, the author has been working on recreating such a marketplace in an undergraduate course. "The Kindergarten Classroom" is one of the required methods courses that elementary preservice teachers take in the 2nd year of their 4-year program and just prior to their first extended field experience in schools. Her use of the marketplace was first inspired by Fraser (2000, 2006), who described an assignment in which student teachers bring in objects to elucidate principles central to a Reggio Emilia educational philosophy: aesthetics, transparency, collaboration, relationships, bringing the outdoors in, reciprocity, flexibility, and active learning. Fraser's idea originated with Malaguzzi (1998), who has provided intellectual direction for Reggio Emilia, and first used the marketplace as a metaphor to describe the kind of stimulating learning environments that teachers can create in classrooms: "Customers look for the wares that interest them, make selections, and engage in lively interactions" (Malaguzzi, cited in Gandini, 1998, p. 173).

The author combines Reggio Emilia's notion of "environment as third teacher" with her own interest in touchstones, that is, memories of places (real or imagined) to which adults continually circle back and that are often formed in childhood through play and stories (Strong-Wilson, 2006). Her purpose is twofold: (a) to encourage preservice teachers to see the world as if from a child's perspective, and (b) to perceive classroom surroundings in a new way, as a "third teacher." The course is divided into four themes: image of the child, teacher role, environment as third teacher, and curriculum. Linking across the four themes is a teacher portfolio. The format of the portfolio invites student teachers to draw connections among themes. The process begins with the image of the child theme, in which they compose two autobiographies about their childhood; one on stories, the other on toys and games. In small groups, they share and discuss their autobiographies. Outside of class, they also complete one of the following: a short narrative or sketch of a secret childhood place (Goodenough, 2004), a neighborhood map showing their favorite haunts from childhood, or an interview with a relative about stories or games that they remember from childhood. The author has found that through this initial writing and sharing about their early experiences, student teachers recall with often uncanny precision the spaces that they inhabited as well as the details of the interactions that they experienced there. Student teachers often comment that through the remembering, they relive the childhood experience. The author has also conducted this activity with inservice teachers, with the same results. The most poignantly remembered experiences are often those in which teachers, as children, had used their imagination to transform their environment in ways that the adults around them had not planned for or did not anticipate, thus creating "children's spaces." Tree branches became houses; cramped spaces became secret hide-outs; discarded building materials (wire, netting, pieces of wood) imaginative fodder for art, drama, and science; and a hammer transformed into a doll.

If we look closely at the eight Reggio principles in light of research on children and place, we find that they also coincide with how young children use and perceive space in unplanned ways, that is, with Rasmussen's (2004) notion of "children's places." For instance, aesthetics and trans-

parency draw our attention to how children are attracted by and curious about anything that engages their senses. The principle of flexibility articulates how children will often use objects in their play in ways not explicitly intended by the teacher or curriculum. Active learning recognizes how children learn through experimenting with and manipulating objects, whereas bringing the outdoors in acknowledges children's curiosity about the natural and social worlds surrounding them.

The marketplace creates a context in which preservice teachers become more thoughtful about how they can provoke children's interactions using everyday objects; the objects, placed in relationship with one another within the classroom, can carry messages that invite children to engage with the world. Because the assignment follows on memory work into early childhood experiences, the teachers' choices of objects bear traces of their remembered experiences of how stimulating and full of unexpected surprises the world often was as children; those remembered experiences are mostly of unplanned rather than planned opportunities for learning. The challenge that Reggio Emilia has taken up, through the notion of environment as third teacher, is to create rich contexts (a "marketplace") that allow children to find their own "affordances" through their interaction with objects and other people (Kyatta, 2002), and in which teachers, through documentation and negotiated curriculum, learn from children, thus creating a community memory.

Translating Theory Into Practice

How might the notion of "environment as third teacher" invite teachers to imagine new ways to use classroom space? One powerful strategy, as just discussed, is for teachers to have opportunities to recall as well as collectively discuss images of the child as formed within their childhood experiences. A particularly effective way of eliciting such childhood memories is through drawing a map of the neighborhood where one grew up (Frank, 2003) and identifying secret places where they played alone or with other children (Goodenough, 2004). Teachers can then examine classroom and school environments for what they allow and what they prevent children from exploring and investigating. Another idea is for teachers to involve the children in the process, as in Rasmussen's (2004) study when she gave children disposable cameras and asked them to identify which places were most significant to them and why. Following on Tarr's (2004) suggestion, teachers can also conduct an informal inventory of what they see on their walls, in particular, looking for the presence of commercial images, and ask questions (like the following, based on Tarr, 2004, p. 90) about whether, how, or to what degree (going back to Bearne et al.'s [2003] definition of "interaction") their present uses of space "move thinking and learning," including their own as teachers as well as those of parents and caregivers: Why am I displaying these materials and for whom? What image of the child does the display communicate? Does the display honor children's voices and work? How can the walls invite active participation and learning on the part of the children as well as of their parents and caregivers? The classroom is more likely to become a child's favorite place if it supports autonomy, social affiliation, and creative exploration and expression. Attention to the "environment as third teacher," because it is so close to children's ways of interacting with the world, is one way to accomplish these goals.

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The small changes in classroom environment that can improve learning

Improving learning environments does not need to be expensive, says Professor Peter Barrett

Peter Barrett
guardian.co.uk, Thursday 25 April 2013 06.42 EDT

Using light constructively can encourage a positive learning environment. Photograph: View Pictures/Universal Images Group Editorial

We all know the spaces we live and work in affect us. We are likely to find soft colours soothing, clutter distracting and high temperatures soporific. But this idea may not be fully accepted when it comes to schools. Recently, the DfE stated: "There is no convincing evidence that spending enormous sums of money on school buildings leads to increased attainment. An excellent curriculum, great leadership and inspirational teaching are the keys to driving up standards."

Of course teaching is central – but what if spending small amounts of money, or just doing things a bit differently at no extra cost, could make a real difference to students' attainment?

I led a pilot study of 751 primary students in seven Blackpool schools, which established that, all other things being equal, a child in the best environment could be expected to make two SATs sub-levels more progress during a school year than an equivalent child in the "poorest" classroom environment. That equates to a whole year's average improvement for a child in reading, writing and maths.

The Head Project (Holistic Evidence and Design), a research study of the impacts of the built environment of UK primary schools (4-11 years) on the learning rates of students, is the first study to identify the impact of the built environment on children's learning.

Six factors came out as particularly influential: light, choice for the user, flexibility, connections (such as corridors and the way different areas fit together), complexity (for instance having different types of learning areas) and colour.

There were surprises. It appears easier to over-stimulate students with vibrant colours and busy displays, than to create calm but interesting environments suitable for learning.

Daylight is important, but it also needs to be linked to effective glare control and users need to remember not to block the light with furniture or by leaving blinds down.

Many important factors that impact learning rates are not expensive to change and can be organised by teachers and students, such as the layout of the room, the choice of display or the colour of the walls.

Of course teaching is key – but intelligent choices about spaces are very important too. They need not be expensive. And, they can be put into effect with existing schools as well as in new designs. We are going to keep on researching this further, but the initial evidence is there – why not see if it can make a positive impact on the learning of our children?

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Table 1
E–H–P factors model.

Design principles	Design parameters		Indicators		Factors		Classroom characteristics making up high ratings
Naturalness	N1	Light	A	The quality and quantity of natural light the classroom can receive.	1	Orientation of the room facing	Daylight can penetrate into the room from more than one orientation and the south side is towards the sun's path for most of the year
					2	Glazing area/floor area	The classroom can receive more daylight if the ratio is higher.
					3	The most distant point from the glazing	The distribution of daylight level can be more even when this value is smaller.
			B	The degree to which the lighting level can be controlled manually	4	Quality of the electrical lighting	More electrical lighting with higher quality can provide better visual environment.
					5	Shading covering control	The blinds (shading coverings) are better than the curtains; All binds (shading coverings) are in good condition; The space adjacent to the window is clear.
	N2	Sound	C	The frequency of the noise source's disturbance	6	Noise from the school outside	The room is far away from the road traffic and there is a buffer zone between the room and traffic road.
					7	Noise from the school inside	The windows are towards the quite area; There is no busy activity area adjacent to the room; The chairs have rubber feet.
			D	The degree to which the pupils can hear clearly what the teachers say	8	Size and shape (length/width)	It is easier for pupils to concentrate on teachers when the classroom is rectangular on plan rather than a square.
					9	Carpet area of the room	More carpet area is, less reverberation time (RT) can be.
	N3	Temperature	E	The degree to which the pupil feel comfort in summer and winter.	10	Amount of the sun heat	Rooms with south façade can receive more sun heat than any other orientated rooms.
			F	The quality of the central heating system	11	Heating control	Underfloor heating is better when it comes to evenly distribute the heat with a thermostat.
	N4	Air quality	G	The frequency of the contaminated air that comes into the classroom	12	Contaminated air inside the classroom	Usually, CO_2 level is lower if the room volume is bigger when same amount of people in it.
					13	Contaminated air from other spaces	The room is far away from the polluted air, e.g. toilet.
			H	The degree to which the stuffy feeling can be adjusted manually	14	Opening size	The air exchange is quicker when the opening size is bigger.
					15	Opening options	Different opening positions can give occupants more choices to increase the air movement.
Individualisation	I1	Choice	I	The degree to which the distinct characteristics of the classroom allow the sense of ownership	16	"This is our classroom!"	Any design features that distinct characteristics of the room allow the sense of ownership.
			J	The degree to which the FFE are comfortable and familiar, supporting the learning and teaching	17	Furniture, Fixture and Equipment (FF&E) quality	The facilities are comfortable with high quality, supporting the learning activities.
					18	Quality of the chairs and desks	The desks and chairs are comfortable, interesting and ergonomic.
	I2	Flexibility	K	The degree to which the pupils live together without crowding each other	19	Size for the pupil's activity area	Bigger size helps pupil to learn better.
					20	Configuration changed to fit the size of class	Easier the teacher change the space configuration, more teaching methods can be adapted to pupils learning.
			L	The degree to which the room plan allows varied learning methods and activities	21	Zones for varied learning activities	More zones can allow varied learning activities at the same time.
					22	Attractive (or useful) space attached to the classroom	The storage and/or breakout space are always available and not used for other purposes.
	I3	Connection	M	The presence of wide and clear pathway and orienting objects with identifiable destinations	23	Corridor usage	It is not used for storage and/or breakout purpose.
					24	Corridor width	Wider the corridor is, quicker the movement can be.
			N	Clear and orienting corridor	25	Clear and orienting corridor	Large and visible pictures and or landmarks are along the pathway.
					26	Safe and quick access to the school facility	The room is near the main entrance and other specialist rooms, e.g. library, music, café etc.
Stimulation, appropriate level of	S1	Complexity	O	The degree to which the school provide appropriate diversity (novelty)	27	Site area/total pupils in school	Bigger the site area is, more potential opportunities for the school to provide varied outdoor learning patterns and activities.
					28	Building area/total pupils in school	Bigger the building area is, more potential opportunities for the school to provide alternative learning rooms and spaces.
			P		29	Diversity (novelty)	

(*continued on next page*)

Table 1 (*continued*)

Design principles	Design parameters		Indicators		Factors		Classroom characteristics making up high ratings
				The degree to which the classroom provide appropriate diversity (novelty)			The interior decor can catch the pupils' attention and arousal, but in balance with a degree of order. Diversity and/or atypicality are expected to be good in producing stimulation.
					30	Quality of the display	The displays are stimulating, well designed and organized, ideally without cluttered noisy feelings. Diversity and/or atypicality are expected to be good in producing stimulation.
	S2	Colour	Q	The degree to which the 'colour mood' appropriate for the learning and teaching	31	Colour of the classroom	Carefully considered colours for the wall and floor area. Taking age into consideration, warm colours may complement the young pupil's extroverted nature, while cool colours enhance the ability to concentrate on learning later.
					32	Colour of the furniture	Carefully considered colours for the furniture. Pupil age is also taken into consideration (same as 31).
					33	Colour of the display	Carefully considered colours for the display. Pupil age is also taken into consideration (same as 31).
	S3	Texture	R	The degree to which the views of nature through the window	34	Distant view	There is a wide-field vision with sky, distant urban and rural area and landscape.
					35	Close view	There are full of natural elements, e.g. grass, garden, pond, tree etc.
			S	The presence of fabric variety, seasonal cycles and varied learning opportunities	36	Outdoor play quality	The pupils can have abundant play area outside, ideally adjacent to the classroom.
					37	Outdoor learning alternative	The pupils can have varied learning opportunities other than in the classroom.

Table 14
The most distinctive classroom characteristics that relate to the improvement of the pupils' academic achievement via the model.

Design principle	Design parameter	Good classroom features	
Naturalness	Light	◆	Classroom receives natural light from more than one orientation. And (or) natural light can penetrate into the south windows.
		◆	Classroom has high quality and quantity of the electrical lightings.
		■	The space adjacent to the window is clear without obstruction.
Individualisation	Choice	◆	Classroom has a high-quality and purpose-designed Furniture Fixture & Equipment (FF&E)
		◆	Interesting (shape and colour) and ergonomic tables and chairs.
	Flexibility	◆ ■	More zones can allow varied learning activities at the same time.
		◆ ■	The teacher can easily change the space configuration.
	Connection	◆	Wide corridor can ease the movement.
		■ ▭	The pathway has clear way-finding characteristics.
Stimulation, appropriate level of	Complexity	◆	Big building area can provide diverse opportunities for alternative learning activities.
		■	With regard to the display and decoration, classroom needs to be designed with a quiet visual environment, balanced with a certain level of complexity.
	Colour	■	Warm colour is welcomed in senior grade's classrooms while cool colour in junior grades, as long as it is bright.
		■ ◆	Colour of the wall, carpet, furniture and display can all contribute to the colour scheme of a classroom. However, it is the room colour (wall and floor) that plays the most important role.

◆: design-related classroom features; ■: usage-related classroom features; and ▭: future study is needed to pursue its positive characteristics.

6. Conclusion

6.1. Generally

A range of hypotheses was tested using data on 751 pupils from 34 classrooms in seven schools. Clear impacts on learning progression by a range of environmental design parameters have been identified, using multi-level statistical analysis. Up until this point the parameters have been listed in the order in which the analysis produced them. Now they are summarised in Table 14, using the structure of Table 1, so that the relationship to the overarching design principles can be seen.

