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Abstract

This research explores the quality and importance of the physical environment of two early learning centres on the Sunshine Coast in Queensland, utilising qualitative interviews with parents (n=4) and educators (n=4) to understand how design might impact on children's development and a quantitative rating (the Early Childhood *Physical* Environment Rating Scale; EC*P*ERS) to assess the quality of the physical built environment and infrastructure. With an average EC*P*ERS quality rating, thematic analysis of the interviews revealed that educators and parents viewed the physical environment as important to a child's development, although the quality of staff was predominant. Early learning centres should be 'homely', inviting, bright and linked to the outdoors, with participants describing how space "*welcomes the child, makes them feel safe and encourages learning"*. Four key themes characterised views: Emotional Connection (quality of staff and physical environment), Experiencing Design (impact of design on child development), Hub for Community Integration (relationships and resources) and Future Vision (ideal physical environment, technology and ratings). With participants often struggling to clearly articulate their thoughts on design issues, a collaborative and jargon-free approach to designing space is required. These findings will help facilitate discussion about the role and design of the physical environment in early childhood centres, with the tangible examples of 'ideal space' enhancing communication between architects and educators about how best to design and reconfigure space to enhance learning outcomes.

Keywords: physical environment, design, early learning, child development, parent perceptions, educator perceptions

There is a growing awareness internationally of the importance of early learning, its impact on the individual child, and the wider implications of early learning on the social and economic capacity of communities and nations. Alongside teacher and program quality, the physical environment is seen as a critical partner in a child's cognitive, social and physical development, described by many as the '*third educator*' (Hebert, 1998; Moore & Sugiyama, 2007; Weinstein, 1987). The quality of the physical environment has been linked to positive learning outcomes, with a small body of research illustrating how the design of interior (e.g., room size, layout, furniture, lighting, noise) and external (e.g., outdoor spaces, nature, play equipment) space in an early learning childcare environment may enhance children's learning and development (Evans, 2006). To date, however, despite educational theorists and practitioners acknowledging the importance of the design of the interior and exterior physical environment in an early learning environment, relatively little is known about the experiences and views of Australian educators and parents.

The role of the physical environment and children's learning

Educational theorists and practitioners have always recognised the importance of physical space in an early learning environment, with prominent theorists such as Werner, Piaget and Montessori arguing that a child's environment is crucial to their development and that educational environments should be rich in stimuli, providing opportunity for exploration and testing (Moore, 1987). The design of the physical environment should facilitate a child's sense of competence (their capacity to explore their physical world with independence), creating opportunities for learning and play (Maxwell, 2007). Unfortunately, to date, relatively little research has focussed explicitly on the role of the physical environment of early childhood centres and the impact of interior and external space design (Moore & Sugiyama, 2007). This small body of literature suggests that three specific physical environment design dimensions are believed to be most influential in early learning: space fostering exploration, independence and development (a child's sense of self and willingness to play), spatial quality (through space, colour, light, noise and materials), and integration of outdoors and the indoor environment.

Space fostering exploration, independence and development

Research has illustrated how the design of space can foster child development, with Curtis and Carter (2005) highlighting the importance of creating "*environments with a vision for childhood....a time of wonder and magic when dreams and imagination get fueled*" (p. 34). Thoughtful and appropriate design of physical space can offer the capacity for exploration, learning through play, peer interaction and the development of self-confidence and social skills. Space should be flexible, with moveable

furnishings and equipment, offering play places at different angles and levels and, to design both quiet and active spaces (Curtis & Carter, 2005). Appropriately designed space, by facilitating a child's sense of competence and providing a sense of place, security and comfort, can help children form an identity and a sense of self-worth by encouraging exploration and play (Moore & Sugiyama, 2007; Weinstein, 1987).

