Designing playful and inclusive spaces

Nicola Bould and Charles Bezerra
University of Otago, New Zealand
nicola.bould@design.otago.ac.nz
charles.bezerra@design.otago.ac.nz

Abstract

Play is one of the greatest learning tools that a child may experience; yet standard public outdoor modular playgrounds exclude all but able-bodied children. The needs of children and supervising adults are the same whatever their level of ability in terms of accessibility, social interaction and safety.

Since March 2004 this inclusive design philosophy has been used as an innovative educational tool and a realistic full year project for design students at the University of Otago, in New Zealand.

This project is part of a deeper research on designing playful and inclusive spaces. Inspired by the work of Jean Piaget and Lev Vygotsky, several issues concerning social play behaviour and cognitive development are currently being investigated. The goal is to develop a planning methodology for designing playgrounds that are accessible, stimulating and adventurous for all children.

1. Introduction

It has been said that knowing how to play is one of the greatest gifts of life. According to Piaget, play is far from being a meaningless activity, “play can only be conceived as the pursuit of specific ends”[1].

Play is almost synonymous with life in the early formative years of childhood, rated second to the most basic needs of being nourished, protected and loved. It is the basic ingredient of physical, intellectual, social and emotional growth, and therefore, extremely important to individuals and to society. It is through play that we learn who we are and what we will become.

The need for playful activities are the same for everyone, whatever their level of ability in terms of accessibility, social interaction and safety.

The 2001 disability survey shows that one in five

New Zealanders have a disability (physical, sensory, psychiatric, neurological, intellectual etc). With such a high ratio it is surprising when people with disabilities encounter issues with accessibility and social attitudes in their everyday lives [2]. If we consider industrial design we commonly see products that are manufactured to focus on the 5th to the 95th percentile, ignoring the other 10%. The biggest challenge is to design for those who are individual and naturally different to ensure they benefit from user experiences.

A good example of society excluding disabling children or adults with disabilities are outdoor public play areas, which are intended to be the hub of a community, to encourage interaction and inclusivity. The Office of the Deputy Prime Minister in the UK states that to build relationships and neighbourhood networks, children with disabilities and their families need to be enabled to access play spaces. It is here where new community alliances can be forged and inclusive play spaces become the “seedbeds from which sustainable and inclusive communities grow”[3].

This paper investigates the questions surrounding play spaces, from the psychology of play and cognitive learning to the perceived risk and injury rate of play. Secondly, it explains the theories of inclusive design and explores the abilities of children with disabilities. Thirdly, it questions the inclusivity of existing play equipment and discusses new technology, which leads to investigating the opportunities and challenges of integrating a real life project with tertiary student education. Finally, it examines how inclusive design can enhance play for children with disabilities and how modification of the design process can produce inclusive and inspirational playground solutions.

2. The psychology of play

The act of play can be described as a multi-sensory experience that can be anything from active, passive,

solitary, independent, assisted, social, exploratory, educational, imaginative or just for fun. As a child most of us know how to do this but as we age somehow the joy dies and “reality sets our course to things much more grim. Yet a small fire may glow on, deep inside, and occasionally flicker up. In a moment we are young again, we laugh and the world looks brighter”[4]. As George Bernard Shaw says “We don't stop playing because we grow old; we grow old because we stop playing”[5].

2.1. Physical effects

The US surgeon general reports that running, skipping and walking are vital for children's development because “it is during childhood and adolescence that a person's bones experience the most growth. Researchers have found exercise before puberty offers the maximum benefits with regard to bone density and strength”[5].

“Movement is not only essential for nerve net development and thought, but also for heart and lung development to support brain function”[6].

The Centre for Disease Control states “physical activity decreases blood pressure in those with borderline hypertension and both increases fitness and decreases the degree of overweight in obese children”[5].

Outdoor play spaces encourage children to participate in energetic physical activities. As children vigorously move, oxygen is taken to the muscles, which increases cardiovascular health and muscle growth. The numbers of capillaries in the brain are increased resulting in superior absorption of nutrients and eradication of waste products. Children's motor skills from locomotor (travelling) non-locomotor (stationary) and manipulative (object-control) skills are built up through play. Aerobic endurance improves with physical activities, as does muscular strength. The heart, lungs and other vital organs are stimulated to grow stronger.

Activities that are often found in a play space, such as swinging, sliding or climbing provide an abundance of benefits for children. Swinging and sliding increase coordination and promote balance, whilst a child climbing up a slide will require planning, will develop problem-solving skills and improve their balance as they dodge sliding children and try not to fall off. Climbing provides an abundance of development, from boosting cardiovascular flow through raising arms above the shoulders, increasing and maintaining flexibility through stretching and building general body strength. Overall it also improves coordination [5].