It should be remembered that the spaces have been assessed in functional terms, focusing entirely on the impact of the differences between spaces on the academic performance of the pupils. In this context it can be seen that parameters to do with the design principle of "individualisation" are prominent. Here the issue of connection has raised some surprising issues compared with prevalent theory, but these can be seen to make sense if a pupil's perspective is taken. Achieving the "appropriate level of stimulation" for learning is also important and raises the issue of functional requirements versus aesthetic preferences. So young children may like exciting spaces, but to learn it would seem they need relatively ordered spaces, but with a reasonable degree of interest. In the area of "naturalness", only the parameter of light remained in the equation, and even this was quite a complex relationship between a desire for light, a dislike of glare and the importance of good artificial lighting. The other parameters for naturalness did not show up so strongly, and possible reasons for this are discussed above.

In Table 14 the features of "good" classrooms are distinguished as being either primarily design-related or use-related (or both). There is quite an even mix indicating that both designers and users have significant opportunities to take these findings into account in the design of their classroom spaces.

6.2. Limitations and future research

The study to date has involved a limited number of pupils in a particular area, with a focus solely on their academic performance. Clearly more work is needed. This study has provided important insights into the combined impacts of built environment factors on the learning progress of pupils. In the process it has also challenged the research team in various respects and much has been learnt that can be factored into future studies. In particular:

(a) The work will be extended to additional schools in other geographical areas in order to test, validate and illustrate the results to date. This will involve a replication of the existing methodology, enhanced through experience to date, plus additional dimensions, such as targeted classroom observations. In doing this further work:
  (i) The possibility of revealing "school" level effects will be revisited.
  (ii) Redoubled efforts will be made to gain access to measures of teacher performance, so that this aspect can be more clearly isolated in the analysis.
  (iii) The issue of "connection" will be explored further.
  (iv) The four aspects that were competed out of analysis at this stage (sound, temperature, air quality and texture) will be retained and explored further in the context of a larger and more varied sample.
(b) In the future, options to extend the work to other building use types will be considered, as will cross-cultural comparisons.

6.3. A significant direction

Given the size of the challenge as indicated in Section 1, it is a significant step that a hypothesis-led, multi-level model that explains 51% of the variation in pupil learning has been successfully developed. All the more so as it reveals that the six identified E–H–P design parameters account for a 73% reduction in unexplained variance at the class level. The impact of these environmental factors alone has also been scaled and appears to account for, in the order of, 25% of the learning progression of pupils.

We anticipate that this team and others will be able to fruitfully build on the direction we have set out upon in this study, both in relation to schools and for other use types.

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Photo right: Diana School, looking into a courtyard from the piazza

"The visitor to any institution for young children tends to size up the messages that the space gives about the quality of care and about the educational choices that form the basis of the program."

Lella Gandini, the North American liaison for the Reggio Emilia preprimary schools

Aesthetic Codes in Early Childhood Classrooms:

What Art Educators Can Learn from Reggio Emilia

By Patricia Tarr

In this article I will compare the messages contained in the physical environments of early childhood classrooms in Reggio Emilia, Italy with typical early childhood settings in Canada and the United States from the perspective of the "aesthetic codes" (Rosario & Collazo, 1981) embodied in these spaces. I will discuss how these codes reflect each culture's image of the child, cultural values and broad educational goals. I will conclude with the implications these codes have for art educators. For clarity, I will focus on the North American kindergarten which is specifically for 5-year-olds in the year prior to entry into first grade. Many aspects of this discussion also apply to preschool classes for 3- and 4-year-olds. While I will focus my description on kindergartens in the North American context, classes for 5-year-olds in the Italian context are an integrated part of their preprimary schools which serve children from ages 3 to 6 years. (The Municipality of Reggio Emilia also funds infant-toddler centers for children under 3 years of age which operate under the same educational philosophy.)

The term "aesthetic codes" comes from Rosario and Collazo (1981) who looked at the kind of children's artwork valued by teachers in two preschool classrooms. Rosario and Collazo drew on Pierre Bourdieu's work on the sociology of perception in which Bourdieu described aesthetic perception as a social construction which is learned consciously or unconsciously (Rosario & Collazo, p. 74). My purpose is to explore how these aesthetic qualities, or codes, operate within these early childhood classrooms and what these codes might be teaching children both formally and informally. In the context of this paper, aesthetic will refer to both the visual qualities of objects and the environment and to those experiences which permit deep feeling (Flannery, 1977). Flannery describes coming into aesthetic behavior:

> As one allows one's attention to focus intensely upon the multi-faceted, multi-layered presence of feeling- visual feeling, tactile feeling, olfactory feeling, kinesthetic feeling, gustatory feeling, and emotional feeling - one comes into aesthetic consciousness and into aesthetic behavior. (p. 19)

I would also like to extend Efland's (1988) notion of "school art," art which only exists in schools (p. 518) and is "an institutional art style in its own right" (p. 519) to include the classroom environment as also an institutional style in its own right. I will argue that while all classrooms may

have their own "school art style," North American early childhood classrooms are more distinct aesthetically from other social contexts than are classrooms in Reggio Emilia.

North American Early Childhood Classrooms

I will begin with examining the classroom environment of a typical North American kindergarten. Of necessity, the descriptions will be generalized and do not reflect all classrooms. In both Canadian and U.S. programs there is a strong value for preparing children for future life in schools. For example, in Alberta, the Kindergarten Program Statement (Alberta Education, 1995) specifically states that kindergarten is to prepare children for grade 1 as well as for the future. This strong relationship to first grade, reinforced by the kindergarten's location within the elementary school, plays a strong determining factor in the aesthetic codes that operate within the classroom.

Diana School, atelier

As we enter the school there is traditionally a corridor for human traffic to move through and into self-contained classrooms as quickly and quietly as possible. The classroom space is a discrete entity which is subdivided into "centers" including art, writing, sand/water, reading, math, manipulatives, blocks, science, and a domestic/house or dramatic play area. There is also a meeting area. The room may appear crowded with the amount of furniture and shelves in the space. Consider what is allowed into this space. On the walls are commercially made (along with some teacher-created) charts or posters. Adjacent to the calendar, or included as part of it, is a weather chart. Along the top of the chalkboards, or just underneath, are strips depicting the alphabet and numbers to10. Charts identifying colors and shapes are posted on available bulletin board spaces. There may be seasonally related posters, or pictures of community helpers (doctor, firefighter, police officer, letter carrier), or information posters on dinosaurs, parts of the body or animals, depending on the current theme of study. The bulletin boards will be backed with colored papers and surrounded by a scalloped decorative boarder. Each bulletin board may be decorated in a different color of paper with a different scalloped boarder. For example, in one small classroom I visited recently there were seven different boarders around six boards each backed in one of

three different colors. There may be mobiles or things hung from the ceiling. The overall impression is often of a visual bombardment of images. There is a particular "aesthetic" to this room. Just from the images on the walls we know at once we are in a kindergarten (or primary grade) classroom. This look, like the string paintings or string prints typical of school art (Efland, 1988), exists only in schools.

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Aesthetic Codes in Early Childhood Classrooms:

Section 2

Contributing to this unique aesthetic are the stereotypical symbols and visual qualities of the items in the room. The commercial posters and materials usually include simplified, black outlined figures reminiscent of coloring books. They are colored in bright, flat, even colors and usually have a stylized "cartoon-like" appearance. An alternate style is a slick, simplified "modernist" art style. The seasonal materials bear a "greeting card" aesthetic reminiscent of decorations purchased at the local mall or products created from popular crafts kits such as those featuring bunnies and teddy bears. When children's work is displayed on the walls, it is often placed against colored paper, surrounded by decorated borders, and hung at skewed and irregular angles. It may even be cut into shapes by the teacher to create a theme-based display.

Diana School, central piazza

In perusing both U.S. and Canadian educational catalogues, one is struck by the profusion of color; the furniture, equipment and play materials are in the primary colors: red, yellow, blue, plus green, and sometimes orange. Pastel colors are usually reserved for infant toys, or possibly girl's toys. In these catalogues you can color-coordinate your plastic drawers for storage, furniture, and fill the shelves with a wide assortment of toys, all in bright colors. These catalogues seem to be driven to saturate the environment with primary colors, seemingly based on an assumption that children prefer bright colors and the desire for children to learn the names of the primary colors.

> The flatly colored, outlined stereotyped images of the posters and bulletin board boarders talk down to children and assume that they are not capable of responding to the rich, diverse images and artifacts, including images from popular media culture, which the world's cultures have created.

Classrooms are often crowded with centers and materials yet the overall aesthetic of individual items is one of simplification in form and uniformity of style and color. Teachers can even purchase clothing and jewelry decorated with these images of apples, school buses, the alphabet, ghosts or jack-o-lanterns and Santa Clauses to match their classrooms. The flatly colored, outlined stereotyped images of the posters and bulletin board boarders talk down to children and assume that they are not capable of responding to the rich, diverse images and artifacts, including images from popular media culture, which the world's cultures have created. Even objects found at home-- vases of flowers, comfortable furniture, real dishes and tools, collections of natural materials or treasured objects-- are not typically considered essential items in an early childhood classroom. When nature is allowed into the classroom, again it is often decontextualized in the form of planting a seed in a paper cup, or caring for a class hamster. In a visual and operational sense each institution is a separate entity in relationship to the other: home is home; school is school, relatively impermeable to the outside world.

Diana School, classroom

The image of the child is one who must be protected from the outside world in order to learn. The child is seen as an object to be filled with information distilled and dispensed in regulated doses beginning with simple concepts leading to more abstract concepts. However, Egan (1988) argues that even very young children are concerned with the abstract themes of good/bad, beautiful/ugly, power/control, love and hate-- all those issues surrounding what it means to be human, are typically excluded from early childhood. Dahlberg, Moss and Pence (1999) state,

> He or she is not an innocent, apart from the world, to be sheltered in some nostalgic representation of the past reproduced by adults. Rather the young child is in the world as it is today, embodies the world, is acted upon by the world -but also acts on it and makes meaning from it. (pp. 50-51).

Aesthetic Codes in Early Childhood Classrooms:

Section 3

The Pre-primary Schools of Reggio Emilia

In contrast, the educators in the preprimary schools of Reggio Emilia are very concerned about what their school environments teach children, often referring to the environment as the "third educator" in conjunction with the two classroom teachers (Gandini, 1998, p. 177). The environment reflects the schools' grounding in John Dewey's educational philosophy and Vygotsky's social constructivist learning theory (Malaguzzi, 1998). It embodies Reggio educators' belief that children are resourceful, curious, competent, imaginative, and have a desire to interact with and communicate with others (Rinaldi, 1998, p. 114). They believe that children can best create meaning and make sense of their world through living in complex, rich environments which support "complex, varied, sustained, and changing relationships between people, the world of experience, ideas and the many ways of expressing ideas" (Cadwell, p. 93) rather than from simplified lessons or learning environments. They also believe that children have a right to environments which support the development of their many languages (Reggio Children, 1996).

Arcobaleno Infant-Toddler Center, dining room

A detailed and well-illustrated discussion of the importance of the environment in the preprimary schools of Reggio Emilia can be found in *Children, Spaces, Relations: Metaproject for an Environment for Young Children* (Ceppi & Zini, 1998). This book describes the depth to which the environment supports the educational and cultural values of the school and the community. It demonstrates the belief that children have a right to be educated in thoughtfully designed spaces. Children in the Reggio schools are learning to value their rich visual heritage and to become perceptually aware through the support of the environment designed for multi-sensory learning. As Louise Cadwell, who has adapted the Reggio approach to the College

School in St. Louis, Missouri, learned from her work with Reggio educators, "no space is marginal, no corner is unimportant and each space needs to be alive and open to change" (Cadwell, 1997, p. 93).

Ceppi and Zini (1998) use the term osmosis to describe the relationship of a school to the world outside. "A school should not be a sort of counter-world, but the essence and distillation of the society. Contemporary reality can and should permeate the school, filtered by a cultural project of interpretation that serves a membrane and interface" (p. 14). In discussing the Reggio schools they state,

> There are many components of a city and its daily activities in the school for young children, just as the daily work in the school creates a microcosm of society. So the school is not just open to the city in terms of activities and schedules, but the characteristics of the space itself (both functional and aesthetic) are as hybrid as those of the city: dense, "contaminated", simultaneous. (p.14)

There is great concern for what the environment is teaching. The design of the schools reflects the structure of the community. The schools reflect a diversity of ages and architectural styles yet each school is designed around a piazza which reflects the central piazzas of the city. These are not solely vehicles for moving through to get someplace else but serve as gathering places for children from all the classes and comfortable meeting spaces for parents and teachers. Entering the Diana School, a visitor looks down the piazza where floor to ceiling windows and plants blur the boundaries between outside and in, supporting the concepts of transparency and osmosis. Lights and shadows reflect and flicker across the floor. The piazza offers many possibilities: a store, stocked with real vegetables during my visit; the kaleidoscope large enough to hold several children; and fanciful dress-up clothes all invite investigation, lingering, conversation and collaboration.

Reggio educators include aspects of a home into the school: vases of flowers, real dishes, tablecloths, and plants. There is attention to design and placement of objects to provide a visual and meaningful context. The objects within the space are not simplified, cartoon like images that are assumed to appeal to children, but are "beautiful" objects in their own right. For example, dried flowers hang from the ceiling beams and attractive jars of beans and seeds are displayed on shelves in the dinning area of Arcobaleno Infant-Toddler Center. On the 1997 study tour to Reggio, I was struck by the beautiful wooden table with a large bowl of flowers and wooden sideboard in one of the rooms in La Villetta School. I imagined being in a fine Italian dinning room! Manufactured and natural materials available for art projects are carefully displayed in transparent containers, or objects are set on or before mirrors to provide multiple views and capture children's attention. The strong role of the arts in Italian culture is clearly evident in the place of the atelier (art studio), mini ateliers adjacent to each classroom and the role the atelierista (artist-teacher) plays in supporting children and teachers in their work.