Impact of spatial quality: space, light, colour, noise and materials

Best practice design guidelines for early childhood centres emphasise how specific elements of spatial quality (space, light, colour, noise and materials) impact on children's learning and development. Specifically, the best layout of a learning environment is 'modified open-plan facilities', retaining the best of open and closed plan facilities (Moore, 1987). Little research has explored vertical space (i.e., height), although Read, Sugawara and Brandt (1999) found that continuous bland ceilings had a negative impact on a child's cooperative behaviour whereas differentiated ceiling height had a positive impact, creating different experiences and social exchange. Lighting should be selected to suit the activity and the space, providing flexibility in natural and artificial light to meet various tasks and mood requirements (Olds, 1987), whilst colour can create a sense of place, (Read, 2007), communicate information (Dudek, 2000), create landmarks for spatial orientation (Acredolo, 1979) and encourage cooperative behaviour through variation (Read et al., 1999). Exposure to uncontrollable noise has a negative impact on children's cognitive development, reducing memory, language and reading skills (Evans, 2006). The sensory world is also a rich source of information, with the materials and finishes used offering a good source of variety and tactile sensory stimulation (Olds, 1987; Weinstein, 1987).

Integration of outdoors and the indoor environment

Integrating the outdoors and the natural environment is extremely important. Through simple measures such as good solar orientation, energy efficiency through natural day lighting and ventilation, and links between the interior and exterior environments, an early learning centre can have natural, healthy and 'green' qualities (Dudek, 2000). Research has demonstrated that natural play environments seem to be better for children's cognitive and physical development than built play areas. For example, children who play in natural areas engage in more physically demanding play compared to traditional playgrounds (Fjortoft, 2004), whilst those who attended a more natural daycare centre showed better motor skills, increased attention spans and less sick days (Bagot, 2005).

Integration of the wider community

As well as increasing awareness about how the physical environment affects child development, researchers and policy-makers are also exploring how informal and formal interactions at early childhood centres might be utilised to "strengthen and build the social cohesion between families, communities and government and nongovernment sectors" (Duncan, Bowden & Smith, 2006, p3). Internationally, and within Australia, many centres are now designed to act as a 'one stop shop' service to better support families, in terms of providing convenient on-site access and referrals to specific programs, services and resources (e.g., maternal and child health, family support, allied health services). Indeed, a recent review assessing the effectiveness of service integration and co-location concluded that despite a "lack of rigorous research evidence for the benefits of integrated services, there is an emerging consensus or practice wisdom" about the benefits (Centre for Community Child Health, 2008, p.29). Thus, as well as exploring how parents and educators viewed the physical environment, a secondary aim of this research was to investigate reactions to early childhood centres offering a more a 'one stop shop' service.

Assessing the physical environment of early learning

To date, despite a relatively large body of resources and research on how different design elements impact on child development, interactions and behaviour, very little is known about how parents and educators experience design in early learning centres or how to quantifiably identify and assess the specific characteristics that best enable learning. Fortunately, researchers have begin to develop measures to assess the relative quality of the physical environment in childcare centres; in Australia, Moore and Sugiyama (2007) have developed the Early Childhood *Physical* Environment Rating Scale (EC*P*ERS), designed to assess the quality of the physical environment of early childhood centres in regards to their potential for child development and learning. EC*P*ERS is useful both in the design phase of a new building and in the planning stages for a renovation to an existing building, bringing together architectural language and educational theory as a tool for architects, centre operators and those interested in the effect of the physical environment on a child's development. To date, however, EC*P*ERS has only been utilised a handful of times and has not been compared against the qualitative experience and evaluations of educators and parents. Moreover, to our knowledge, neither stakeholder group has been explicitly asked about how they might design an early learning centre, their expectations of the physical environment or their ideal design ideas for the future.