In addition to these physical benefits there is current research in Canada which “has discovered that

the most active young people are the least likely to smoke!”[5].

2.2 Cognitive effects

Lev Vygotsky believed that social interaction is integral for child development. He distinguishes the capabilities of children, what tasks a child can do alone, what are beyond their abilities and what can be performed with the help of a more capable peer or adult. The latter being the ‘zone of proximal development’. This scaffolding can be seen in social situations where an individual with more advanced skills can help a younger, less experienced or less able child to develop play, language or cognitive skills by elaborating or expanding on the child's behaviour. He also suggests a child will always behave as if he or she were older and more knowledgeable than their years whilst engaging in play activities [7].

Major work on hypothesizing children's development has also been conducted by Jean Piaget, who argues that children's behaviour depends upon their cognitive structures. He argues that the way children perceive and think about the world changes as they gain experiences. As children mature they move through identifiable phases and their behaviour and its changes allow deduction as to their causes. This leads to the conclusion “that children play (or behave) in certain kinds of ways because that kind of behaviour is determined by the structure of the thinking or cognitive processes of the child”[8].

A key stage for children's cognitive development is between the ages of two to five as at this age they learn to process information and expand it into creativity. Children who interact and play will accelerate this process because they learn from each other's imaginations [6].

2.3 Social and cultural effects

The major works of fundamental themes of most developmental theories, including those of Baldwin, Erikson, Freud and Piaget are social relationships with close partners. Suomi and colleagues dramatically demonstrate that social relationships with peers are essential for a child's development in an experiment involving Rhesus monkeys. The experiment compared peer-deprived monkeys to monkeys living in a social environment to prove the need for peer relationships. “Peer-deprived monkeys rarely engaged in playful interactions, were highly aggressive and seemed to lack social skills necessary for appropriate interactions with monkeys of similar ages. Although one can ask whether the effects would be of a similar magnitude

with human babies (since human infants may be able to adapt to a wider range of environmental variations), such findings nevertheless suggest that peer relations are critical for children's development"[9].

It can be said that play and physical activity is related to higher self-esteem (the value the child places on herself) and self-concept (the understanding the child has of herself). Physical activity not only offers young children independence, muscle control and good hand-eye coordination, it also enhances children's feelings of effectiveness. It contributes to an overall sense of well being through improving body image and mood whilst also having a positive impact on moral reasoning. For some children, being physically skilled can increase popularity with their peers, even among pre-schoolers.

The social and emotional field can be explored through game planning. "Laying down the ground rules helps children understand the necessity for rules. Reworking the rules as needed helps children acquire flexibility in their thinking, developing problem-solving skills and take the perspective of others (which is a vital social skill). Children who learn to make up and organise their own games learn to avoid conflict - and when it can't be avoided resolve it"[5].

Different values and skills are learnt when children are brought up in different countries with different cultures, which leads to a huge variety in children's behaviours. With an influx of multi-cultural citizens with different perspectives and goals we are exposing today's children to different cultures at an early age. They are growing with an open-mindedness, curiosity and tolerance that was not obvious thirty years ago. In such a culturally diverse society it is not hard to envisage the next generation of children who are perfectly at ease living in numerous worlds, with numerous cultures and numerous languages.

3. Safety versus risk

It is understood that play is an important part of healthy development of children and playground equipment serves as one tool with respect to that development. Upon the realisation that children have injuries in playgrounds, numerous studies were carried out in various countries, which lead to the introduction of safety equipment. Impact absorbing surfaces, equipment entrapment avoidance, height restrictions, guardrails and changes in materials used in the design and construction of equipment were some of the issues covered. These changes led to the introduction of standards in Britain, Europe, Australia and the United States.

3.1 Current safety regulations

The current safety standards for New Zealand were released in July 2004. Some city councils had a knee-jerk reaction to them, for example, Dunedin City Council removed every round-a-bout (merry-go-round) from play areas in the city, possibly for fear of injury, death or prosecution. The standards are open to interpretation, as the rest of the country had the same documents but most other councils did not regard the round-a-bout to be excessively dangerous. This poses questions as to the clarity of the standards.

3.2 Risk

Risk can be broken down into two categories: perceived and real. One of these can be designed into play spaces and the other can be designed out. Designing in perceived risk can mean designing equipment that appears to be risky to a child but actually meets safety regulations.