In bringing the outside in, Reggio educators accept play and images from popular culture. Vea Vecchi, atelierista at Diana School, writes about the importance of narrative for young children,

> In this construction of virtual worlds, the characters proposed by the mass media have an important place for both the younger and the older children: Power Rangers and Sailor Moon are currently the most frequently impersonated, for which the children have precise and shared schemas concerning their roles, words and gestures. (Vecchi, 1998, p. 130)

The walls hold the history of the life within the school in the form of documentation panels of children's words and photos which synthesize past projects and chronicle current ones. Children's work and words are highly visible within the space communicating clearly to the children, their parents, and the community respect and value for children's abilities and potential, creating another form of transparency and osmosis between the school and surrounding community.

Implications for Art Educators

The preprimary schools in Reggio serve children from 3 to 6 years before they enter compulsory education. They do not operate under a mandated curriculum nor is there an emphasizes on "school readiness" which is in contrast to the more academic nature of North American kindergarten programs for 4- and 5-year-olds.

These two spaces reflect distinct cultural values for children: The typical North American classroom reflects notions of preparation for the future world of work, of an environment that isolates particular aspects of a culture, which simplifies visual forms, and protects children from the outside world. Its visual aesthetic reflects mass marketing and craft-store culture. It does not challenge children aesthetically to respond deeply to the natural world, their cultural heritage, or to their inner worlds. Art and early childhood educators can learn a great deal from Reggio educators about creating schools in which all aspects of the physical environment are carefully considered as to their educational potential without sacrificing each culture's unique values and goals.

As a professional body, art educators have a responsibility to form collaborative partnerships with early childhood educators to raise the quality of education for young children. Art education must go beyond providing art experiences that meet goals for programs involving studio, history, criticism and aesthetics and begin to consider the environments in which these activities take place. What are children learning when the goals of art education are at odds with the environment in which they learn? Art educators need to find ways to collaborate with early childhood teachers to critically examine the aesthetic codes which permeate their classrooms and then together find ways to create environments which support children's aesthetic and artistic development. Together they may examine critically the image of the child they hold and how to express this through the both the environment and the learning experiences within this environment. Together they need to explore how to incorporate aspects from the world outside school in ways that are fully integrated into the life in classrooms and not just a "lesson on ...." Art educators can assist classroom teachers with ideas and techniques for display that value and respect children's work rather than trivialize it.

Teacher educators also have a responsibility to help pre-service teachers, either general education majors in art methods courses, or art specialists, to begin to look critically at the spaces in which learning takes place to consider, "what does this environment teach?" They may also challenge pre-service teachers to seek new and collaborative roles in their future places of employment.

Reggio has shown how partnerships between artist-teachers and early childhood educators can have a powerful impact on all the learning that occurs. Art educators can be challenged to take on the role of atelierista within a school, working as partners with teachers to support children to communicate their ideas visually, help to create provocative learning experiences, and design environments that enhance children's perceptual awareness and provide places for wonder, curiosity and the expression of ideas. In a tradition where art specialists are responsible for art education and generalist teachers are responsible for the core subjects, this is a major challenge to rethink roles, responsibilities, how time is spent within the classroom and within the school, and the value of collaboration to support children's learning. However, given the vision of other possibilities from the preprimary schools of Reggio Emilia, this is a challenge worth taking.

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Photo Captions

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Chapter 1

School buildings

'A safe haven, not a prison ...'

The *Education Guardian*, when it reported the results of the competition, 'The School I'd Like' summarised the statements made by children and young people as 'The Children's Manifesto' (Birkett, *Education Guardian*, 5 June, 2002).

> The School We'd Like is:
> A beautiful school
> A comfortable school
> A safe school
> A listening school
> A flexible school
> A relevant school
> A respectful school
> A school without walls
> A school for everybody.

The school building, the landscape of the school, the spaces and places within, the décor, furnishing and features have been called 'the third teacher' (Edwards, Gandini and Forman, 1998). A beautiful, comfortable, safe and inclusive environment has, throughout the history of school architecture, generally been compromised by more pressing concerns, usually associated with cost and discipline. The material history of schooling, as conveyed in school buildings, is evident still in the villages, towns and cities of any nation. In the UK, one need not look far to locate, still functioning as schools, stone-built 'voluntary' schools of the mid-nineteenth century. The 'Board' schools of the late nineteenth century still stand, as red brick emblems of the cities in which they were built in an era which placed enormous faith in 'direct works' and 'municipalisation'. The schools built in the 1920s and 1930s reflected changes in educational policy indicating the beginning of a recognition of the diverse needs of children and consideration of health and hygiene. These decades saw the building of looser groupings of units, classrooms with larger windows and with removable walls being capable of being thrown almost entirely open. Architects worked to precise standards of lighting and ventilation as set out by the Ministry of Education. The post-war building plans saw the erection of buildings utilising modern prefabricated materials. Schools were built in large numbers, quickly and cheaply with the view that they would provide a stop gap until greater resources were available. 'Finger plan' schools, featuring one-storey classrooms set

in parallel rows with a wide corridor to one side were popular. Thus started, for children, the long journey to toilets, hall and dining room as the buildings sprawled over large plots.

Already in the late 1960s, it was estimated that nearly three-quarters-of-a-million primary school children in England were being educated in schools of which the main buildings were built before 1875 (1967: Department of Education and Science 1967: 389). Standards were poor in general but there were particular problems, such as the 65 per cent of schools whose toilets were located in school playgrounds. The Plowden committee reported, 'children have to use cold, dark and sometimes even insanitary school lavatories' and remarked, 'we have heard from many sources of the dislike of school that can be created by the condition of the school lavatories' (ibid.: 391).

The new buildings erected in the 1960s and 1970s were needed to accommodate the swelling numbers on the school roll, the adoption of comprehensive secondary education and the extension of the school leaving age after 1973. Architects often used prefabricated assembly systems to help reduce costs and most new schools tended to resemble factories in their construction and style. Design aesthetics and comfort were usually given less importance than economy. However, many of the ideas about the flexible use of school buildings, first voiced by Henry Morris in the inter-war years, were revisited during this period. It was argued:

> Society is no longer prepared to make available a set of valuable buildings and resources for the exclusive use of a small, arbitrarily defined sector of the community, to be used seven hours a day for two-thirds of the year. School buildings have to be regarded therefore as a resource for the total community available to many different groups, used for many different purposes and open if necessary twenty four hours a day.
>
> (Michael Hacker of the Architects and Buildings Branch, Ministry of Education, cited in Saint, 1987: 196)

Open-plan arrangements reflecting child-centred pedagogy were criticised during the late 1970s and early 1980s. Educational policy under successive Conservative governments emphasised the importance of traditional methods of instruction and whole-class teaching rather than group collaboration and teacher facilitation. A recently concluded research study of classroom arrangements in the UK suggests, however, that for the majority, tradition overcame fashion (Comber and Wall, 2001: 100).

After decades of having to meet the enormous costs of refurbishment and repairs, the UK government in 1992 adopted the policy of financing public services including the building and refurbishment of schools via the public–private finance initiative (PFI). The first privately financed state primary school was opened in Hull in January 1999. At the time of writing, 20 public–private finance initiative contracts are already operational, a total of 30 new, rebuilt, or extensively refurbished schools are now open and another 500 are planned (the *Guardian*, 30 September 2002). However, there is some disquiet among the teaching profession about the standards and quality of buildings that have recently emerged and concern that the design of schools today will rapidly become outdated as the organisation of learning changes in the future. The UK government's own watchdog on architectural matters, the

Commission for Architecture and the Built Environment (CABE) has recently voiced concern over design standards of new schools built under the initiative. Their chief executive, Jon Rouse has stated, of the 30 PFI schools already built, many are like 'sheds without windows', and fail to comply with best-practice standards of natural light (Rouse, 2002).

CABE has warned that there is insufficient effort being made to consult the users of school buildings. 'Schools need to get involved in that process and be specific about what they need. The whole process has got to be led by the curriculum' (Fraser, CABE, *Education Guardian*, 30 September 2002). However, CABE does not advise that children and young people should be involved in the design process.

It is remarkable, in view of the fact that architectural education is very rarely provided within compulsory schooling, that there was such a wealth of material contributed to the collections in 1967 and 2001 about the shape and design of schools. However, some have argued that children are 'natural builders' or 'have a natural talent as planners and designers' (Hart, 1987; Gallagher, 1998) and that the school curriculum might be better organised to recognise this. Writing in the USA, architecture and design educator Claire Gallagher has noted, 'The typical means of instruction in our educational culture is either linguistic and/or mathematical. Rarely is any attention paid to visual or spatial thinking or problem-solving' (1998: 109). Her work with 'at risk' elementary school children in designing and planning their own neighbourhoods has illuminated how children have a distinctive knowledge and understanding of spatial environments that policy-makers rarely tap.

The 'School I'd Like' competition spontaneously produced dozens of models, hundreds of plans and thousands of implied designs of ideal sites for learning. In addition there was produced a remarkable collection of drawings and paintings through which children have expressed their ideas on curriculum, use of time, role of teachers and form of school. These design ideas address more than the shape of building and the ordering of spaces; they tell of a vision of education that reaches beyond the strict mechanics of building science.

The 1967 competition had also produced entries which were architectural in approach. Indeed, one of the winners at that time was a detailed plan produced by a 17-year-old pupil, said to want to become an architect. Like many of the plans and models contributed in 2001, this plan featured domes and pyramidal structures, circular spaces and a lot of glass.

Blishen was compelled to comment on the number of circular designs suggested by the 1967 competition entries. He noted that the young designers,

> having none of the problems of an actual architect ... let themselves go and there can't for a very long time have been such a lavish decreeing of pleasure domes.
>
> (Blishen, 1969: 43)

He suggested that such a quantity of circular schemes were, in fact,

> reactions against a quality in school buildings that many inveigh against: their squareness. ... Most were tired of squareness: where an actual shape was suggested, nine times out of ten it was a round one.
>
> (ibid.)

The 1967 cohort wanted schools not to resemble schools at all, but to resemble the adult world where individual privacy, comfort and relaxation were permitted. And it was not only the classrooms and building shell which were subject to the circuitous (Plate 10) but also the organisation of bodies in spaces more generally.

> There would have to be a school with rooms, but furnished with soft chairs in a circle.
>
> Richard, 15

Within a circular school with circular classrooms and spiral staircases, what becomes challenged is the institutional: the regulation and ordering of bodies in precise spaces; the processing of children as in a factory; the rehabilitation of individuals as in a prison. An alternative regularity found in nature is envisaged in schools as colonies of life and development. The outer membrane, as in a cell, is penetrable, filled with light, transparent and attracts public view (Plate 1).

Jerome Bruner has proposed that the curriculum should be conceived of as a spiral to suggest how learning is achieved through a series of ever deeper encounters 'in the processes of meaning making and our constructions of reality'. The object of instruction should not be 'coverage' but rather 'depth', and the teacher is a collaborative learner and guide to understanding which begins with an intuitive impulse, 'circling back to represent the domain more powerfully or formally as needed' (Brunner, 1996: xii). When describing the spaces for learning as 'caves' and the corridors as 'spirals', the children here could be seen to be expressing their instinctive cultural understanding of how learning occurs.

We could argue that the preference for dome-like features in the recently collected archive (see, for example, Plates 1, 3, 8, 10) can be explained simply through acknowledgement of the fact that domes are features of leisure environments that children and young people frequent. These features are representative of enjoyment, freedom, play and excitement. They are semi-permanent structures that are literally here today, gone tomorrow. They are 'light' in both senses of the word. The Millennium Dome in London had entered the consciousness of every child in Britain during the exhibition period of the year 2000, even if they had not actually visited it. And, indeed, some children did clearly state that the Dome should be turned into a school as a model from which other schools could derive inspiration.

Perhaps it could be argued, however, that we have here in this collection of material, responding to the same question over time, evidence of constancy in childhood. Traditionally the school room is square, has corners and contains rows of bodies in disciplined rank. The comments of children about the significance of this in contrast to their preferred spherical arrangements betray an understanding that a shift occurs in the organisation of authority and control in moving from the rectangular to the circular.

A recurring theme of likening school to a prison is found in competition entries, both past and present, suggesting that, from the point of view of those compelled to attend, little has altered in the basic character of school in spite of the vast extent of policy intervention over the intervening period. Blishen said of the contributions to the 1967 competition, 'When I was reading these essays, the image of the prison

returned to me again and again' (1969: 14): '... we're like caged animals!' is a remark which speaks for many in the more recent collection.

Comfort, privacy, space for social activity and rest, and colourful, softly textured inviting interiors are called for by countless numbers of participants in the 2001 Archive. Once again there is continuity with the demands from the past. 'They cry out for colour, and are very conscious of the drab uniformity of many of the walls within which they sit' (Blishen, 1969: 43).

Toilets continue to be an appalling problem in many schools, over 30 years after the Plowden committee recognised the severity of the problem, and there were very few ideal schools, whether in essay, design, photographic or video format, that did not feature strongly a major criticism of the school toilets. Many suggest practical ways they can be improved but most wanted them to be less institutional, more comfortable and accessible (Plate 2). For many children, not being able to lock the toilet door safely causes distress. Local research studies support children's views. During the 1980s in Leeds, a survey was conducted of school toilets which were believed to be a breeding ground for the viruses commonly causing illness. The study found the toilets to be:

> dirty, smelly and unpleasant places which suffered from vandalism, particularly in the girls' toilets. There were broken toilet seats, no lids, insufficient supplies of toilet paper, poor hand-washing facilities and string in place of chains to flush the toilets. As a result children were unwilling to use the toilets and suffered uncomfortable afternoons as they waited until they got home to relieve their bladders and bowels.
>
> (Schweiger, 2002)

A further study in 1999 revealed that 'fifty six per cent of pupils thought their toilets were dirty, 39% did not have lockable cubicles, 41% did not have toilet paper and 29% of pupils refused to sit on the toilet seat' (Brocklebank, 2001).

Many children are still compelled to attend school buildings designed and built half-a-century ago. Distressed about the poor state of the fabric of their schools, most want more space and recognise the limitations of school design in relation to inclusive school policies. Young people in special schools who have difficulty just getting around the inadequately designed school spaces, take the opportunity to recommend change. Some argue convincingly that if the overall appearance of the school were improved then children would be more likely to want to attend and not to truant.

