

Power of participation: children's learning about sustainable design through co-designing an eco-classroom

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ABSTRACT: The proposition that knowledge and skills of sustainable design can be developed in primary school children through their engagement in an on-going and real design and build project at their school is supported by the results. A major contributor is determined to be the participatory and community-focused approach that has been embedded into the project. However a number of conditional points also emerge from the data and these are discussed. Gathering data from both adult and student stakeholders has enabled a broader perspective to be gained and provided the usefulness of cross-referencing the narrative data collected. The paper concludes with tentative encouragement for further collaborative learning projects like this with children, in the sustainable design arena.

Conference theme: Global

Keywords: children's learning, environmental architecture, participation, co-design

INTRODUCTION

Participation and community engagement are woven into the core details of the updated New Zealand school curriculum (MoE 2007:8-10), which has the vision of young people working towards "a sustainable environmental future for our country". Participation of children and young people in matters affecting them (e.g. design of their school environments) is a democratic right covered by Article 12.1 of the United Nations Convention on the Rights of the Child or CRC (UNHCHR 1989). In addition Article 29.1e of CRC states that children's education shall be directed to the development of respect for the natural environment. Research is unanimous on the benefits of children's participation in the design of their environments (e.g. Driskell 2002; Francis & Lorenzo 2002; Hart 1997; Ittus & Hart 1995), and the value of children's engagement in projects with an environmental education focus is strongly supported (e.g. Barratt & Barratt Hacking 2007; Roe 2007). Linked to this is the importance identified by research (e.g. Barratt Hacking et al. 2006) of children's input into community development. However my own observations and research (Wake 2007) indicate there is often a gap between research recommendations and practice. The purpose of this paper is to discuss selected textual evidence, from a larger case study investigating children's experience and learning as a result of participation in a real project to co-design (and co-construct) an eco-classroom at their school. The project is under the Enviroschools Programme umbrella.

1. PARTICIPATION OF CHILDREN IN THE DESIGN OF THEIR ENVIRONMENTS

1.1. Participation

The essence of participation is widely viewed as endeavouring to increase empowerment levels of marginalized peoples (Reid and Nikel 2008) although, in the twenty-year clamber to endorse the tenets of CRC, it has become almost synonymous with children. Children's participation is therefore an increasingly used term, although the concept is frequently misinterpreted. For example researchers fear its vulnerability to become misused or 'jargonized', especially in educational practices (Reid et al. 2008), and upon scrutiny, the management by adults of some participatory projects have been found to fall short of being directed at child-focused inclusivity (e.g. Dymont 2008) or to truly represent children's voice (e.g. Carlsson & Sanders 2008). One of the most well known models is Hart's (1997) 'ladder of participation' for children that was first published in 1992. It has been widely interpreted, including modification and use as a measuring tool (e.g. Driskell 2002; Shier 2001). In a recent book chapter Hart (2008) emphasised the role of the model was to represent differing degrees to which adults enable children agency of decision-making and involvement. The ladder metaphor was not intended to imply the eight levels were sequentially reached.

Driskell (2002) distributed Hart's eight categories of participation across a graph that represented increasing community interaction and collaboration (x axis) and increasing decision-making and change-affect powers (y axis). The result is a more holistic model that is espoused by the Enviroschools Programme (Mardon et al. 2005) particularly the highest participatory category of 'shared decision-making' (between children and adults).

1.2. Participatory Design Examples

Many of the myriad examples that have emerged in the literature, especially over the last ten years are landscape-situated and environmental education-based. The rationale is that on one level it is hoped that participation in such projects will increase children's current and future awareness and attachment to the environment (e.g. Dymont 2008; Reid & Nikel 2008). On a deeper level of engagement it is intended that it will increase their skills of advocacy and community engagement so that they may develop life-long environmentally responsible habits (e.g. Chawla & Cushing 2007).