Recent Australian survey research, exploring how parents would change their child's kindergarten or school to reduce the risk of obesity, reported that parent's prioritised greater opportunities for physical

activity and wanted the kindergarten/school to increase the amount of good quality outdoor equipment and covered outdoor play spaces (Crawford et al., 2008). The gap in research occurs in a direct and detailed investigation of what parents and educators expect and want in the design of the built and physical environment of early learning centres. Given this knowledge gap, this exploratory qualitative research explores the views, expectations and experiences of a small sample of Australian parents and educators, comparing their evaluations of the physical environment with the objective rating offered by the EC*P*ERS. As well as providing further validity evidence for the EC*P*ERS, enhancing our understanding of key stakeholder's actual and ideal physical environment (both interior and exterior) could help inform and improve the design of early childhood centres.

Methodology

Case Study - Early Learning Providers

Two early learning providers in Beerwah, a relatively socio-economically disadvantaged regional community located on Queensland's Sunshine Coast (Queensland Government, 2008), were selected for this study. Located two kilometres apart, both centres are approximately 30 years old, single-story facilities, with domestic style construction. Centre A sits adjacent residential and light commercial precincts, is licensed for 20 students and has a maximum of three staff. Centre B is sits within a residential community and is licensed for 75 children. In this latter centre the focus of this study was the 'Kindy Room', which was has up to 24 children per day with two staff. Image 1 illustrates the interior play space of each centre.

Image 1: Interior playspace of the two centres

Interior playspace of Centre A

Interior playspace of Centre B

Participants

Semi-structured individual interviews, lasting approximately 30-60 minutes, were conducted on-site with two educators (centre director and one early childhood teacher) and two parents from each centre. The participants responded to a notice on the centre notice board or were specifically invited by the centre

director to participate due to their availability. Limited socio-demographic information was collected, but all participants were female and ranged in age from approximately 26 to 55 years.

Procedure

Standard good practice ethical and interview procedures were followed, with informed consent obtained from each centre and all participants. The two early learning centres were contacted, informed about the study and asked to participate in this project which involved two aspects: qualitative interviews with educators and parents and a quantitative analysis of each centre's physical environment. All interviews were audio-recorded and later transcribed.

Measures

Qualitative interviews

The semi-structured interviews covered the following areas: whether the physical environment is a factor in early learning centre selection, beliefs about the relative importance of the physical environment in a child's development, the defining characteristics of a quality physical environment, the relative appeal of integrating community services (i.e., 'one stop-shop'), as well as their design expectations , ideal design ideas for the future and the perceived value of a star rating system assessing the quality of the physical environment Finally, the participants rated the physical environment of their centre on a ten point Likert scale (anchored at poor and excellent) and, to stimulate discussion about different design options, were shown six images of a contemporary childcare facility in Japan (Canizares, 2008). These images were utilised as the space is a good example of sustainable contemporary design, with high curving roofs, large internal spaces, intricately detailed timber structural elements, non-rectilinear internal spaces, natural day lighting and passive solar design.

Quantitative analysis of the physical environment

The physical environment of both centres was assessed using photographic and spatial analysis (sketch plans and elevations), as well as the EC*P*ERS (Moore & Sugiyama, 2007). Through an approximately one hour site audit of each site in April 2009, EC*P*ERS involved an assessment of the following dimensions of the early learning facilities: planning, building as a whole, children's indoor spaces and outdoor areas (see domains in Table 1).

Analysis

Transcripts were analysed using a thematic approach, identifying key categories, themes and patterns (Liamputtong & Ezzy, 2005). All of the themes come from the research findings, with the identification of themes occurred through four key iterative steps: mechanics (transcription), data immersion (reading and re-reading transcripts), generating initial codes (initial pattern recognition), and categorising key themes and sub-themes (identification of meaningful categories). Emerging themes were reviewed, refined and named into main themes and sub-themes, with the results purposely including multiple excerpts from the raw data using the exact words of participants so readers can evaluate our thematic structures.