Dr. Morrongiello from the University of Guelph, Canada believes that we know a surprisingly small amount about what children perceive as risk. She has discovered, however, that if a child benefited from (real) risk taking activities he or she would endorse greater risk taking [10]. This could potentially result in increased confidence and higher self-esteem. So should the design of play spaces need to take into account that children need to take real risks?

Safety gear adds an interesting factor to play equipment and the amount of risk involved. After studies involving children, their parents and a lot of safety gear it was discovered that parents believe their children are less likely to have an injury, therefore they allow their children to do more risk taking [11].

3.3 Injury prevention

The challenge to increase children's play and increase safety seems to be in conflict and perhaps incompatible. In the UK this debate has been heightened due to suggestions from the health and safety executive that expensive safety modifications have minimal effect and are not cost effective in terms of reducing injury episodes to children [12]. Studies and reports on surfacing, height of falls and equipment discuss the variety of materials available and possibilities of injury.

People know that injury resulting from play is all part of the learning experience of a child. However, a suitable balance is required between the levels of risk children face in outdoor public play spaces and the potential costs of injury, whether that is legal, social or personal.

There is a tendency to be over-protective towards children and even more so towards children with disabilities, who tend to be no less robust than most children. Children with impairments have exactly the same desires as their able-bodied peers and may be more frustrated, therefore having stronger drives to succeed. It is important to expose all children to risks and challenges, allowing them to explore their capabilities and to stretch themselves to develop to their fullest potential. Are we becoming a society that is too scared of lawsuits to allow children to explore, learn and have some fun? If we develop a play space that removes all levels of risk are we disabling our children from learning and developing in our society? Will children try and find this risk elsewhere? Maybe designing in controlled risk will keep the more exploratory children away from the real dangers such as rubbish dumps or railway lines?

4. Inclusive Design

Inclusive design is defined as the design of products, information and environments that can be used by all people to the greatest extent possible. It is all about maximizing the benefits for the 100th percentile individual and not just 5th-95th percentiles. Inclusive design is not age or ability bias. It involves a wide range of users in research, planning and development and does not assume preferences and needs. Information is a right and not a privilege; so inclusive design ensures that people know what is on offer so they can make their own choices.

Design practitioners benefit from seeing illustrations of successful, inclusive solutions to common problems, which in turn increases motivation to designing inclusively.

The Design Council in the UK deem that it is in the approach to designing that designers address the needs of the individual, of the minority groups and of the masses. Perhaps this will become common practice if designers begin with an ideology of inclusiveness.

5. Social exclusion

It could well be argued that inclusivity is not just missing from design but from society as a whole. Goggin and Newell suggest seven methods of integrating people with disabilities into Australian society. The fifth calls for a fundamental change in the realm of culture because Australia obsessively represents disability in terms of misfortune and disaster. "We fail to provide the diversity of cultural representation we need if the cultural citizenship of people with disabilities is to be realised"[2].

Over the past few years there has been a shift in

thinking regarding people with disabilities. The move has been away from the medical model of disability, which emphasizes changing the person to fit the environment to the social model of disabilities, which emphasizes changing the environment to fit the person. Using the medical model the onus has been on the individual, whose impairments have been seen to be the cause of their problems, to resolve any barriers they face, rather than the onus being on the community, organisations and government. Defining disability using the social model is an approach in which deviations from the 'normal' standard are acknowledged and celebrated. "Barriers to disabled people are seen as being attitudinal, organisational and in the physical environment rather than being the impairment or medical condition of the individual"[13]. Therefore disability is not the main barrier to participation in society. It is often society's practices that construct the barriers. "In my head I am not disabled. I have impairments but in my head I am the same as everyone else." Blake (age19) [3].

The New Zealand bases its disability strategy on the social model of disability, thereby differentiating between 'impairments' that individuals have and 'disability', which are the barriers created by society not taking account of people's impairments[13].

The wellbeing and development of children though play is well documented, so imagine when a child is deprived of these beneficial effects because of the ignorance of society? "It is not our impairments - which are what we have - that make us disabled children. For me my impairment will always be with me and is part of me and I can live with it. It is society that makes me disabled by not letting me join in. Playgrounds are sometimes impossible, there are steps down into the sandpit and I can't get on the slide. Sometimes I get teased there. It is these things that stop me going out to play and gives me a disability." Clare (age 14) [3].