There has also been a strong movement to engage children and youth in participatory city and urban planning. For example; by direct involvement in the design process (e.g. Francis & Lorenzo 2006), by contributing to mapping processes that chart how youth use cities (e.g. Berglund & Nordin 2007), or by participating in youth forums. However Freeman et al. (2003) caution that the latter needs to be well planned and managed to avoid becoming what Hart (1997) described as token or non-participatory. Francis and Lorenzo (2002) partly blame the widely acknowledged 'decline of childhood' on the way city design has corralled children into very controlled spaces (e.g. schools, playgrounds) over which they have had little control or input. Working with children and communities these authors have published a list of trends in children's participatory approaches called the 'seven realms'. The 6th is called institutionalised, represented by an approach of regarding 'children as adults' and they propose this is becoming the standard model used by institutions, e.g. national and local government offices. Mannion (2007) points out such a view is somewhat idealistic because it ignores the critical adult dimension and makes the dangerous assumption that children are like adults in thinking and behaving.

Francis & Lorenzo's 7th realm (2002:161-162) is their own-devised "participation with vision" utilising a proactive approach that includes ideas from children and adults working with professionals (e.g. designers, planners and decision-makers). Others have also written about their design experiences with children and youth, using visioning for long term planning, or design charrettes for generation of ideas (Sutton & Kemp 2006; Sanoff 2001). In addition both Iltus & Hart (1995) and Driskell (2002) have published clear, practical advice for working with youth on design projects. However while obviously intended to give voice to children and youth and improve their environments, these projects are not educationally integrated.

More recently there has been research interest in school grounds projects that are 'greening' initiatives motivated by environmental sustainability, aesthetics or encouraging physical activity. These projects are focused on eliciting student perspectives on how they might change their school, using government and non-government (NGO) programmes and competitions (e.g. Carlsson & Sanders 2008; Dymont 2008; Ghaziani 2008). Results highlight difficulties, both in project design and data collection. For example garnering true representation by children, reaching enough children, or providing real and complete projects incorporating student learning with a tangible environmental outcome.

In the United Kingdom, the Design Quality Indicator (DQI) was devised in 2002 as a mandatory participation-based design and evaluation tool for schools taking part in the Building Schools for the Future programme. In a recent critique Webb (2009) points out the long list of generically-worded and often pre-assigned statements it comprises can confuse lay-people and quell feelings of design involvement & creativity in participants. The importance of a well-trained facilitator to lead the participatory sessions is emphasised.

2. BACKGROUND TO THE PROJECT AND RESEARCH

2.1. EnviroSchools

The EnviroSchools Foundation is an NGO committed to "children and young people empowered to contribute to a sustainable world in their own unique and creative ways" (Mardon et al. 2005:10). It is open to all types and levels of schools to join and access the learning resources that form the EnviroSchools Programme. Participation and community development are foundational principles (Mardon et al. 2005) and the programme advocates a 'whole-school approach' to education for sustainability (EfS). Shallcross & Robinson (2008) evaluate this approach to be useful in EfS driven by contributory action.

2.2. Eco-classroom project

The study school is a public primary school situated in the suburbs of a New Zealand city. It has 600 enrolments aged 5-11 and its government decile rating of 10 (highest) reflects the high socio-economic neighbourhoods it draws its student body from.

For the last five years an annually changing group of students aged 9-11 years, who have selected EfS electives, have been working on a currently-being-constructed project (Fig. 1) that utilises eco-technology (i.e. minimising environmental impact by using recycled & environmentally sustainable materials and technologies). A concept plan and model was developed (Fig. 2), led by the students' research and decisions, in conjunction with the school's Environmental Education (EE) Coordinator (lead EE teacher at the school) and a local architecture firm. Detail drawings followed this year and tender documents were prepared, with help from a Project Manager (Environmental Engineer) appointed for this purpose. Students are now contributing to construction whenever possible (Fig. 3). Other school staff, parents and Board of Trustee (BoT) members have also been involved in the on-going project.