Results

Qualitative Interviews

Educators and parents viewed the physical environment of early learning centres as very important to a child's development. They wanted centres to be 'homely', inviting, bright and linked to the outdoors, with one educator describing how the space ideally "*welcomes the child, makes them feel safe and encourages learning*". Four key themes characterised their views: Emotional Connection (quality of staff and physical environment), Experiencing Design (size and flexibility, inside-outside connections and safety), Hub for Community Integration (building relationships and accessing resources through early learning centres) and Future Vision for Early Learning Centres (ideal physical environment, technology and design ratings).

Emotional connection to the centre

Both educators and parents identified quality as the key element driving parent's selection of an early learning centre for their child, emphasising two dimensions of quality – staff and the physical environment. As one educator described, quality was judged via: *"their initial gut feeling – when they walk in and feel welcomed by the environment and by the people and how the adults and children are interacting and the ambience of the place".*

Quality of the Staff

The most important factor influencing centre selection was the quality of the staff and how parents felt after interacting with the staff. All parents described how when they were looking for a place, the quality and warmth of the staff they engaged with was essential at the initial contact (telephone or face to face) and that the staff must show a genuine interest in their child. Parents described how the centre they eventually picked was the one where the director and staff were most friendly and welcoming: "*the*

other centre sounded very clinical. This one, when I rang up they showed interest in my child, they sounded very friendly…and I thought I wanted someone friendly around my child".

Quality of the Physical Environment

The second key factor was the 'general feeling' parents received from the physical environment, with all describing the importance of feeling a 'connection' to the space. Parents valued homely and inviting facilities, particularly those that displayed children's work on the wall. However, most could not clearly articulate specific design features or attributes but rather described experiencing a 'positive feeling' about the space. Only one parent described the physical environment as a conscious element in her decision making, explaining how she had selected her previous centre because it was new, the rooms were large and there was air-conditioning.

Educators also saw the physical environment as a key contributor to parent's initial reactions to the centre, whether that reaction was positive or negative. They felt that a bright, clean and tidy space was critical, with parents valuing large open areas and connections to the outdoors. As both centres were relatively old, they felt parent's sometimes had a negative reaction about the age of the space.

> I think a lot of people look at the bright new shiny centres and we have trouble competing with that because we're an old centre. Its one thing to have happy bright qualified staff, but sometimes that's just not enough. Parents want it to look the part as well.

<u>Experiencing design: Impact of design on child development</u>

None of the participants (including educators) had previously heard a learning space termed as the 'third educator'; whilst all agreed that it was important in a child's development, most were unable to clearly articulate links between environmental factors and child learning outcomes. All saw a positive (but not strong) relationship between the physical environment and children's development, which was generally viewed as secondary to teaching quality. Parents felt that the physical environment contributed to the child's happiness and comfort, giving them a sense of being "at home" and used words such as 'light' and 'airy'. Educators emphasised how the physical environment could give children confidence, through the provision of appropriately scaled furniture and space for play. Participants were generally unable to clearly communicate the value of sustainable principles in design, such as indoor air quality, natural light and cross ventilation, with air-conditioning considered a positive and with less than half valuing the ability to open windows and gain natural cross ventilation. Three main elements of the physical environment were viewed as the key contributors to a quality physical environment: size and flexibility, inside-outside connections, and safety.

Importance of size and flexibility

Size was the primary consideration for all, with participants describing how space – and a feeling of space – was critical to quality. Concurrently, the flexibility of that space was seen as an important contributor to quality. Parents valued the look and feeling of space, whilst educators explained how the design of space can be constricting or enabling to the children. Educators described how large space gave children room to work, diluted the noise and made visual supervision easier. They emphasised that flexibility meant a room could be easily changed to keep up with children's imaginations and ensure they were not bored.