What emerges from the material is evidence that children have the capacity to examine critically the normal and everyday spaces in which they learn and can articulate their future in previously unimagined ways. They want to feel proud of the school to which they belong but many feel embarrassed by their surroundings. The extracts here show how clearly children regard the built environment as 'the third teacher'. To listen to these voices past and present is instructive to all educators, architects, designers and policy-makers who have responsibility for conceiving and constructing the spaces for learning which children inhabit. Seeming to understand the perspective voiced here, Paulo Freire once argued:

> One of our challenges as educators is to discover what historically is possible in the sense of contributing toward the transformation of the world, giving rise to a world that is rounder, less angular, more humane.
>
> (Freire, in Macedo, 1996: 397)

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School buildings

The school I would like would be much more modern than we have now. The outside makes me sick when I come in – all the teachers cars are parked in the playground and we do not have much room to run or even play we have only a small bit even there too. . . . I would want the school to look like the city chambers, marble stairs, it is all that I want. It is just like a dream. I would love to see good people in the school. I am bad sometimes which the teachers are helping me to improve. I don't blame the teachers, it is the pupils and if this happens the school will be the best ever. Would you prefer a carpet or manky floors?

Sher, 12, Glasgow

In my perfect school there would be no square classrooms but instead, triangular shaped ones so that no one could sulk in the back row.

Sam, 14, Penryn

I would like my school to be a giant toblerone shape building with two huge 5 storey cylinders stuck to it. The 5 storey cylinders will be complete with double glazed windows. There will be lots of windows. The classrooms will be circular (so there won't be a naughty corner!) with desks that sit next to each other. The desks will have a part for your stuff. There'll be posters of star constellations on the walls. There will be hundreds and thousands of books on the wooden bookcase. There will be two doors, one leading to the playground.

Joe, 9, Clacton-on-Sea

I want lots of colours.

Liam, 4, Barnsley

I'd like a school with buildings
that are funny shaped
And all around the outside
Coloured cloths are draped.

Mary, primary, Newport

The school buildings should be huge cylinder like buildings and a subject on each floor; we think this is a good idea because then the teachers can't tell you to stand in the corner.

Tim and Dave, lower secondary, Oakhampton

An 'own pace room' where you can go at your own pace in English and maths and work from any text book you want. And then you can go to a marking machine where you put your work in one end and it comes out marked the other end!

Tamsin, 11, Middlesbrough

I would be delighted if I had a dream school with pretty teachers, polite children, bright colours, good displays and a pretty hall with red, blue, green, yellow, pink, brown, purple and with black, silver, gold and orange [walls] and equipment for the playground like a scooter, pretend car, rocking horses, and lots more new books and nice colours like red.

Cameron, 6, Birmingham

The cloakroom is boring. We need it more colourful and it's too small so in our future school we would make it more colourful and bigger and also they should have more shelves and pegs because there is no room for our bags. We want pegs that grab your coats and bags like some hands and we want more benches, so then the cloakrooms wouldn't be a mess.

Class, ages 9 and 10, Durham

I would like a bigger classroom because it is not a very big room. I would like a bigger desk in our classroom because they are very small. I would like to have our classroom painted. We would like to have swivel chairs because in our class we have small children. I would bigger room because we are all crushed. I would like to have a listening corner because when you have done all your work you can go over to the listening corner and put the headphones on but we do not have room in the class ... I would like to have a boys toilet in the class because if we did we do not need to go out of the class. I would like a Science corner because we are not quite good at Science so we can learn for our Friday test.

SB, primary, Belfast

The roof of this whole building is a glass dome with parts which can be opened on hotter days. In the centre there is a fountain which can flow over a closed dome (Plate 3).

Rowan, 12, Hope Valley

I really don't care if the building is old or new providing it isn't vandalised and it has its own sort of beauty. It's dispiriting to have to go every day into somewhere built as cheaply as possible and where aesthetics are thought to be the superfluous icing on the cake.

Hero Joy, 14, Kent

My ideal school has a totally different setting as compared to our schools today. The school has one main compound where all classes take place and all other buildings adjoin this building. It's shape is oval ... there is an oval playground in the middle of the main compound ... The classes are all painted soft pink, sky blue, bright yellow or rich purple. The chairs in all the rooms are soft and have arms. The floors are carpeted and the carpets are cleaned during mid terms and holidays. The toilets are spacious and well equipped, with janitors that clean it regularly.

Aisha, 14, London

There would also be many comfortable and informal meeting places for creative interaction in small groups on key issues, not just on the syllabus but also wider issues occurring locally and elsewhere.

Jonathan, 17, Manchester

The basic aspects of the buildings we are taught in do not promote learning, but instead, enhance feelings of negativity. I hate waking up every weekday knowing that this day, one that is so valuable to me, will be spent in a giant magnolia prison. I want colours, I want beauty in my surroundings, but most of all I want to be filled with inspiration by a place that I can call my home from home. The colour of a room is very important; a calming sky blue for instance will make the room seem less of a cell. No person wants the fundamental years of their life spent in ugliness and why should they?

Angela, 15, Croydon

My ideal school would be a very futuristic one. It would be made of glass and bright blue steel tubing to hold the glass in place. The ground floor of the school would be for classrooms, the outside would be painted gold and it would have many oval windows ... The school would be very eco-friendly. On the roof there would be solar panels and wind turbines in the grounds of the school. This would enable the school to generate its own electricity. Also there would be a recycling area for all the school's paper and bottles.

Andrew, lower secondary, Bristol

The school I would like would be in a beautiful park, with a river running by. The building would be very modern with lots of windows. Some of the windows would be made of stained glass. In the school grounds there would be a glass dome which would be warm inside and decorated with tropical plants.

Hannah, 8, Godalming

Our school playground – it's a tiny, slanted, concrete slab which hasn't changed since Victorian times! Some teachers might say it would cost too much to extend the playground but it would definitely be worth it. You could knock down the huts in our playground and build an extra floor on top of the main school building! After all, there are about 360 of us every year and we're like caged animals!

Alun, 10, Cardiff

The toilets are full with loads of modern technology.

- The suction bin, a bin that you place rubbish near the tube and it will suck it in.
- Smell proof doors.

All of the toilets are different colours, and have slightly different patterns on the seats. There are orange, blue and yellow tiles.

Gabriella, 10, Gloucester

I hate walking from block to block between lessons. When it rains you get really wet. So I think we should have a dome which is glass over school which is always warm inside and never rains.

Hannah, Sara and Katie, lower secondary, Bristol

My ideal school would look nice and bright from the outside and the teachers cars would go in a separate area where the children couldn't go. The windows would be clean and there would be no litter on the ground.

Jade, 11, Glasgow

To help us concentrate even more
We need doors on the classroom to make sure
That noise does not disrupt us as we write
I think that this is only right.

Katie, 10, Bolton

The kind of school I'd like would have:
Sweet smelling toilets with doors that lock.
But instead we've got:
Toilets so disgusting, they're like an old cellblock,
All grungy and mungy, only a couple that lock!

Sophie, primary, Edinburgh

I would like to have a toilet in our class so it would be easier instead of having to walk a long way to go to the toilet.

LO, primary, Belfast

We have the most disgusting toilets. They are small and cramped and covered in graffiti, some of which has been dated 1899. You can see over the tops of the toilets, so you don't have very much privacy. The water is a joke. It is icy cold. My dream school would have sensor taps and the soap would be refilled everyday. The cubicles would be metal and would have enough room to be able to turn around without seeing over the top. There would be air dryers in the shape of animals in the little kids toilets and twenty first century ones in the older kid's toilets. The locks on the doors are very unreliable cause you're worried you are going to get stuck in them, the locks I would like would be very easy to use and you could go to the toilet without worrying whether you were going to come out again.

My dream school would be very modern and have a very nice feel about it and everything would be very fresh.

Melissa, primary, Edinburgh

The classrooms are round and have strawberry red walls.

Emma, 6, Oxford

The design is based on the rebuilt courtyard at the British Museum, Tate Modern in London and also the Eden Project in Cornwall. I like this idea for a school which creates a happy, calm, working environment that inspires all young adults to learn and interact with one another in an environment that values them and treats them with respect, so they can learn to respect other people and cultures with understanding.

Alice, 13, Penryn

I would like the school to have a bigger hall so you can fit more people in and you would not be crammed in. I would also like the toilets to be cleaner and have smoke alarms in them. I also would like the classrooms to have a makeover, e.g. new curtains, carpets, ceiling, chairs, tables and so on because I think you need to feel comfortable around where you are working.

Oliver, lower secondary, Reading

Every classroom in our school is open to the other classrooms. Noise can be heard easily, teachers telling their class what to do and teachers telling other children off! (It's always the teachers making all the noise!). I thought about having walls fitted across the classroom, to stop all the noise.

Callum, 11, Bolton

The toilets feel like you're underwater with a sound track and it is done by using the same way as a picture on the cinema, so the walls have water and sea animals. Also it is the shape of a bubble.

Arianna, 10, Bristol

The basic design of our school would be very futuristic. It would be a giant glass ball and there would be an inflatable cushion on the inside to stop any breakages. Of course it would be stuck to the ground ... there will be glass classrooms with the same design as the school.

Matthew and Joe, 9 and 10, Durham

The school I would like would have to be big with lots of space. My ideal school would be just the same on the outside but with a new coat of paint and all the windows repaired ... we could have decent classrooms with nice comfortable chairs with clean desks. The classrooms could have carpets ... we could have some benches to sit down on in the playground. The thing I would like most about this new school would be the options open to us. We would be able to relax in front of your computer in maths and go down after school and have a swim. At lunchtime, if it was cold, we could go inside and watch videos or listen to music. It would be like just being at home.

Gavin, 13, Glasgow.

I would like the doors of the toilets to have locks on.

Seera, 9, Richmond-upon-Thames

Our school is made from a big old house,
About some things we have a grouse:
Most of us travel round in wheelchairs,
Which means we can't manage stairs.
The lift we have is very small,
It isn't big enough at all
If we could have a bigger one
We'd have more time to have some fun.
We need more room to move in class
And wider corridors so people can pass.
It really is a terrible bore
When we can't manage to open the door,
If doors would open when we shout
It would be easier to get about.

Group, ages 16–19, Bolton

The Activity room will be a place to go after your work is finished. There will be several activities such as painting, an I.T. area, a reading area, a communication area, a music area and a sensory room to inspire good thoughts. The communication area is a place where you can talk to people all over the world by just putting on some headphones and a microphone ... the machine will translate any other languages.

Sophie, 10, Swanwick

My perfect school would have blue wallpaper with silver mirror stars on it and flower clocks. The feel of the wallpaper is velvet. The whole school would smell like Angel perfume. There would always be good music playing. I would not recommend rough music, for example Slim Shady.

Ellis, 7, Glasgow

Art would be a huge part of the education. The children would be able to do huge murals, statues etc. to be put around the school. This will make the children feel that they made part of the school, which should hopefully reduce graffiti and vandalism.

Oliver, 12, Taunton

Everybody has to use toilets in school but I think they should definitely be improved. Firstly, each toilet should have a lock on the door to make it more private. Secondly, there should be toilet paper in every cubicle. There should be full size toilets instead of tiny ones. They should be modernised and made more inviting.

Delyth, 10, Cardiff

I feel very strongly about the colour of the walls of the classrooms because all the walls are white and they make you feel cold. We should have red walls because red is a nice warm colour.

Yusuf, 10, Cardiff

All the students would like more space. Fiona would like wider computers so that she can see her work more easily. Jayne would like a very big hall to dance and move in. It would be nice, Zoe says, to have the doors painted red. Everyone would like a brighter, lighter school.

Zoe, Sam, Fiona, Jayne and Kirsty, Special School, Cheshire.

Chairs are really, really uncomfortable so the school should buy comfortable chairs and, if they don't do that we should be able to bring our own cushions to school. Our classrooms are disgraceful. If you don't believe us come and have a look. We would really like it if our classrooms could be painted in the pupils' choice.

Mathew and Rhys, 10, Cardiff

In the classroom, the desks would be larger and every desk would have a draw containing paper and writing materials the chairs would be leather and the back would be adjustable. There would be carpeted floors in all classrooms and many heaters.

Lindsey, 13, Glasgow

Our floor is awful. It's like a patchwork quilt full of holes. Our chair legs are always getting stuck and we're forever tripping up. Anything could be better, but we could get the floorboards sanded down and painted.

Clare, 11, Cardiff

When going to and from lessons we (all one thousand two hundred of us) have to walk down a corridor that is about one-and-a-half-year-sevens wide (which isn't very big) so we suggest wider corridors that are interesting, colourful and have art graffiti on them as we think this is what people like to gaze at as they are walking along instead of 146 pictures of some year group's trip to the middle of nowhere!

Anon, 12, Bristol

I think the school is really drab and ugly and I would like it to be nice and colourful and clean. I would like lockers to put all our books and p.e. kit in. I think the windows should be cleaned at least once a month. The blinds should be white instead of black. We should have soft chairs instead of hard chairs and nice tables and we should have nice soft carpets. There should be water coolers all around the school. The toilets are really horrible and they should be nice and clean.

Lisa, 13, Glasgow

http://www.choiceliteracy.com

Room for Beliefs: Linking Classroom Design and What We Value

Debbie Miller

Step outside your classroom door and look back in, as if for the first time. What do you see? Do you want to come back inside? Or do you want to run and hide? If you're inclined to run, force yourself back. Grab your notebook and divide a page into thirds. In the first column, draw or write about what you like about your classroom environment. What seems to be working?

In the next one, do the same with what bothers you most. What's getting in the way of teaching and learning? And in the last column, write or draw what you'd like to see when you step inside. Do the same from a child's point of view. Get at their eye level and see things as they see them. Now what do you see?

First impressions count. Classroom environments vary, but they need always be welcoming places; interesting places that beckon kids and teachers to actively participate in the pursuit of knowledge. Places that invite curiosity, exploration, collaboration and conversation. Places that make us want to come in and stay, day after day after day.

Next, consider asking a colleague - someone in the field you trust, but probably not a close friend - to step inside your room. Ask this person to take a few minutes to look around (with or without kids present) and then ask them the following kinds of questions . . .