Fig 1: Eco-classroom under construction. Sept 2009

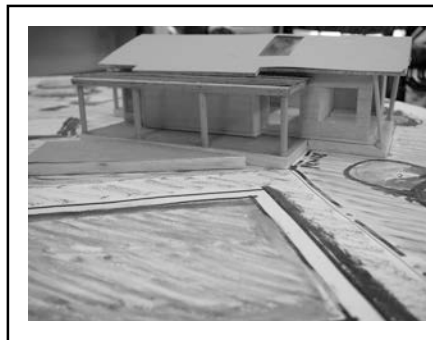


Fig 2: Eco-classroom model generated by student ideas.



Fig 3: Students making clay bricks for one wall.

2.3. Research methodology

A qualitative methodology of narrative inquiry (Clandinin 2007) was chosen, whereby participants' views or stories were collected and analysed. It was deemed particularly important to include both children's and adults' voices because of the 'shared decision-making' philosophy of this project and to enable comparison, something I have perceived as a limitation in other studies.

Stories were collected in three ways. Focus groups were held in 2008 with students (aged 9-11 years) who have been involved in a working party for the project, in 2009 interviews were conducted with key adult stakeholders (architect, project manager, school principal & lead EE teacher, Board of Trustees member and EnviroSchools facilitator) and parents completed questionnaires in 2008. All participants were asked questions about different types of student learning in the project, i.e. development of knowledge (cognitive), skills (psychomotor) and attitudes and values (affective). The terms 'children' and 'students' will be used interchangeably in this paper.

3. ANALYSIS OF RESULTS

Interviews and focus groups were recorded and transcribed. These along with the questionnaires were coded into emerging themes, as presented in Table 1.

Table 1: Selected aspects of student learning about sustainable practices in the built environment as a result of the eco-classroom project

	Emerging Theme	Example
PASSIVE	Aspects attributed to the nature of the project.	Real life context.
	Aspects brought by students to the project.	Unique sense of aesthetics & functionality.
ACTIVE	Participatory aspects fostered by the project.	Careful participant selection & facilitation of the process.
	Community connections fostered by the project.	Reciprocal gains between students and adults.
APPLIED	Knowledge & skills-based learning by students due to the project.	Principles & skills of environmental architecture.
	Attitudes & values-based learning by students due to the project.	Potential influence on future environmental decisions & career choice.

Table 1 presents one example for each emerging theme, chosen out of others identified, for their relevance to this paper. The first two themes in Table 1 are labelled 'passive', meaning that these are aspects of the project that were pre-determined by its nature. The middle two themes incorporate outcomes fostered by the 'active' relationship between participatory practice and community engagement. The final two themes focus on the resulting 'applied' learning (current and future) in terms of design and sustainable practices in the built environment. Each of these, except the last example, will now be discussed.

3.1. Real life context

A large part of the enthusiasm from participants about this project stems from it being a real project that is also firmly rooted in student learning; engaging children creatively and collaboratively in the multi-disciplinary area of environmental sustainability. All research participant groups spoke the clearly developed dialogue between students and design professionals. This shaped the building design through student ideas (creative thinking and research) followed by a tempering process to reach a final design that complied with building codes & council regulations, Ministry of Education (MoE) requirements and the project budget (achieved through fundraising). Adults were unanimously pleased students had experienced the 'realities' of financial and regulatory constraints. For example the BoT member said "They have learnt about the phases - ... teamwork, ... how you widen that out into design, ... then you have to move into a design and build approval process", while the principal highlighted "They have had to learn perseverance and an understanding of how adults work. ... there are processes that have to be gone through and ... Ministry requirements." However in the focus groups students did not give attention to this, indicating their experience was cushioned by the adults' roles, especially that of the architect, who possibly bore the brunt of this more onerous aspect.

Concurring with Mannion's (2007) call for greater consideration of the role and voice of adults in children's participatory projects, it is important to signal some of the dilemmas faced by the architect in his role as the design professional ultimately responsible for the built structure. He was positioned between encouraging the students and having to dash some of their ideas; promoting sustainability and different philosophies versus a building design that was fail-proof and would get MoE approval. This is reflected in his words:

I feel like a bit of a party-pooper in some ways ... having to say that these are great ideas but we can't actually achieve all of the things ... at times I didn't enjoy that tempering process. ... All those things [MoE, codes, costs] which means it has gone from something which might've been more creative, more colourful ... more fun. And it's all come back to a building which people would recognise as a building perhaps. ... we've got something really rectilinear ... that's what I don't like, it's an adult building in a way.