> If it's too small, they're just like little caged animals. If it is claustrophobic, it will start to affect their behaviour. You've got to have enough room for the amount of children. If the room isn't set out correctly – you need to be able to see the whole area

> When we've got 20 children – having them spread out makes it so much more room for them to build and create their things and it keeps the noise down, rather than having 20 children in one little area

Importance of inside-outside connections

All participants believed that connections between the inside-outside were extremely important and felt having a large and interesting natural outdoor space was critical for children's learning. They valued spaces that were light and airy, with large windows and connections to the outdoors – one centre had a large verandah which was utilised often and highly valued.

> I would hate to send my child to a centre where there are no trees. I think a child needs the sun and the trees. They take off their shoes so they can feel the grass and the timber and that is all learning. For a child, I think it is necessary that they have the outdoors

> Parents think it is lovely and when they go outside... it is so lovely and shady, and a big shady verandah and a lovely big fort. Parents always comment about the verandah area they say "wow that is great" and we let them know that we use it summer we use it winter, we use it rain we use it sunshine. I use it inside and outside time. It gives us so much more extra space

When questioned about how they would spend money to improve children's learning outcomes, a common response was to enhance the outdoor experience, especially providing gardens that would grow food, were colourful and scented, and incorporated wind chimes and stepping stones for exploration. Educators also desired more outdoor access, natural spaces and obstacle equipment (e.g., soft fall outside and a play fort). Interestingly, while one educator desired a natural backyard and grass, she felt that as so many children now have grass allergies that might be impractical.

Importance of safety and supervision

Safety and supervision were overarching issues associated with judgements of quality about the physical environment. At a more abstract level, educators explained how as this was children's first time away from their families, everyone needed to feel "*happy to leave mum and know that they'll be safe*

and they're capable and they'll enjoy being in this environment". Good design enabled this transition, giving children and parents a feeling of confidence and enabling educators to focus on teaching, rather than on always monitoring potential hazards. Educators commented that while safety was predominantly for the child, the physical environment needed to be safe and usable by the teachers. They emphasised windows between rooms for active and easy monitoring and the elimination of design hazards, such as stairs and cords, so the children would feel and be safe in the space.

Hub for community integration

All valued the role of the centre to facilitate positive and supportive interactions between parents and staff. Parents spoke of remaining at the centre between 10 to 30 minutes at least a couple of days a week to talk with staff and other parents, describing how they valued the exchange of information, informal learning and development of friendships with other families. Both centres had physical space that enabled these relationships to develop, with adequate space for large groups to gather and chat as well as a private office for delicate conversations.

> I think parents feel welcome and we let parents know Kindy isn't just for the child but it is for the parents as well.... we've had a breastfeeding group just here. We want parents to know that they can discuss anything with us and there's sometimes when they have to talk about something really emotional and personal and they will come and talk to us, knowing we will always keep their confidence

Educators valued this role and had all provided referral information for parents who had a particular need that the centre could not address, specifically speech therapy, dentistry, hearing tests, post-natal care, parenting programs, medicine and counselling services. Both centres had a philosophy of looking after the whole family, and there was a feeling they could play a greater role in facilitating child and family wellbeing. Educators felt that becoming a 'one stop shop' for family services had potential especially in regional areas where some parents do not have transport and might not access information themselves. There were concerns, however, about the practicalities of implementation, including how to stop centres profiting from essential services and how to keep the children's space separate from the public with a greater flow of people.

Future vision for early learning centres

Participant's had a strong and clear vision for their ideal space, uses of technology and the value of a 'building rating tool'. Critically, whilst all felt the physical environment was important and liked the idea that the architectural language and buildings of early learning in Australia could become more innovative and expressive, they emphasised that architectural merit alone is not the key to learning: *"for me…its more about the teachers and what goes on inside the building".*

The ideal physical environment

When participants were asked to imagine what the ideal learning space would look like, they frequently evoked words such as bright, open, soft, homely, friendly, inviting and colourful. Their descriptions about the key spatial qualities emphasised volume (high ceilings), area (large spaces) and light (expansive use of glass), with their words implying pockets creating areas for exploration and imagination, rather than an open, unobstructed space.