The majority of individuals have a fundamental desire to develop and sustain lasting, positive and significant relationships and attachments with others. These experiences of inclusion develop positive emotions, whilst negative experiences and the feelings of exclusion are frequently accompanied by emotions such as sadness, loneliness, jealousy, anger, shame and anxiety. Low self esteem and depression are also closely related to exclusion and rejection [14].

These detrimental effects for children or adults with disabilities must be overcome.

6. Abilities of disabilities

The 2001 disability survey reports that 11% of New

Zealand children aged 0-14 had some form of disability. This equates to 90,000 children. A breakdown of these figures shows 33% have chronic health problems, with another 33% having sensory impairments. The breakdown reported that 5%, approximately 4,600 children, had a limitation requiring the use of technical equipment such as a standing frame, wheelchair or artificial limb [15]. Such high figures could mean that a surprising amount of children are experiencing social exclusion and lacking in the development that inclusive play provides.

Potentially play can be a way of integrating groups and overcoming divisions based on physical ability. There are many diverse types of disabilities that have differing effects on children and adults. The following categories examine impairments and discuss the challenges and opportunities of each.

6.1 Physical impairments

A physical impairment means the child or adult is the user of a wheelchair, crutches, a walker, a prosthetic limb or has limited dexterity or strength. Children with any of these impairments may not be able to run around in a similar manner to an able-bodied child because they have a different set of abilities.

Play areas can often be intimidating for children with physical impairments because they do not offer a range of activities that the child can accomplish. This is an issue for children with balance, co-ordination and motor problems and those using wheelchairs. Some children may want to be taken out of their wheelchairs to fully experience the play area, whether that is joining in on group play, which could be a group swing, going down a slide, playing on a see-saw, **figure 1**, lying on a surface or pottering around and generally being included in the play area, **figure 2**.

Figure 1. Playing on a see-saw

Figure 2. Pottering around

Currently some play equipment hinders these activities, **figure 1** shows parents uncomfortably supporting their children on the see-saw, where the children are either balanced on the metal beam or precariously perched on their parents lap. **Figure 3** depicts a parent struggling to place a child in a toddler swing.

Figure 3. Playing on a swing

It is not difficult to change the thinking on the design of a swing to allow children with differing abilities to utilise them. **Figure 4** shows a simple design that allows any child to climb in or be laid in and experience swinging.

Figure 4. Accessible swing

Caregivers or parents with physical impairments have the same requirements as able-bodied parents and caregivers so why are some play spaces designed to

exclude? **Figure 5** shows the barriers into play equipment, for anyone who uses mobility devices, pushchairs or prams.

Figure 5. Creating barriers into playgrounds

6.2 Cognitive impairments

Children with cognitive delays may have difficulty in engaging in high levels of socio-dramatic play because of difficulty thinking abstractly. However these children may engage more positively through exploratory behaviour than in a direct play behaviour situation. Children with Down Syndrome benefit from balancing activities, whilst children with developmental difficulties, like autism, need play structures where they can play alone.

6.3 Communication impairments

Children with communication impairments may find it especially hard entering into or initiating play with others, explaining or commenting about their own play, or playing with the effects of words and language. It is interesting that children who speak different languages can play together although they cannot communicate verbally. Actions often speak louder than words and this can be related to children with communication impairments.

6.4 Sensory impairments

Children with visual impairments may experience problems with orientation to playgrounds and equipment. Hearing impaired children may lack language and speech skills, so could be similar to children with communication impairments. The other senses of these children will often be heightened so

they will gain an extraordinary amount from tactile and audible or visual equipment.

6.5 Medical and temporary impairments

A child with serious medical problems or illnesses may have restricted movement and may tire easily. Children with temporary impairments, such as broken limbs will have similar abilities to children with physical impairments.

6.6 Inclusivity

To maximise the abilities of children and caregivers with disabilities, playground designers need to provide the opportunities for all children to be with and learn from each other.

It has been stated that it is “unrealistic to expect all pieces of equipment or indeed all areas of a play space to be accessible to all children. It is inevitable that certain pieces of equipment will be specifically designed not to be accessible to certain groups of children, for example where age or height mean children might not cope with inbuilt risk factors. Children and families know this”[3]. Is this not just a ‘get-out-clause’ by some designers or planners? How can this promote inclusive social communities? Surely all children need to be able to access all pieces of play equipment. Then it becomes the individual’s choice as to what they *want* to play on and not what they *can* play on. Maybe the method in which they access it is different, but the ultimate goal of ‘getting to the top’, or experiencing that swinging, sliding, spinning or balancing effect can be achieved. Maybe finding abilities in disabilities will provide the key to designing inclusive play spaces. Audio, visual and tactile activities are under utilised and opportunities for children who use wheelchairs to challenge themselves are rare.