In contrast students didn't perceive this negatively. For example someone said "Whenever we asked if we could have something like ... a fish pond ... he didn't just go oh no sorry you can't have that because it's just not happening. He came back with a different idea."

3.2. Unique sense of aesthetics and functionality

It is widely acknowledged that children bring a different aesthetic and functionality perspective to the design arena that is likely to result in a more usable product for them (e.g. Iltus & Hart 1995; Sutton & Kemp 2006). In this project there was widespread agreement by adults about this, for example the architect said "The students' input has been ... a broad range of ideas. Definitely things an adult wouldn't think of ...", while the BoT member enthused "The concept of the kids' participation added a truck load of important outcomes to the project that adults wouldn't have seen. Not just the learning but the building functionality ...". The students, who clearly believed they had something unique and beneficial to offer the project, corroborated this. For example one said "... the kids are the ones thinking

of all the ideas, there aren't just adults", while another felt that "we think it's a lot more creative if ... kids have designed it...".

3.3. Careful participant selection & facilitation of the process

A widely acknowledged aspect by all research participant groups was the importance of having the right adults involved, especially the skills and enthusiasm of the Lead EE teacher as facilitator, and the architect as designer. The BoT member widened this out to include the selection of the students to be part of the working party, emphasising their high motivation. He also credited the devolved management style of the principal that supports and enables this kind of project to flourish when a teacher has a particular interest or specialty. Frequent praise was given towards the architect's attitude; as the principal explained "the architect and his team, they very much treat the children as clients." The students agreed. For example someone said "... we're actually lucky to have [the teacher] because she's really helped us run this ... I mean we're only kids but she's helped us to get things", and another enthused that "[the architect] actually takes time with us to include the features we want".

3.4. Reciprocal gains between students and adults

The project has required a high number of volunteer hours but the data collected clearly indicated that everyone involved felt the gains outweighed the costs. For example the project manager said "I have gained an insight into the value of [environmentally] sustainable education and working with young people ..." while the BoT member proposed "It's highly innovative ... it not just the kids, it's all of us [that] are learning". The teacher expressed appreciation for the expertise of professionals from the community, saying "these people that we work with are really important. It's not a school topic. ... There are people ... that study this ... coming in to talk to us, so it's giving meaning and reinforcing value [to students] that this is actually a real project". Students all agreed, variously acknowledging "it's fun but we've probably all of us learnt heaps", "[the architect's] knowledge saves time" and "he's donating quite a lot of time and ... he's a professional".

Parents also gave generously with time and skills to the project but it was potentially the architect who was most financially compromised by his input. He balanced the different aspects of his input in the following way:

I absolutely love it. ... I come back from the classroom and think this is the best thing I do. ... The enthusiasm and liveliness of the kids is just wonderful. ... The disadvantages from our point of view is that it is not an economic proposition ... more than half of the time we are putting into the project is volunteer. ... We are doing it because ... educating people ... and the green environment is really important to us. ... And we have all gained a lot on a personal level. And I think that other clients can see what we are doing... What this is about isn't the project in itself so much, it's actually about what's happening to those students.

3.5. Principles & skills of environmental architecture

All research participants felt students had developed a grounding of knowledge and experience in environmental architecture, which the architect expressed as "... what I see as the value of this project. So with any [building] project in the future the environmental aspect will be fundamental to them". The research data collected included mention of low impact and low energy design, ecological footprints, building orientation, choice of materials and development of a more integrated approach to designing an indoor-outdoor living space. As a major & tangible part of the project this clearly had everyone's attention and enthusiasm. This included parents who listed their children's experiences for example as "using clay for bricks" and "... choice of products which affect the environment e.g. water tanks, solar panels"). Also students who said for example "it's a building that's environmentally friendly and it's got a smaller carbon footprint ...", "I learnt lots of skills ... like evaluating and green star ratings ..." and "we're also using some grey water".