> Nice and bright and open, not necessarily square or rectangular, incorporating inside and outside. Nice soft things as well and lots of homely touches. Quiet areas where they could go off and do what ever they want in a quiet area, and noisy areas, wet areas. Having an environment that, you know, is built just for you – I mean who wouldn't want that? Lots of things to explore, interesting little nooks and shelves with interesting things on it that they can go and get things off the shelves and play. Lots of play-space, glass in the ceiling, more mirrors and light.

> I think that a big open centre that feels more like a park, with a big open grass area and trees, sort of like a kids fairy tale thing. A fun feel about it. Bright airy and inviting. More bright colours – if you walked in and it was a friendly environment. It might be best to ask a child - little girls would want it princess and boys would want superheroes. Good facilities for storage. I like the idea of a separate sleep area that's nice and dark. A television area – like their own little movie area, carpeted and soft with pillows.

When describing the interior, words such as playfulness, fun, bright, soft and attractive were utilised. Participants felt it was important that the child could represent themselves within the space through their artwork or photos, and they wanted a big blackboard kids could draw on, a roof to hang things off, and a really inviting space with cushions and bright colours. A seamless flow between the internal and external learning spaces was valued, as was flexibility and the ability to change the environment as the children changed or needed more stimulation.

> I think we should make up the space how they want it…it would have a lovely home corner set up down there with all the resources to change from week to week – one week it could be a shop, another day a hairdresser. A boat and tent area where you can go and read books – climb in to make a different world. Their imaginations can go wild.

Reactions to the images of the highly designed Japanese early learning centre were mixed, with some viewing the large size and scale as positive and others that it was just "too *big.. I'd get tired running around in this huge place*".

Role of technology

Parents and educators valued the role of technology in the early learning classroom, and while some of the educators were hesitant about its use (wanting children to predominately play outside), all saw technology as an unavoidable part of children's learning. Computer technology was seen as assisting with learning outcomes through developing fine motor skills, self-esteem and independent learning. Educators expressed a desire to see data projection, mobile computer stations (for staff and children to work together) and interactive whiteboards to assist with learning. Parents were very receptive to the

idea of an online viewing portal where they could sign in and watch what was happening during the day, but most educators had reservations about this concept.

> I personally am not comfortable with that at all – particularly for the confidentiality of the child. There could be an accident or a tantrum - something could be happening and the parents are getting a very limited view of what is going on. I think it is invasive of the children. This is a children's space – why do they want their mother and father watching them?

The potential impact of design ratings

Reactions to the possibility of integrating a voluntary star rating which quantitatively assesses the quality of the physical environment in order to assist with parent's selection of a provider, and, also as a means to increase incentive for providers to create a quality facility in a competitive market, were mixed. Half the educators felt this would be a negative thing, explaining that it would be difficult for lower socio-economic centres to meet the building design requirements yet they might have excellent teacher quality. Other objections were the need to include other measures of quality (curriculum and teacher quality and sustainability), how it would be assessed given cultural and regional differences between centres, and if it would increase competition to get children into high quality centres. Some educators thought it could be positive, explaining that it might "*force the provider's hand a bit more – there might be less options and they might have to invest in upgrading the physical environment*". Parents saw the introduction of a scale as a positive thing, explaining how they could make more informed choices – one described how she did not really know how much space, noise and light affects children until the interview and thus felt that it would be good for people to have that information. Generally, the overall conclusion was that a star rating *would* influence parent's decision on where to send their child, as long as staffing quality and the educational philosophies were also of equal quality when comparing centres of differing physical environment ratings.