As mentioned previously young people aspire to be at least a couple of years older than they actually are and the challenge for these children has been how to access that older territory. Maybe children with disabilities aspire to be accepted in a similar way and their challenge is to access that able-bodied territory.

Our challenge, as designers is to advantage children with disabilities invisibly, therefore creating extraordinary play environments where children of all abilities can experience play together.

7. Existing concepts

The idea of inclusive play is already present in many countries throughout North America, Europe and Australasia. There are a handful of companies that

have been exploring the concept of inclusive play and what it means for children and adults with disabilities. The following are some examples of these companies and what they have been achieving.

7.1 Sensory room

The Snoezelen room was developed in Holland to improve leisure activities for people with sensory and learning disabilities. Snoezelen provides a full range of sensory stimulation and enjoyable experiences in a safe, comfortable environment. They target the primary senses with combinations of music, light, gentle vibrations, tactile sensations and aromatherapy. Exploration and exercising control away from the pressures associated with direct care and therapy are encouraged.

The Snoezelen room however, is not for outdoor use. Therefore the challenge is how to combine some aspects of the Snoezelen philosophy into the public domain where the external factors of weather, vandals and constant use are pertinent issues.

7.2 Inclusive play

The National Centre for Boundless Play in the USA has been exploring inclusive play for eight years. Their philosophy has been to create a playground where children and adults of all ages and abilities can play alongside each other.

Sutcliffe play is a UK based company who launched their inclusive play products in 1994. Their beliefs are to provide play experiences for all children in a non-segregated environment.

Wicksteed Leisure, also UK based, provide a range of inclusive equipment for children with differing abilities.

The Office of the Deputy Prime Minister in the UK offers a 'good practice guide to developing accessible play spaces'. It makes recommendations to developers with regards to developing inclusive, community play areas that can be tailored to individual settings.

Importing equipment from these inspirational companies is an expensive business for small communities. Maybe more importantly, New Zealand needs its own society to be thinking and designing inclusively.

7.3 Exclusive play

The Variety Liberty swing, proudly built for children who use wheelchairs, has been implemented in New Zealand. The good intentions of the Variety Club were to provide those children who do not often have the opportunity, to experience swinging.

Unfortunately the swing itself is so cumbersome that it is dangerous when in use, therefore it is separate to the play area and has a fence around it. Sadly it is a prime example of good intentions combined with poor understanding. It is, however, exciting that the council are realising that children with disabilities are excluded from 'average' play areas. This solution is a step in the right direction, but it does not take into account the user and what their benefits are going to be.

7.4 New technology

The escalating advancement of information and multi-media technology means that children today, commonly labelled 'Generation Y' are bred with technology on their laps, to them technology is like the wallpaper, it is ubiquitous. With regards to play this can be both beneficial and detrimental.

Telecommunications, biotechnology and new energy technologies to name but a few are advancing our world at a rapid rate.

Computer games and TV, however, are just a couple of products that are influencing children to stay indoors and become inactive, which could be related to health issues, such as obesity, and social difficulties. Karl Popper once said, "Television corrupts mankind. It is like war"[16]. He believed that children adapt if they are constantly exposed to extreme situations. This leads to concerns over the problem of their adaptation to violence because they are more exposed to violence today than ever before. Popper knew that TV, and possibly now digital games, were going to cause problems for future generations because they are more seductive, more interesting and more involving than the child's interest in their own lives [16].

Maybe there is an opportunity to take this new technology and put it to good use in the playground environment, thus encouraging the child to play outdoors, and more importantly with each other.

8. Kidz@play

During this academic year, third year design students at the University of Otago, New Zealand, will be researching, conceptualizing and prototyping designs based on inclusive play spaces. Whilst it is important to consider how competitive this project can be in terms of manufacturing, it is also important for the students not to lose sight of its aim; creating an accessible playground that is exciting, adventurous and encourages play. Whilst providing students with a practical project and interaction with users, manufacturers and local authorities, it has integrated design theory and practice with pertinent issues in psychology, inclusivity and ethnography.

The students have had workshops in working with people with disabilities, they have studied children with and without impairments at play and they understand the social model of disability.

The following ideas are some of the student's solutions to date:

A group swing, **figure 6**, can provide an abundance of play activities for children of all abilities. Not only does it encourage social interaction but also it provides a space for parents or caregivers of children with severe physical impairments to swing with their child.