- *What do you know I value?*
- *What do you know about what I believe about teaching and learning? What's the evidence?*
- *What do you know about the kids in this room?*

Any thoughtful person who spends even a small amount of time in our classrooms should be able to respond to these questions. If they can't, or if they say something that seems to us totally off the mark, it should give us pause. We have to wonder what it is about the environment that's sending mixed signals or no signals at all. Just as we must define our beliefs and align our practices, we must create classroom environments that reflect and support them.

One way to begin is to ask yourself questions like these...

- *Will I need a meeting area? Why? How will I/we use it? Can it be used for more than one purpose? Where will it go?*
- *Do I need areas for pairs and small groups of kids to work together? How will they be used? How many will I need? How will I define these spaces?*
- *What about kids' desks or tables? How will they be configured? Why this way?*
- *Where will kids keep their books, notebooks, pencils, paper, backpacks, etc?*
- *Do I want writing, math, science, and social studies areas? Why? What will be their purpose-will kids come here to work, or is the space for organization and accessibility of materials? Where will these areas be in the room?*
- *What about books? Do I want them in one area, or throughout the room? Why? How and who will organize them?*
- *Computers? How many do I have? How many do I need? Do they all work? How will they be used?*
- *What about my desk? Do I need it? How will I use it? Where will it go?*

There are no right or wrong answers. What matters most is that you take some time to be thoughtful about questions like these and decide for yourself what will make the most sense for you and the students you teach. The decisions you make will reflect what you believe about teaching and learning. Here is how I answered one of these questions while planning at the start of the year, and how my answer affected my classroom design.

Do we need a meeting area? **Yes.** It's the one place in the room we can all come together, and children and I use it in a variety of purposeful ways throughout the day, including opportunities for . . .

- *explicit teaching, modeling, and teacher/student demonstrations, often within the context of shared reading, read alouds, think alouds, and interactive read alouds*
- *classroom discussions, turning and talking in twos and threes, getting eye-to-eye and knee-to-knee for focused discussion*
- *kids and teachers to reflect, share, and teach each other what they've learned about themselves as readers, writers, mathematicians, and scientists that day*
- *partner and small group work, conferring, and independent practice, when we're not using it in the above ways*

The meeting area needs be large enough so that everyone can fit inside comfortably. Mine was in a corner of the room, defined by two walls, low sets of bookshelves, tubs of books labeled in a variety of ways for easy access, a chair, a rug, a lamp, and that yellow cabinet with red trim. A bulletin board for anchor charts and student work lined one wall, and books and a white board (for the morning message and announcements) were propped onto the chalk-board ledge.

A small basket filled with things I/we might need was on the floor by my chair-things like dry erase and permanent markers, Sharpies, vis-a-vis pens, sticky notes in different sizes, scissors, tape, a stapler, a small bottle of glue and a class set of sharpened pencils. Clip boards and small dry erase boards were kept in a small crate in this area, too-I tried to keep everything we might need at any time close by.

Sometimes we think about meeting areas as something for primary classrooms only. I disagree. In my work now, I often work with teachers and kids in the intermediate grades. There's something about bringing kids together, often with clip-boards and pencils in hand, and asking them to listen to or read a short, thought-provoking piece of text, write a response, and turn and talk with each other about both the content and the processes they used to make meaning. It forces the matter-the message is this is what we're about, this is how it sounds, this is what we do.

There's an intimacy in coming together, asking questions, thinking about big ideas, and synthesizing new learning that's less likely to happen when kids are at their seats. Whether it's during reading, math, writing, social studies or science, a meeting area can be the perfect place for modeling, thinking aloud, conversation, and demonstration, no matter what the subject or grade. I guarantee it - you create it, they will come!

Once you've thought about questions like these, and you're clear about the areas you want and need, you can begin to think about physical space and room arrangement. One of the best ways to begin is to move as many of the desks, tables, chairs, boxes, and crates as you can out in the hall or at least over to one side of the room. Take some time to look objectively at the space you have; take a look at your notebook entries and think carefully about the kinds of spaces you'll need and where it makes the most sense for them to go.

Sometimes it's fun to work with a colleague - you can help each other move furniture and think together about how best to create environments that are based on and support what you believe about teaching and learning.

Bianca Hewes

Using archetypes to match learning spaces with physical and digital spaces.

Posted on **April 22, 2012**

> *(NOTE: The following is an article that was written for a teaching journal, after a bit of an anxious wait it was rejected – didn't quite fit in with the focus of the edition. It's somewhat dated now, but thought some of you might find good in it. Some of it is from older blog posts, sorry for those who've been reading my drivel for a while now.)*

We all know that education is changing rapidly. We've all been to conferences where the keynote speaker shows slides depicting how vastly different the world is now to 25 years ago and how vastly different it will be in another 25 years. We know that the internet has lots of information and that the educator's job is to support students as they wade through the mire that is the world-wide-web. So just how is this changing the physical education landscape? For many, it's not. The traditional classroom stands tall, defying the agitating of edupunks around the world.

The traditional classroom originated in the throbbing heart of the Industrial Revolution – that was over 200 years ago. As pointed out by Nair and Fielding the 'early 20th century school design standard (was) modelled after Henry Ford's factory production methods' (http://www.designshare.com/index.php/design-patterns/traditional-classroom) . [BH1] Model T anyone? I doubt any parent would like to think that in 2011 their child was being viewed exactly the same as the child beside her/him. So why set up an environment (a visible embodiment of a teacher's education philosophy) that fails to differentiate between human beings?

Over the last twelve months the way I view my (physical) classroom has changed significantly. These days I encourage my students to align their physical learning space with their mental learning space. I've been interested in the role that physical spaces play in learning since the introduction of DER and the immediate discovery that a 1-1 classroom will not function effectively with students sitting in rows facing the front of the room. However a chance encounter with the article 'Classroom for the 21st Century' ('Australian Teacher Magazine' - the 'ICT in Education Guide 2010')[BH2] by Steve Collis, Director of Innovation at SCIL, gave me

the impetus to think more seriously about the interplay between spaces and learning. Collis' discussion of the 'mythic notions of the campfire … the watering hole … and the cave' (Collis, 2010, p.10) really grabbed my attention. I blame this on the fact that I'm an English teacher and salivate upon seeing metaphors. Inspired by what I had read, I was keen to see how I could (re)organise my classroom space to better match my students' learning.

Collis' 'mythic notions' of learning spaces were discussed back in the '90s in an article by Prof. David D Thornburg titled 'Campfires in Cyberspace: primordial Metaphors for Learning in the 21st Century'. In his article Thornburg identifies four 'archetypal learning spaces':

1. **Campfire:** A place 'where the storyteller … shared wisdom with students who, in their turn, become storytellers to the next generation.'

2. **Watering hole:** A place 'where we learn from our peers … each participant at the watering hole is both learner and teacher at the same time.'

3. **Cave:** A place where learners 'isolate themselves from others in order to gain special insights.'

4. **Life:** 'The application of knowledge … is an essential component of the learning process (because) when we learn something in anticipation of its immediate use, we not only reinforce our understanding, we increase the likelihood that what we have learning will not be readily forgotten.'

These have been adapted by architects responsible for designing new educational spaces, and images of these designs can be seen on the DesignShare website: http://www.designshare.com/

I have had great success introducing my students to these archetypal learning spaces and helping them to learn how to match their learning space with the physical space. Like I mentioned earlier, I am a public school teacher with very limited resources, so I have to be creative and really embrace the 'failure is the road to success' mantra. Ultimately my students have learnt that their physical learning environment is flexible as they rearrange furniture each lesson (and often during the lesson) to ensure it meets their specific learning needs.

There has been a lot of talk in the media and in the academic world about 'learning spaces' in the 21st century. Often the term '21st century learning space' is accompanied by images of students lounging in brightly coloured beanbags looking into the screen of a Macbook or iPad or working in groups at jellybean shaped tables. The rooms are large, flexible spaces that allow for many more than 30 students and one teacher. But the reality is that for many of us teachers – especially those of us working in a public school – these types of spaces won't be available to us for a long time. Furthermore both teachers and students must undergo a process of un-learning and learning if they are to effectively utilise this more flexible spaces being made available. The aforementioned archetypal learning spaces metaphor can support the successful transition from traditional to 21st century learning spaces. I am a public school teacher and I have managed to transform a very traditional

learning space (4 walls, a door, two windows, a whiteboard, 30 plastic chairs and 30 small desks) into a flexible 21st century learning space.

The reshaping of my room has pushed me into reshaping my pedagogy – a most desirable outcome. I am more conscious of the types of learning that are implicit in the activities I create and the outcomes I expect students to meet. Essentially I have created a space where the class can come together and discuss, present and listen (our campfire) as well as spaces for group work (watering hole) and individual work (caves).

It's true, my students did think it was a bit odd when I started saying, 'OK, everyone into their cave for some quiet reading!' but after a while they just 'got it' and they now happily move their chairs into the campfire position for 'story-time', into bunches for 'watering hole' chats or find their own personal 'cave' for reflection and internalisation of knowledge. When students need to move into the 'cave' I allow them to listen to quiet music on their iPods, sit on the floor, sit outside in the hallway or move their tables and chairs somewhere solitary in the room.

Here's how it's working for my classes right now:

Year 9: We sat in the 'campfire' circle to chat about their test results and the features of 'persuasive texts' that they were struggling with. Then they moved to the desks (watering hole) to work on their projects … some more successful at this than others.

Year 10: We sat in the 'campfire' circle to read 'The Catcher in the Rye' and discuss what the novel is teaching us about 'resilience'.

Year 11: We sat in the 'campfire' circle to read 'A Property of the Clan' and discussed the focus question 'Should Art Imitate Life?'. Students then moved to the desks (watering hole) to work on a mini-group task based on one of the Five Elements of Writing – these were then shared in our cyber-space campfire – edmodo.

Year 12: We sat in the 'campfire' circle to read 'Notes on Nationalism' by George Orwell and discussed the similarities between Orwell's world and our own. Our discussion led us to the killing of Osama bin Laden and how the celebrations of the Americans reflected their nationalism.

When thinking about how you could transform your own space, it is important to acknowledge two things:

1. Many teachers do not have their own 'home room' as they spent much of the day 'travelling' around the school from room to room. This makes it very difficult to have a permanent furniture arrangement. I think that this restriction should be viewed as a challenge rather than a barrier. Sacrificing time during the lesson to arranging and rearranging the furniture to suit the learning occurring is really worth it.

2. It is important that you do not try to create a space that is inflexible – try not to allocate a specific area for

'caves', 'campfire' etc. What a classroom needs is flexibility of space and furniture this allows for an ever-changing, dynamic learning environment. This approach to classroom layout can be quite intimidating for teacher and students initially as it is unfamiliar. It takes time to create a thinking culture and requires a much more relaxed attitude towards classroom furniture being moved – in fact, I've changed entirely as I now actively encourage my students (nay, require) them to move the furniture to suit the learning experience they will be involved in during our lesson.

What is important to acknowledge is that my classroom is different not simply because I am flexible with its daily design. My classroom is different because I use metaphor as a means to help my students develop metacognition. Using the metaphor of 'archetypal learning spaces' my students are actively engaging with their own learning. They must consider what type of learning will occur in each lesson and how the design of the physical space needs to alter to meet the learning taking place. I do feel that my students are developing learning autonomy.

My room is a little different to most I see daily because I have considered the impact that physical space has upon intellectual and emotional space. This is not to say I (and others) haven't ever (re)designed a classroom to maximise learning – I have been known to do this frequently and have been an advocate for groups/bunches that allow students to work together, especially with the introduction of the Digital Education Revolution's 1-1 laptop program in NSW. The introduction of mobile digital technologies into the classroom necessitates a transformation of the learning environment. A failure to consider the impact of the relationship between these technologies and the physical learning environment can seriously undermine the value of these technologies in a 21st century classroom.

For me the current design is different because it drew on the mythical archetypes of the campfire, watering hole and cave. This philosophical underpinning gave me a metalanguage with which to speak to my students about 'why' the room is configured in this new way. This 'language of myth' actually works as a cue for my students. Yes, they think that it's pretty uncool to start with – but once you get them thinking about WHY these three types of learning are relevant to their world, they just get it. Plus, kids like it when you show enthusiasm for their learning – they love it when teachers throw caution (or is that fear?) to the wind and take a very visible risk. I can now be heard saying to my students, 'Alright – lets have a chat around the campfire and then you'll spend some time in your caves.'

Visual cues really help orient students with the lesson's expectations and prepare them for the transitions between cave/camp-fire/watering hole. A chronological list of the lesson 'goals' matched to the appropriate learning and physical spaces can be written on the whiteboard or projected onto an interactive white board. This visual cue gives students the opportunity to self-direct their learning. The metalanguage of the archetypal learning spaces similarly engages students in metacognition as it forces them to think about the types of learning behaviours associated with each learning space. Ultimately students, familiarised with the notion of 'mythic spaces' to enhance learning outcomes, will self-select the appropriate 'space' to meet a task. It is this which is my ultimate goal – to encourage self-direction and an appreciation of the influence that physical

space can have on intellectual/emotional space. Speaking of visual cues, the pre-service teacher I have been supervising this year, Lauren Forner, even created beautiful posters as visual reminders to my students of the expected behaviours within each 'space'.

Of course there are risks to be taken in this approach to classroom design. There can be a great deal of noise as the students move furniture (where necessary) and as they move themselves into the appropriate 'space'. But the fear of noise in a classroom is simply a veiled fear of that which is natural and normal.

David Thornburg was interested in how these mythic notions of learning can be replicated in 'cyberspace'. Since the theorising of Thornburg, a plethora of digital tools have become available to teachers who wish to replicate the physical archetypal learning spaces in cyberspace. From my experience it is possible to use just one flexible online tool to facilitate this shifting from physical to online space (such as the social networking for education site edmodo) or multiple online tools. For example, my Year 10 English class have successfully used edmodo for their cyberspace campfires, watering holes and caves.