Far from being regarded as a project that will end once constructed, students have designed the eco-classroom to be dynamic. As the teacher explains "the children always thought of it as a living monitoring place that they can learn from continually and that other schools can come into ... It is also a really good way to get the community involved". Students have named it the 'Living Room' and as a student explains "... we're hoping to monitor the weather and how we can live sustainably". As a result different insulation materials were chosen (wine bottles & pumice as well as traditional polystyrene) to be laid under different parts of the concrete floor (dark coloured for heat-absorbency and partly recycled), with viewing windows & measuring equipment to enable comparison.

During the focus groups students talked confidently about material choices such as "different woods that don't rot, without chemical treatment". According to the teacher:

... they had to work through the process of which one [product] would best suit our project. Also ... their choices when services haven't been available, like waste management... When the children thought someone would do the right thing, but they found there wasn't... They haven't compromised sustainability in any way though. ... but they can make choices within sustainability like the timber they have chosen.

As a result Cupressus macrocarpa was chosen for framing because it does not require chemical treatment, and a pallet fire was determined to be more efficient than a heat pump for inside, especially when backed by a heat-storing clay brick wall (WWF 2009).

CONCLUSION

The oft-thought question regarding participation is as follows. Are children being expected to shoulder more responsibility and (sometimes) power than is able to be usefully channeled into either productive learning or design outputs that improve their lives? Skeptics of the practicality of genuine and useful participatory processes with children in different arenas, including design, are possibly as numerous as advocates. However the preliminary results of this research, as presented here, show that this project has been effective in promoting student learning about sustainable design. Based on the data analysis used (coding for emerging themes followed by subsequent interpretation) it is clear that the dynamic relationship between the participatory practices employed and the strong community input were pivotal in engendering this. The collection of data from both students and adults in this research has resulted in a rich array of perspectives across the spectrum of the project. For example when students in the focus groups were asked what had been the best part of the project they unanimously replied it was because it was “kid-run” (student-led). Triangulating from this the architect said “I think the fact that they are taken seriously and they are actually driving the process ... is really important to them ... and they enjoy that”, and the teacher commented “it’s hard to keep them informed all the time. But we have to work really hard to do that... Student led is the absolute key to the whole project”.

The research also highlighted some important conditions and some contradictions that need to be considered in any similar projects in the future. One condition was the choice of professionals that related very positively to children and were committed to a more holistic outcome than just a built structure. Another was having a supportive pedagogical and education management style. These played an essential part in this project. As the architect said “You are actually building something into those students, and not the building itself, which has got a future and a very important future”. In addition, agreeing with Webb (2009), it was clear that the role of the facilitator was critical. Contradictions centred on the architect’s sense that his role frequently involved ‘pouring cold water on student ideas’, compared to the students’ perceptions. Also his slight disappointment that the resulting design was not as ‘child-imaginative’ as hoped. This is not what the students felt, nor the Enviroschools facilitator who implied that the design was unique to the students’ input when she said “I think if adults had taken over ... we would’ve got another adult building...”.

In the review of this paper it was suggested that current participatory models in EfS are flawed due to the scientific and fact-driven nature of issues in sustainable architecture, which always advantages adults’ input over children’s. While to some degree this is incontrovertible I would argue that the decisions and choices made by the students in this project were not only about facts and data, but also about social issues (e.g. how to construct while minimising loss of their playing fields) and balancing trade-offs (e.g. the losses & gains from removing a tree to build). There was also a great deal of learning involved through conducting scientific tests to help with their decision-making about factual matters. In the spirit of the architect’s words, any design or building project at a school that does not engage students in a learning process focused on sustainability, is a wasted opportunity. To conclude, the following quotes from Mannion (2007:417) about partnership participation captures the spirit and success of this project well. He emphasised the need to acknowledge “... children’s lives are co-constructed by the actions of key adults”, and the importance of developing “... improved relations between children and adults and a key context: space and place”.

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