Early Childhood Physical Environment Rating Scale (ECPERS) and Parent Perceptions

Table 1 illustrates the results of the EC*P*ERS audit of the two early learning facilities, which demonstrated that Centre A scored 'above average' in terms of quality of the physical environment and Centre B scored 'below average' Table 1 shows how the EC*P*ERS results for Centre A revealed the areas that could receive improvement (below a score of 2.5) were *Home Bases* (functionality and adjacency of spaces that provide functional care-giving – cubbies, eating, toileting and sleeping), *Physical Activity Areas* (spaces for physical, musical and fantasy play) and *Messy Activity Areas* (arts and crafts, water play and science/nature areas). EC*P*ERS scores showed there was adequate size, a positive scale and 'feel' to the building, and an excellent outdoor space, although there was a discrepancy in terms of indoor environmental quality (deemed adequate by participants but low quality by the EC*P*ERS). The results for Centre B revealed the areas that could receive improvement were

Image and Scale (welcoming facade), *Circulation* (traffic through the building and within the learning space), *Common Core of Shared Facilities* (administration, staff and resource spaces), *Modified Open-Plan Space* (flexible, partially enclosed spaces), *Home Bases, Quiet Activity Areas* (reading, manipulative and computer based play spaces), *Physical Activity Areas* and *Messy Activity Areas*.

*Table 1: ECPERS of two Sunshine Coast early learning environments^*

Subscales	*Centre A*	*Centre B*
Planning		
Centre Size + Modules	4.00	1.66
Building as a whole		
Image and Scale	2.83	2.16
Circulation	3.33	2.16
Common Core of Shared Facilities	2.60	1.53
Indoor Environmental Quality	2.62	2.62
Safety and Security	3.00	3.00
Children's Indoor Spaces		
Modified Open-Plan Space	2.57	2.00
Home Bases	1.66	2.00
Quiet Activity Areas	2.70	1.25
Physical Activity Areas	2.44	1.55
Messy Activity Areas	2.13	1.13
Outdoor Areas		
Play Yards (functional needs)	4.00	3.14
Location and Site	2.64	3.09
TOTAL	2.82	2.08

^Note that a rating below 2.5 means needs improvement

The ECPERS audit was consistent with reflections from the participants. Participants in Centre A gave the physical environment of their centre an average of 8.25 out of 10, citing reasons such as size of internal and external play space, the quality of the external play space, general ambience and safety; the only negative was its age and locality to a main road. Participants in Centre B gave the physical environment of their centre an average of 6.25 out of 10. They felt that the positive elements of the centre were its outdoor play space, its natural light and ventilation and safety, whilst the negative

aspects were the age of the building, *lack* of natural light and ventilation, functionality, layout and size of the learning spaces. Overall, the EC*P*ERS scale mirrored participant's perceptions that safety and outdoor play spaces were positive elements of the centres, whilst functionality, circulation and the design of the administrative spaces were the biggest challenges.

Discussion

Both educators and parents agreed that, along with staff and program quality, the physical environment of early learning centres contributed significantly to children's development and learning outcomes. In terms of ideal architectural and design characteristics, all believed that early learning centres should be 'homely', inviting, bright, linked to the outdoors and designed so the space "*welcomes the child, makes them feel safe and encourage learning".* Consistent with past research (e.g., Moore & Sugiyama, 2007; Read, 2007; Weinstein, 1987), specific characteristics of the physical environment such as space, light, colour, and materials were seen by both educators and parents as contributing to the child's enjoyment and learning in the centre. Critically, whilst all participants valued the physical designed environment, they typically had abstract and emotive responses to space and often struggled to clearly articulate the specific design features or attributes common to architectural language (such as scale, form, organization and light and air qualities) that enabled children's development and learning. Such findings highlight the importance of designers adopting a human-centred, collaborative and jargon-free approach to designing space, with the tangible examples of 'ideal space' enhancing understanding and communication between architects and educators about how best to design and reconfigure space to enhance learning outcomes.