My students often use the small-group function on edmodo as their virtual 'watering hole' – a place where they discuss and collaborate on projects. Posting to the class group facilitates whole group discussion for an even larger 'watering hole'. Students wishing to work independently in the 'cave' can read and view posts made to the edmodo group or write and create posts of their own that can be shared privately with their teacher, with a small group or with the larger class group. Edmodo is also a wonderful presentation tool for those 'campfire' sessions where the teacher or student adopts the role of 'storyteller' or 'expert'. Files, videos and other learning objects are easily accessed and larger group discussions can occur in 'real time' by students interacting with polls or responding to group posts.

Here are just a few examples of other digital tools that facilitate online archetypal learning spaces:

- **Campfire** – videos (youtube, teachertube), virtual worlds, video-conferencing, Skype, transmedia texts (including interactive narratives like *Inanimate Alice*)
- **Watering hole** – social networking (twitter, facebook, google +), wikis, google docs for collaboration, multi-player games, virtual worlds
- **Cave** – blogs for reflection, interactive learning aids, single-player games, the web itself for independent research.
- **Life** – the web itself is pure Life space. The most important digital tools that allow students the opportunity to apply their learning in the Life space are social media, blogging and youtube. These tools provide a powerful, immediate and global audience for student projects, discoveries, ideas and experiences.

Given that most teachers will (at some point) incorporate the first three spaces – campfire, watering hole, cave – into their lessons, it is pertinent to note that the final space – Life – is ironically missing from most classroom 'learning'. Student-centred pedagogies – like Project Based Learning – force students to grapple with real-world problems and share their products and presentations with an authentic audience. These pedagogies provide students with the opportunity to apply the knowledge, skills and habits of mind developed in the campfire, watering hole and cave learning spaces to the final and most important space – Life. It is because of these reasons that Thornburg states 'The pedagogical model most closely aligned with the learning space of Life is inquiry-driven project-based learning.'

I'm really happy with my new approach to learning spaces. Through my continued experimentation with learning spaces, it has become evident that a 21st century classroom is not, nor has it ever been, about the screens, gadgets or funky furniture. Rather it is about developing a heightened awareness of how the digital and physical learning environment being created helps to construct each learning experience. I firmly believe that the true 21st century teacher embraces a changing learning landscape and is as much at ease facilitating a group discussion on Macbeth outside under a tree as she is moderating a Skype call between students and a published author. I do hope that in the future more schools will be approaching learning spaces in a far more flexible and student-centred/learning-focused way. So whilst it might initially feel a little contrived, I encourage you to use the metaphor of the archetypal learning spaces to help your students develop an appreciation for the need to alter their physical and digital spaces to match their learning space.

Reference:

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1

The Influence of Design on Learning Outcomes

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John Dewey believed that children learn best by doing, a concept extended in the Reggio Emilia and Montessori approaches, both of which recognize the role of the physical environment in shaping how young children acquire knowledge. To create preschools and kindergartens in which the physical environment is closely integrated with pedagogy and assists both teaching and learning, architects must consult educational theory and practices, study learning environments, and examine architectural precedents to understand which architectural features of schools best encourage children's engagement and which are counterproductive.

Understanding how the physical environment influences and shapes learning requires a comprehensive approach to the programming, planning, and design of schools—an approach in which research plays an integral part. Research can inform the designer about the "transactional nature" of the learning environment—that is, how the physical environment affects the learner. Examples of such research include Barker and Gump (1964), Lippman (1997), and Kennedy and Moore (1998).

Before designers create a preschool or kindergarten, they must understand the social and emotional advancements that children are making during these years. In addition, they must understand how influential pedagogical theories—such as constructivist theory and practice theory (Lippman 2011)—describe the role of the physical environment

in the learning process. Such understanding helps architects become informed and effective advocates for design innovation.

Guidelines for the design of learning communities

This chapter provides guidelines for the design of 21st-century classrooms and entire learning communities. Grulke, Beert, and Lane (2001) propose the concepts of *personalization* and *ability to manage interactions*. Two more concepts—of *flow* (or transition) and of *layered spaces of variable size*—are recommended by Lippman (2011; 2004). A fifth concept, *place attachment*, is derived from Low and Altman (1992).

The concepts and guidelines described above suggest attributes of learning environments that support the variety of ways in which people learn. While relevant to all learning environments, they are fundamental for planning and designing preschools and kindergartens.

Personalization and managing interactions

Personalization is required to create spaces in which all members of the learning community are enabled, engaged, and empowered to acquire knowledge and master skills. The learning, social, and physical environments are understood as working together to encourage learning. In a personalized setting, teachers are encouraged to work cooperatively with one another as they develop a curriculum and pedagogy to support and guide their students. The personalized school is also a place with an evolving educational program, where students are encouraged to develop and connect with teachers and their peers.

The social component of the learning environment is widely acknowledged to be essential in encouraging cooperative work and promoting an integrated learning environment, but the role of the physical environment is often ignored or misunderstood. This is unfortunate, because the physical environment is the vehicle that reinforces the mission and vision of the school.

Properly planned and built, the physical environment amplifies and enhances the diverse ways in which people learn. It is crucial for creating an environment that may be characterized as personal—for example, by creating zones in schools where teachers and students have the opportunity to be engaged peripherally, such as by clustering classrooms around a common area. Within the common area, the spaces must be attached to specific instructional spaces. By connecting these two spaces, a learning zone is created that is owned, maintained, and can become personalized by the learners from a particular classroom. Furthermore, these learning zones and activity settings become places that tie students to a classroom and allow them, as they use the space, to connect

with others from other classrooms. Another possible activity setting might be a grand staircase where people can meet informally as they move from floor to floor. This design feature can also be a place where members of the learning community can gather formally (for presentations or assemblies involving the entire school) or meet informally to work on projects.

The ability to manage interactions refers to the ease with which learners and teachers can become engaged, formally or informally, in independent or cooperative activities. The concept also refers to how learners are able to obtain, retain, and use the tools and resources in their learning environment to solve the problems at hand. Knowing that people can move from a position of being fully engaged to peripherally engaged (or vice versa), the physical environment must have features that promote opportunities for learners to manipulate their environment to support the ways in which they choose to work. In addition, managing interactions involves how learners and their peers and teachers (the social environment) perform the following tasks:

- Arrange the furnishings in the setting "sociopetally" (meaning connected to one other, as in a circle) or "sociofugally" (meaning separate from one another, as with airport seating) (Osmond 1966)
- Manage the air temperature in the zones in which they are working
- Adjust the light in the zones in which they are working
- Work together to manage noise levels in their working zones.

Layering

Layered spaces are defined learning spaces. When formal and informal activities are allowed to extend beyond those spaces into the learning zones that are attached to them, the settings expand to create places where activities can overlap. Layered spaces are variable in size and support opportunities for individual, one-to-one, small-group, and large-group transactions. Examples of such spaces are discussed below.

- *Gathering spaces* are generally moderate to large areas in the learning community, or common areas where large groups. These may be inside or outside the facility. Inside the facility, gathering spaces may be outside instructional spaces or offices.
- *Planning spaces* may be medium-sized learning zones where small groups can come together and share information about the projects on which they are working. These include teacher workrooms, learner breakout rooms, as well as conference rooms.
- *Resource spaces* are large spaces in the learning community, such as media and technology rooms and faculty offices.
- *Production spaces* are moderate to large learning zones where learners construct projects.

- *Practice spaces* are smaller learning zones—areas where students develop practical skills that may be transferred to other settings outside the learning community. Science laboratories, for example, are places where students learn to use specialized equipment.
- *Presentation spaces* are small to mid-sized areas where students' work is displayed and where students may present their projects.
- *Community spaces* are generally the largest places in the learning community. Examples include the gymnasium, cafeteria, media center, auditorium, and theater.
- *Formal/direct instructional spaces* are moderate to large learning zones, such as classrooms and seminar rooms.
- *Informal instructional spaces* are learning zones that may be found anywhere in the learning environment. They include places where active learners develop scientific knowledge from everyday experience.

The list above identifies the types of learning zones needed to encourage, promote, and support the various ways in which learning occurs. While this list differentiates specific spaces to accommodate particular activities, each area is properly considered in relationship to the others.

Flow and transition

Flow and transition refer to the situated nature of learning—the "between time" spent in motion, or the fifth dimension—the realm of students' relationship with space and their transactions with others in space. This term, *flow and transition,* addresses the notion that learning and teaching should not be understood as static but rather as dynamic. For this reason, the entire learning facility must be programmed and planned to promote opportunities for extending both teaching and learning beyond formal instructional spaces (Lippman 2007). As students move between the spaces in the school, the spatial design must provide for transitions from one place to the next. These transitional features should highlight how particular activity settings are intended to be used. For example, changes in the type of furniture, or the presence or absence of furniture, can encourage or discourage certain activities. Chairs and tables with casters can be moved between spaces to encourage a variety of social gatherings. Countertops with stools may support independent work, whereas chairs that allow rocking encourage students to become fully engaged in activities at hand by dissipating their natural nervous energy.

Place attachment

Place attachment promotes opportunities for privacy, personal displays, security, and serenity (Low and Altman 1992). The notion may also refer to opportunities for the learner to be creative and master both informal and formal skills in the learning environment. Because time spent in the learning community is limited, its physical environment should enable learners' to make the most of it by promoting a sense of peace and positive self-identity. Serenity may be achieved by giving learners areas for reflection and engagement, which typically include private and independent working areas. When such places are available, learners are less likely to feel stressed, because they have a space where they can accomplish their work (Lippman 1995; Oliver 2004; Oliver and Lippman 2007).

Examples of the application of these principles

The innovative preschools and kindergartens profiled below offer contemporary examples that promise to shape the future development of learning environments. They were chosen because they were planned and designed around the complementary notions that the learner is an active participant in the learning process and that the physical environment, too, should be understood as active.

Loris Malaguzzi Infant School, Reggio Emilia, Italy

Year of completion: 2008
Architect: Tullio Zini Architetto and ZPZ Partners
Pupils: 90

Named after the teacher and psychologist who developed the Reggio Emilia pedagogical approach, the school comprises an exhibition hall and research center. Flexible classrooms contain a variety of activity settings that allow for the management of interactions: an atelier area for creative work (figure

Figure 1.1. Atelier, Loris Malaguzzi Infant School, Reggio Emilia, Italy. Children working in the atelier remain connected to others

Photo: Tullio Zini Architetto and ZPZ Partners

Figure 1.2. Piazza, Loris Malaguzzi Infant School Reggio Emilia, Italy.

1.1), a laboratory for studies centering on science and technology, and a piazza for performance and physical play (figure 1.2). The piazza supports assemblies and performances but may also be used for small-group and independent learning. Flexibility is achieved by movable furniture and shelving so that the room can support a variety of activities simultaneously. Extensive storage is thoughtfully integrated into the learning environment, with storage units functioning as walls that create possibilities for informal games. Personal storage areas for each child and a mezzanine level in each classroom, where children nap, create place attachment (figure 1.3). Connections are established by the stairs to the loft space, interior glass, exterior glass, and built-in storage. This room can support a variety of activities simultaneously, since the furniture and shelving are easily moved. In these instructional spaces, students can manage their interactions, choosing what activities to perform and with whom to work.

Figure 1.3. Classroom, Loris Malaguzzi Infant School, Reggio Emilia, Italy

Little Stars Childcare Centre, Melbourne, Australia

Year of completion: 2009
Architect: Graypuksand
Pupils: 75

Located in Melbourne, Little Stars Childcare Centre is an extraordinary example of how good design can overcome challenges—in this case the challenge of being located on the first floor of an old and recently refurbished office building. The renovation of the facility extended the facade to provide a landscaped outdoor space (figure 1.4). Designed as a center-city childcare facility for the children of employees of the National Australia Bank, it provides interior and exterior play areas, sleeping facilities, and supporting amenities such as a fully equipped kitchen, manager's office, reception desk, and staff breakout area. The outdoor play area integrated into the design ackowledges the importance of physical activity for young children. It also helps them learn how to negotiate space.

A sense of flow was achieved by selectively placing glass in the walls. This established visual connections throughout the numerous spaces, encouraging a sense of personalization. Children and staff have the opportunity to get to know one another by seeing each other work, learn, and play in different areas, with peripheral, guided, and full engagements achieved via other salient features in the physical environment. These features

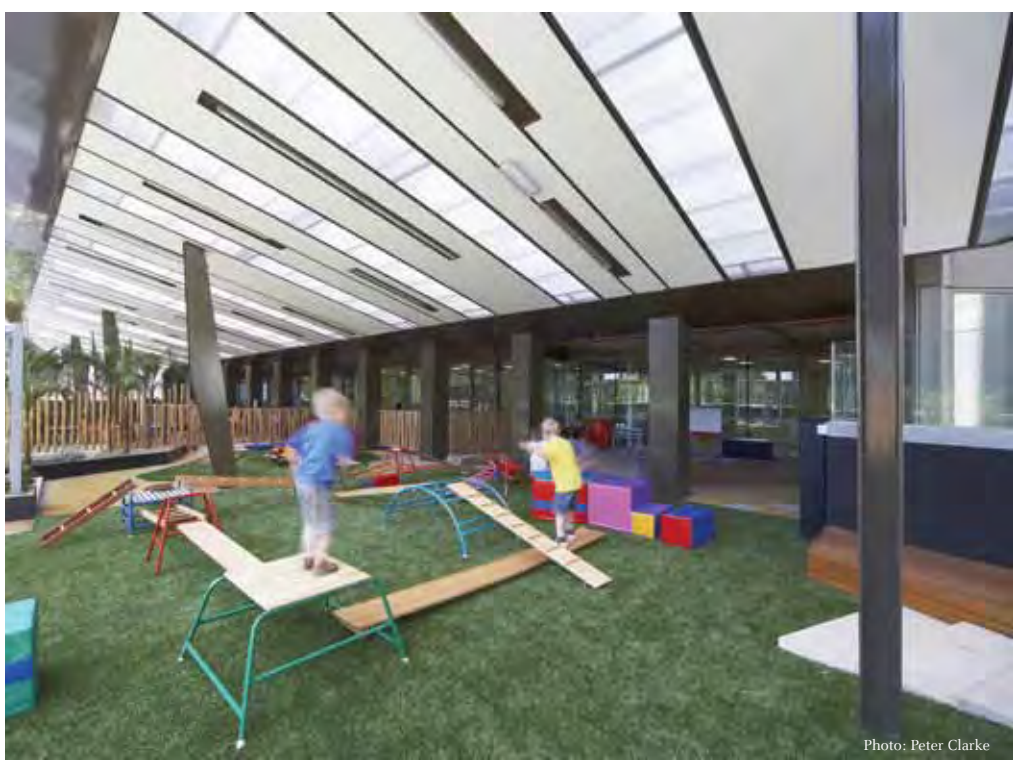

Figure 1.4. Outdoor space, Little Stars Childcare Centre, Melbourne, Australia

Figure 1.5. Classroom, Little Stars Childcare Centre, Melbourne, Australia

include child-height tactile surfaces, seating built into the window walls (where individuals or small groups can sit and observe activities beyond the boundaries of their play areas and classrooms), and "pods" that provide a quiet haven where children can rest, read, or play independently. Wall seating encourages independent and one-on-one learning opportunities, without separating learners from others (figure 1.5).