Design implications for the idea space - design with size, nooks, light, airiness and technology

Parents and educators description of the ideal learning environment provides designers with significant insight into design priorities for the physical environment of early childhood centres. Descriptions about the key spatial qualities emphasised volume (high ceilings), area (large spaces), natural light (expansive use of glass), with their words implying pockets creating areas for exploration and imagination (e.g., tents, lower or higher ceilings, private refuge spaces), rather than an open, unobstructed space. This is in line with Moore's (1987) concept of 'modified open-plan facilities', which promotes making small and large play areas open enough for children to see out of, and yet provide a sense of privacy in their play and protection from noise and distraction. The design implications for this include a much higher value placed on aspect and orientation when first positioning a centre to maximise natural day lighting and cross ventilation, as well as increased relationship between the inside and outside, maximising openings to the transition zone. Participants spoke of creating *"fairytale*

like spaces" through design tools such as mirrors, glass ceilings to the sky, colourful walls, cushioned walls and small tent like spaces. The creation of such spaces would require an evolution in both the planning of a space – to ensure optimum flexibility and size - as well as the materials employed within the space – materials that are responsive to the touch, hard wearing and imaginative. The use of glass and the introduction of as much natural light as possible was a key theme for the indoor spaces, while lush, beautiful gardens which employed tools to engage all the children's senses was a key theme for the outdoor spaces. Educators also spoke about the importance of flexibility within the space in order to keep up with children's developmental needs, specifically the rearrangement of space to suit what the children were learning as well as fantasy play areas that could change theme, such as from home to shop to hairdresser to garage.

There was also an acknowledgment that rapidly evolving technology demands spaces that are adaptive to encourage learning through interaction and engagement with new forms of computer based learning, with this interactive technology requiring a larger space with areas for individual and quiet computer play as well as shared and potentially noisy computer play. Parents and staff participated in, and valued, an exchange of meaningful information at their centre, through formal and informal conversation. To facilitate this, future design regulation could include an emphasis on the design of large open foyers for encouraging general gathering and communication, for example hallways and the space around the entry and exit from individual rooms, could become wider to encourage greater interaction. All liked the notion of integrating services that promoted child well-being and supported families within an early learning provider, believing that such services would be valuable and useful. From a design perspective, the integration of services within early learning environments would affect both where and how centres are located, with planning needing to change to flexibly accommodate a diverse range of services while maintaining the security of the children and the privacy of those who accessed the services.

The EC*P*ERS measure used in the current study was an effective tool for assessing the quality of the physical environment of both centres, with a strong correlation between participant perceptions of each centre and the overall quality rating achieved. This suggests that while the quality criteria of the tool related to childhood development are not always immediately perceivable by a non-expert, the quality of the space can be perceived intuitively by non-expert users (parents and educators). Although participants had mixed feelings about the introduction of a star rating that assessed the quality of a centre only in terms of to the physical environment, most felt introduction of a star rating scheme via the

ECPERS could provide incentive for providers to increase the quality of their learning environments in a competitive market.

Implications and limitations

These results must be interpreted in light of the study limitations, particularly the relatively small sample size of eight participants associated with two early learning providers on the Sunshine Coast in Queensland. The results are limited to a particular cultural and economic demographic. A larger and more diverse sample group is needed to fully understand the current and future role of the physical environment in the Australian context, as well as to make explicit observations and assessments of children's interactions in different spaces. Our hope is that our findings will encourage others to more fully explore the role of the physical designed environment in early learning, with this research highlighting two key things. First, both parents and educators valued the physical environment of early learning, and parents considered it one of their top considerations when selecting an early learning provider. Second, both parents and educators struggled to articulate the relationship between the physical environment and children's learning, thus demonstrating a need for increased recognition and awareness of the impact of the physical environment on young children. As the 'third educator' in children's emotional, physical and cognitive development, the role of the physical environment cannot be underestimated. A new paradigm of design is required that puts the child in the centre of the picture, producing quality learning environments in order to meet the evolving needs of education, and increasing the potential and productivity of our future generations.

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