Skanderborggade Day-Care Center, Copenhagen, Denmark

Year of completion: 2005
Architect: Dorte Mandrup Arkitekter
Pupils: ~50

The Skanderborggade Day-Care Centre is an extraordinary example of how good design can overcome serious constraints—in this case the shortage of light, particularly in winter.

Lighting studies mapped the sun's path at different times of the year, particularly through the long northern winters, so that optimal light levels could be achieved on the ground floor. A pleasant and comfortable sense of flow was achieved by creating a series of courtyards, each with a specific environmental quality but connected to the next. A yard in the quietest corner of the center was set back from the street, shaded by trees to reduce temperatures, and designed for relaxing and sleeping in the summer months. The central, curved courtyard and rooftop play space were designed to maximize daylight for playing outdoors year round (figure 1.6). Nursery bays, promoting

Figure 1.6. Entrance elevation, Skanderborggade Day-Care Centre, Copenhagen, Denmark. The building is located comfortably in its urban site

personalization, are clustered around a common area that is part of the central lobby and connects the rooms. The central lobby fosters opportunities for peripheral, guided, and full engagement among staff and learners.

Springfield Literacy Center, Springfield, Pennsylvania, United States

Year of completion: 2010
Architect: Burt Hill (a Stantec company)
Pupils: 350

The Springfield Public School District embraced an alternative model for literacy education known as the individual literacy program. To support the implementation of that program, the Springfield Literacy Center required a variety of activity settings throughout the school so that learners and teachers could manage their interactions, engaging in one-to-one and collaborative small-group instruction in classrooms and other areas. The kindergarten and first-grade classroom wings are arranged along single-loaded corridors (figure 1.7), affording flexible, multifunctional spaces outside the instructional settings.

Figure 1.7. Site plan, Springfield Literacy Center, Springfield, Pennsylvania, United States. The floor plan implies that learning extends through the building and onto the site

The library is the first space that learners encounter. It tells them that everyone can learn to read enjoyably (figure 1.8). Spaces for small-group instruction are located between classrooms, exemplifying the concept of flow; they are separated by sliding barn doors that define specific activity settings. Windows in the doors enable learners to remain peripherally engaged in the activities beyond. The face of the school (figure 1.9) lets children know that nothing is beyond their reach.

Figure 1.8. Lobby and library, Springfield Literacy Center, Springfield, Pennsylvania, United States

Figure 1.9. Elevation, Springfield Literacy Center, Springfield, Pennsylvania, United States

The Montessori School, Kingsley, Australia

Year of completion: 2010
Architect: Edgar Idle Wade Architects
Pupils: 182 students (56 early childhood students, 40 lower primary students, 40 upper primary students, 30 lower secondary students, and 16 upper secondary students)

This Montessori school complex in western Australia has primary and secondary buildings as well as an early childhood building. The classroom buildings are clustered to create shared common areas between the structures. Each of the buildings and the complex are good examples of layered settings. The spatial design of each classroom building offers differentiated learning zones (or activity settings) that can expand and contract depending on the project at hand and the number of learners engaged in a particular task. In the layered classroom shown in figure 1.10, the walls provide the resources and tools students need.

The floor plan is organized as a series of nested, concentric learning zones. Resources and tools are stored along the perimeter walls, creating a zone that offers the learner a variety of learning choices, such as books and blocks. As learners select tools they move from a private zone to a semi-private zone in which they can share tools with one another.

At the center of the room is the most public zone, where the entire class can meet. Within all zones, students may learn individually, in pairs, in small groups, or as a whole, with or without teacher guidance. The buildings also have multiple usage patterns that are intended to attenuate the teacher-student hierarchy.

Each classroom is linked to an outside space, affording opportunities for gardening and nature activities. Students can move freely between buildings and spaces to engage in peer-to-peer learning and self-directed investigation based on experiential activities.

The buildings were designed for passive sustainability. Their southeast orientation, operable windows (for cross ventilation), thermal mass walls, clerestory windows (for sunlight in winter), and rain-water collection tanks all support that goal. The decision to use passive solutions will have a direct effect on the life-cycle costs of the building. With no mechanical heating or cooling systems to maintain, funds that would otherwise have been spent on these systems can be used to advance the educational programs.

Figure 1.10 . Classroom, The Montessori School, Kingsley, Australia

Fuji Kindergarten, Tokyo, Japan

Year of completion: 2007
Architect: Tezuka Architects
Pupils: 500

The largest kindergarten in Japan, Fuji Kindergarten affords a learning environment that encourages individual development and expression for all its pupils, utilizing the concepts of place attachment and flow. Montessori pedagogy guided the planning and design of the building. The "roof house"—an oval-shaped play deck—is used throughout the year, primarily for informal play, but also for more formal learning and assemblies. The design also incorporates three Zelkova trees, a slide from the roof, and water taps for outdoor play. The plan makes each classroom space visible and encourages an open teaching approach in which it is not uncommon for children to mix during lesson times. The building encourages a choice of interactions for learners. Classroom spaces, play areas, and support facilities flow into one, offering a landscape for children to investigate and adapt to their needs. The intention of the design was to provide a safe and secure setting to which learners will become attached and where they can be creative as they master skills.

Conclusion

As architects and designers strive to design learning environments for the 21st century, they must be *responsive* in their approach. To do that, they must develop a better understanding of educational theory, research on learning environments, and architectural precedents. Specifically, design professionals must understand how young learners acquire knowledge so that they can be more effective in creating places that inspire and motivate, even at the cost of challenging architectural standards and practices.

Preschools and kindergartens must be understood as places of inspiration and fun, where a child's innate learning skills are nurtured and developed. In these settings, the young learner is an active, motivated, and wilful participant. The school environment, therefore, must serve as a vehicle for learning, providing a variety of settings for the child to explore. Furthermore, it must support the diverse ways in which children master the skills they need to understand the complex world in which they live. Similar strategies for the design of the learning environment can be adapted and carried over to elementary and secondary schools to diversify and enrich the learners' educational experience.

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2 CHAPTER
EIGHT PRINCIPLES THAT DEFINE THE NEW SCHOOL DESIGN PARADIGM

Authentic

That learning experiences should be authentic should not even be up for debate — what other kind of learning is there? Our answer to that, unfortunately, would be schooling itself. Schooling is designed to formalize learning so that adults can measure students' "progress" along predetermined paths they have set down. This formal process sacrifices authenticity for simplicity and, in doing so, militates against the very thing schools are supposed to do — encourage students to "learn" as a means toward realizing their own unique, individual potential.

So what is authentic learning and how does this look different from the hierarchically directed "formal" learning that predominates the student experience in schools? A simple way to describe "authentic" is to look at a school's sports team. In this instance, the work students do to become better as individuals and as a team is abundantly clear. There is a direct cause and effect relationship between their efforts and the results they see on the field. There is also the reality they must face of their own limitations and to what extent these can be overcome with hard work, teamwork, and coaching.

> "Authentic learning is about students' exposure to subjects in a manner that resembles what professionals in the field do on a daily basis.

With sports, the results of the work students do can also be measured by real outcomes. This alignment between student achievement and adults' need to measure success allows sports to function as one of very few truly authentic experiences that students experience in schools. There is also an important component of self-selection that is part and parcel of the "authenticity" that is found in sports. Students who participate in sports are there because they want to be and because they see themselves as playing the

Figure 2-1, 2-2: *The theoretical work done in the school attains greater meaning when it is based on real-world experiences. Hiking in nature is as authentic as it gets. There are numerous opportunities for students of all ages to acquire a variety of useful skills on a nature walk such as teamwork, observation, endurance, and learning about the natural world that is far removed from the screens on their digital gadgets.*

real game the professionals play — even when they know they aren't as good as those at the top of the game.

Success measures in sports can go beyond winning or losing. Students can be rewarded for their efforts, for the real progress they make as a result of the work they do and the extent to which they support their team to succeed. Sports also contain many non-measurable benefits like discipline, persistence, teamwork, self-confidence, and learning how to deal with and overcome failure.

Go into the classroom now and look at the way mathematics is taught and "learned" in schools. First, how many are there because they want to be mathematicians? Second, how does what happens in a math classroom compare to what professional mathematicians do? There is a superb essay on this subject called "The Mathematician's Lament" by Paul Lockhart.[12] It illustrates why what math students are forced to do in school bears almost no resemblance to the real world of mathematics. The overwhelming majority of students who study math in schools will do so without being exposed to the real beauty of the subject.

[12] A Mathematician's Lament by Paul Lockhart. https://www.maa.org/external_archive/devlin/LockhartsLament.pdf

THE 20 MODALITIES OF LEARNING

1. Independent Study
2. Peer-to-peer Tutoring
3. One-on-one with Teacher
4. Lecture
5. Team Collaboration
6. Project-based Learning
7. Distance Learning
8. Learning with Mobile Technology
9. Student Presentation
10. Internet-based Research
11. Seminar-style Instruction
12. Performance-based Learning
13. Interdisciplinary Study
14. Naturalist Learning
15. Art-based Learning
16. Social-Emotional Learning
17. Design-based Learning
18. Storytelling
19. Team Learning and Teaching
20. Play and Movement Learning

Making math learning "authentic" will require a radical retooling not only of the curriculum but also the way it is learned in schools. Children can exist at various points in the spectrum of becoming professional mathematicians — most will, of course, not go on to become professionals just as most students will not play professional sports — but wherever they are, they will be there by choice and because they see the utility of math in their own lives.

This discussion about mathematics is equally true of all the other subjects like English, social studies, science and languages. Authentic learning is about students' exposure to these subjects in a manner that resembles what professionals in the field do on a daily basis and not the watered-down one-size-fits-all simulations that students experience in schools.

Figures 2-3: *Schools can only truly transform when they understand that it is OK for students, even when they are in the same space, to be doing different things. Unlike a traditional classroom in which every student has a similar desk and chair, a well-designed space for learning will provide a variety of seating and working options that students will naturally select and gravitate toward based on what they are learning and who they are learning with.*

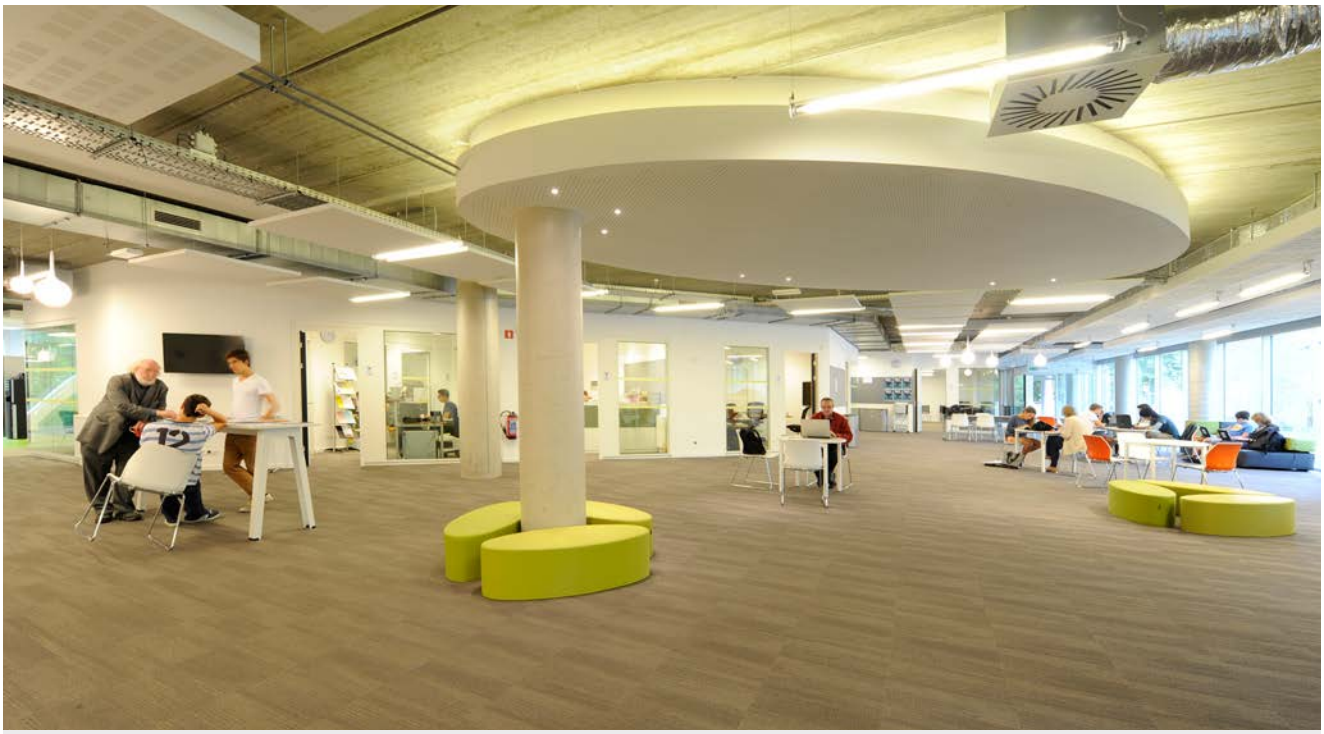

Figure 2-4: *In a common area like this, which is an essential part of a learning community, far more modalities of learning will be possible than in the learning studios which are more suitable for group instruction. Look at this image from the perspective of the 20 modalities of learning and it will become immediately apparent that it will accommodate almost all of them. Such spaces are "dynamic" and "living" in the sense that they can be easily configured and reconfigured to serve teaching and learning.*
Kevin Bartlett High School at the International School of Brussels.

Multi-Modal

The way classrooms are designed leaves little room for modes of learning beyond the artificial teacher-directed exercises that students are forced to do. Classrooms themselves, the places where students spend most of their school day, are severely limited when it comes to the modalities of learning they will comfortably accommodate. Look at the 20 modalities of learning listed above and transpose them into a classroom setting. How many can a traditional classroom accommodate well? Two or three maybe? Classrooms are well designed for teacher and student presentations but fall short when measured by their ability to deliver the other modes of learning.

By multi-modal, we are saying that students need to select the mode of learning that is best aligned with two criteria: 1) what they are learning and 2) how they would like to learn it. What is being learned is only one piece of the puzzle. It does not tell us how any particular student may choose to learn it. Just as some students are happy to learn in the hustle and bustle of a Starbucks while others prefer a quiet corner somewhere, so also students in school need choices so that they have the opportunity to become comfortable in

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Classrooms are well designed for teacher and student presentations but fall short when measured by their ability to deliver the other modes of learning.

Figures 2-5, 2-6: *Almost everything in life is interdisciplinary and schools should be no exception. Students are much more likely to be engaged in their work when they can see the connections between disciplines. This can be done via projects in Maker Rooms or STEAM labs that let them apply math, science and engineering concepts in a creative way.*
Maker Lab at Hillel School of Detroit, Michigan.

their environment as a prelude to learning whatever it is they are learning.

Interdisciplinary

There is beauty in the purity of each subject and we appreciate why there are instances where it is important to see a subject in its own special light. Subjects in school are not there because of this high ideal of presenting their beauty and purity to students. They are there because of the ease with which this kind of artificial way to segment learning allows the school day to be broken up into bite-sized chunks of time.

We challenge schools to expose students to the interdisciplinary nature of everything they will encounter in their lives. It is hardly a secret that we are now in a changing world where almost every desirable job has interdisciplinary elements. This trend is not just here to stay but accelerating at a pace that makes it impossible to ignore. Schools have begun to take notice and efforts to make the

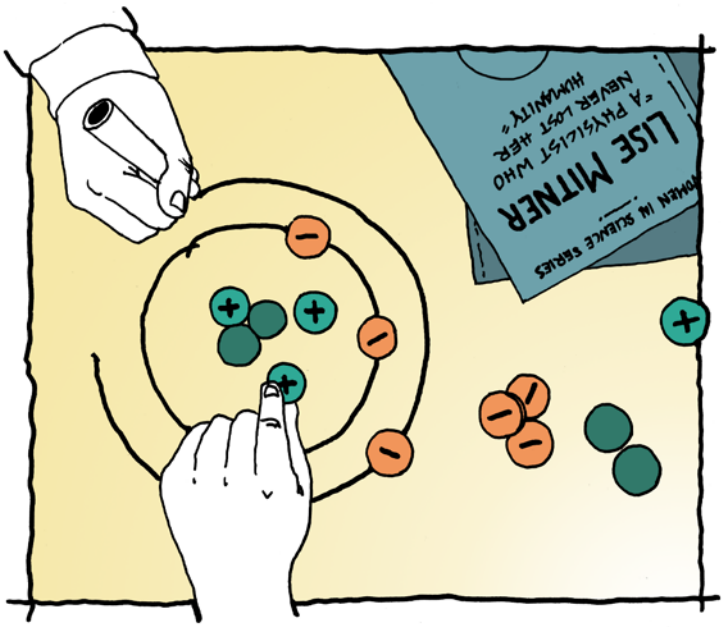

Figure 2-7: *No matter what modality of learning is used, and no matter if it is happening alone, with a teacher or with peers, all learning is, ultimately, personal. Every student constructs learning based on his or her own life experiences and predispositions. Understanding this very fundamental rule about learning is the first step toward moving away from the mass-production model of schooling and toward a personalized model in which each student is seen as a completely unique person with completely unique aptitudes and interests. One-on-one learning with a teacher at American School of Bombay, Mumbai.*

student experiences more interdisciplinary can be found in project-based offerings, STEAM curriculums, service learning, and internship opportunities. These programs stand out for the manner in which they engage students to become more active participants in their own learning. Despite their obvious benefits, schools are reluctant to dive in with both feet and become more interdisciplinary. This reluctance comes from their efforts to juggle two basically incompatible paradigms – the old teacher-directed, classroom-based, subject-driven educational model against the new student-directed, experience-based, interdisciplinary model. Real change from the old, familiar but completely obsolete educational model can only happen when we replace not just parts of the old model, but introduce a whole new one. Please refer to the chapter in this book on Pathfinder Projects that illustrates one effective way to introduce real, meaningful, holistic, and sustainable change.

Personal

We have chosen to use the term "Personal" and not "Personalized." These two terms are derived from the same understanding that no two students are exactly alike. They recognize that education needs to move away from the one-size-fits-all model to a model where individual differences are recognized and celebrated. But let us look at each term

> We challenge schools to expose students to the interdisciplinary nature of everything they will encounter in their lives.

to understand why we prefer to use the term "Personal."

Personalized education assumes that an adult, like a tailor, custom-designs learning experiences to fit the individualized needs of each student.

Personalized education assumes that an adult, like a tailor, custom-designs learning experiences to fit the individualized needs of each student. That's like 25 people of different sizes and shapes wearing the exact same tuxedo, fitted perfectly to their own measurements. The goal is to make them all look as much like each other as possible. Personalized education is the quintessential 21st century nod to the industrial "Hierarchical Individual" education model and provides the rationale to keep it alive. It is saying that adults know exactly what all children need to know and when they need to know it but that we need a "delivery system" for the content and skills that takes individual differences into account. In the end, a personalized learning model may not be about the student at all but simply a way to sugar-coat a poison pill – an apt term to describe the obsolete, test-based, content-heavy education model that prevails across the globe.

Personal education, on the other hand, starts with the personal aptitude, skills, interests, and needs of individual students. Learning experiences are designed from the ground up to develop each individual student's potential to be the best at whatever that student wants to be best at. In a personal education model, the teacher and student are partners working together to first figure out and then implement a program where learning is a means to the larger goal of citizenship, human development, and self-actualization. Personal education has the added advantage in that students are able to connect emotionally with the subject at hand because of their personal interest in it. Not only does this make learning more meaningful but it is also a good way to ensure that students will be learning things they are more likely to use later on in their lives.

Not time-bound

The architecture of time may present an even greater challenge to real learning than the architecture of space. While space constraints are easier to find workarounds for, time constraints are like a straitjacket from which there is no escape. No matter how good a lesson may be, or how engaged students are in a lesson, the tyranny of the school bell instantly tears it all apart. Mihaly Csikszentmihalyi in his book, "Flow," talks about how we are our most creative selves only after we enter a state of "flow."[13] This requires a level of attention and commitment to a task that would be nearly impossible to achieve in the highly artificial and orchestrated environments of classrooms. As if this weren't enough of a barrier to creativity, we have the added assurance that even for those rare occasions in which students may be able to get into flow in a classroom, there is a certainty it will be broken by the school bell.

Schools have recognized that the 45-minute period is simply not enough time to do any work of a serious nature and many have gone to a block schedule model with 90-minute blocks of time dedicated to a particular class or lesson. This is a step in the right direction but has its own problems. The opposite of flow is disengagement and boredom. If the lesson being taught or learned is intrinsically uninteresting and boring, then extending it to 90 minutes does nothing to help students get into a state of flow.

While space constraints are easier to find workarounds for, time constraints are like a straitjacket from which there is no escape.

What we are suggesting is a school day without periods.

[13] Flow: The Psychology of Optimal Experience by Mihaly Csikszentmihalyi. Harper & Row 1990

Figure 2-8: *What most adults don't fully understand is that students, even at a very early age, are fully capable of directing their own learning. Another key learning fact is that the more "agency" a student has to make important decisions about what to learn and how to learn it, the more engaged he or she will be and the better the quality of the learning.*
Shorecrest Early Childhood Center, St. Petersburg, Florida.

This will work only if it is combined with an individual learning plan for every student that provides every student with a clear roadmap of where he or she needs to be in any given area of expertise at the end of some defined period like a day, a week, a month, or a semester. The learning plan is co-created by the student and his or her teachers and is the only reference of progress. Think of an architectural office with 25 people in it. Everyone knows what they need to do and when they need to do it by. Everyone has some tasks that are more complicated than others, some that take longer and some that require partnering with others in the firm. Is there a bell that goes off at fixed intervals throughout the work day? Obviously, if it made sense to stop everyone cold in their tracks every 45 or 90 minutes so that they are forced to drop what they are doing and move onto another task, then this would be the way most businesses are run. Yes, we understand that schools aren't architectural offices but the work example illustrates the absurdity of making ***any*** group stop and start their work at fixed intervals regardless of what they are actually doing or how much time they actually need to properly execute the task at hand.

> If the lesson being taught or learned is intrinsically uninteresting and boring, then extending it to 90 minutes does nothing to help students get into a state of flow.

Figure 2-9: *Author Daniel Pink once asked, "When was the last time you spent any significant time with a group of individuals who were all the same age as you?" Age-based groupings don't make sense in the real world and make no sense in school either. It makes eminent sense to group students in ways that offer them the best opportunity to get a rich learning experience and not on the basis of their age. Spaces in school like this commons area provide opportunities for inter-age groupings in a way that grade-based classrooms don't. PK Yonge Developmental Research School at the University of Florida. Gainesville.*

Self-Directed

The term "student-centered" is often used to imply self-direction. However, this term can lead to some confusion. To illustrate, let us look at a scenario where we observe a teacher sitting silently, passively observing or gently coaching as students are laboring hard on a multiplicity of assignments. On its face, this seems like a perfect description of what a student-centered learning activity looks like. Now let's assume that the work students are doing has been highly orchestrated by the teacher beforehand so that students are actually just carrying out the teacher's instructions even as they are hard at work.

Compare this to another scenario where the students are also engaged in work that, on its face, looks very similar to the above scenario. Except here, students worked together with the teacher and negotiated not only what they would work on but also how they would execute the assignment and for how long they would work on it. What we are saying is that student agency, the recognition by adults of their interests and preferences, is the secret to having them be truly engaged as learners.

> A personalized learning model may not be about the student at all but simply a way to sugar-coat a poison pill.

Figure 2-10: *Taking teachers out of classrooms they own and giving them, instead, an area where they can work and collaborate like professionals is probably one of the biggest game-changers when it comes to educational innovation. Collaboration that is continuous throughout the school day is far more effective than the isolated hour or two of group prep times that teachers normally have during any given week.*
PK Yonge Developmental Research School at the University of Florida. Gainesville.

Inter-Age

Strong as the structures around subject-based and classroom-based groupings are, they are easier to dismantle than age-based groupings in school. We have found no evidence that shows some intrinsic educational or human developmental value to organizing students by age and, yet, it is an age-old practice (no pun intended) that seems nearly impossible to break. Any parent with more than one child at home knows the benefits of having interaction between children of different ages. Such interactions benefit both the younger and older children in different ways. Yet, we see very little of this in schools. All this starts with the classroom. Once a decision is made to organize a fixed group of students within one small room with an adult, then it follows that we may as well group them by age for our own convenience as adults. It allows us to rationalize the uniform delivery of content and skills under the false premise that all students of a similar age need to and will progress at a similar pace developmentally

> “Student agency, the recognition by adults of their interests and preferences, is the secret to having them be truly engaged as learners.

if they are subjected to the same teaching practice. Even though we know this is patently wrong and that no two children are exactly alike, the fear is that the differences and learning difficulties will be even further exaggerated with a multi-age group. The fallacy to this argument is that we need not subject the multi-age group to the same teaching practice and, in fact, having a multi-age group of students only illustrates what we already know – that all children are different and they are different not only because they are not all the same age. With this realization, we can begin to rethink teaching itself and allow it to take a backseat as learning becomes front and center with students directing their own learning and also helping each other. This theory has been proven convincingly by Dr. Sugata Mitra with his hole in the wall experiments. These experiments show definitively that inter-age groups of students are perfectly capable of self-organizing even with the complete absence of adult supervision.[14]

> “Any parent with more than one child at home knows the benefits of having interaction between children of different ages.

Collaborative Teacher Teams

Why do we have an educational model in which one teacher is in charge of a fixed cohort of students organized by age? We have a one-word answer to that. The classroom. The moment you create a classroom and fill it with an age-based cohort of students, you also need them to have an adult supervisor – hence the teacher. That means, the rationale to have one teacher for 25 or 35 or even 15 students is really not one grounded in an education rationale, but one driven by the architecture of schools. Classroom = teacher + fixed number of same-age students.

We have compelling evidence that this system, which isolates teachers with students while preventing teachers from collaborating effectively with their peers, is actually a terrible one both from the teacher's and student's perspective.[15] Our idea is to move away from the classroom-based model to the learning community model in which teachers and students are not trapped in classrooms. Instead, multi-size and multi-age groupings of students can vary throughout the school day and the teacher-student ratio can also vary continuously to best accommodate the learning that is actually going on.[16]

Collaborative teacher teams have the advantage in that students have continuous access to a caring group of adults instead of having to primarily depend only on one classroom teacher. From the teachers' perspective, they will no longer be isolated from their peers but be able to collaborate with them to develop interesting and engaging multidisciplinary lessons. Socially also, teachers who can work in close collaboration with their peers are likely to be more professionally fulfilled and happy. All this translates into better student outcomes – not just with test scores but also in the areas that matter such as being more engaged and fulfilled, and happy.

> “Collaborative teacher teams have the advantage in that students have continuous access to a caring group of adults instead of having to primarily depend only on one classroom teacher.

[14] Kids Can Teach Themselves. LIFT 2007. TED Talk. https://www.ted.com/talks/sugata_mitra_shows_how_kids_teach_themselves?language=en
[15] The Missing Link in School Reform, Carrie R. Leanna, Stanford Social Innovation Review 2011 https://www2.ed.gov/programs/slcp/2011progdirmtg/mislinkinrfm.pdf
[16] Blueprint for Tomorrow, Redesigning Schools for Student Centered Learning by Prakash Nair, Harvard Education Press, 2014