Figure 6. Group swing

TraX is a concept that combines the desire for adventure and excitement with physically challenging activities. There is a bridge to slide across, **figure 7**, spinning corners, **figure 8**, a tipper platform, **figure 9** and a circular balance board (pivoted in the middle), **figure 10**. There is a section of the course that has a slalom of moguls with ropes above to provide a more challenging surface to overcome.

Figure 7. Sliding bridge

Figure 8. Spinning corners

Figure 9. Tipper platform

Figure 10. Circular balance board

The round-a-bout, **figure 11**, is an idea to allow children of all abilities to sit next to each other and play together. There is alternate seating; one space is wide enough for a wheelchair whilst the other is a seat. This encourages children who use wheelchairs to sit next to their able bodied peers. Everyone controls the speed of the round-a-bout by the central rail.

Figure 11. Round-a-bout

Other concepts include an idea for an audible/visual/tactile wall that would appeal to most children, whatever their ability. It is an idea of a low wall that can be clambered over or leaned on that is full of exciting sensory playthings.

Another concept is a tree house that has a variety of different methods of access. Including a lift operated by a hand crank, a slide that has monkey bars above it to pull or climb up on, a second slide that a child in a wheelchair can access, a cargo net and a ladder. This merges the natural environment with man-made equipment to create an area accessible to all.

An additional concept is a tunnel full of lights and sounds that are powered by the different tactile activities inside.

There is an idea for a quiet zone, an area where parents or children can have some down time. Children who have severe physical impairments can just laze around and take in the sensory stimulations next to children who have sensory impairments or able-bodied children. It is full of extruded foam to mimic grass, with an umbrella of coloured and interesting shapes and materials that daylight shines through, perfect for the imagination to run wild.

Finally, there is an idea of a three-dimensional map that will orientate users in the play area.

These are just a handful of the inclusive ideas from the group. If these concepts can be developed they

could potentially create the extraordinary play equipment that is required to stimulate children's imaginations, provide controlled risk and to encourage them to be active. It enables all children to choose what equipment they want to play on, it allows them to play together and to explore their potential and exceed their expectations.

The work so far this year is more inclusive than the student work of 2004. This proves that a deeper knowledge and appreciation of inclusivity is required to design inclusively. It demonstrates that a modification of the design process can produce inclusive and inspirational playground solutions. This project is by no means finished. It is all part of a deeper research on understanding playful and inclusive design. The ultimate goal is to develop a planning methodology for the design of play spaces that are accessible, social, stimulating and adventurous for all children.

9. Conclusions

Our children are our most important assets. They are our future. We need to ensure that we are providing these people with the most valuable education possible. We want them to grow to be social individuals who are determined, passionate and respect each other.

Play is a tool towards these goals. It provides the physical attributes necessary to build stronger more coordinated bodies and brains. Play can accelerate cognitive learning and is a way of integrating cultures and abilities to overcome social exclusion. Play spaces can be the toolbox in which these tools are found. With the right setting and the right equipment children can interact with each other and learn of their differences and similarities, abilities and strengths without pity or resentment. In this environment children can learn to value their peers.

If we get it right from the beginning we can change society and educate our future leaders to build a culture of people who can make their own choices no matter what their ability. This will then be the building block for inclusive and sustainable communities.

10. References

- [1] J. Piaget, *Play, Dreams and Imagination in Childhood*. London: Routledge & Kegan Paul Ltd, 1951.
- [2] G. Goggin and C. Newell, *Disability in Australia: Exposing a Social Apartheid*, 1st ed. Sydney: University of New South Wales Press, 2005.
- [3] K. Dunn, M. Moore, and P. Murray, "Developing Accessible Play Space: A good practice guide," Office of the Dept Prime Minister, 2003.
- [4] P. Slade, *Child Play - its importance for human development*. London: Jessica Kingsley Publishers, 1995.
- [5] R. Pica, *Your Active Child - How to boost physical, emotional and cognitive development through age-appropriate activity*. New York: The McGraw-Hill Companies, 2003.
- [6] C. Hannaford, *Smart Moves - Why learning is not all in your head*. Alexander: Great Ocean Publishers, 1995.
- [7] D. J. Sluss and A. J. Stemmle, "A Sociocultural Investigation of the Effects of Peer Interaction on Play," *Journal of research in Childhood Education*, vol. 18, pp. 293, 2004.
- [8] M. J. Ellis, *Why People Play*. New Jersey: Prentice-Hall, Inc, 1973.
- [9] J. C. Valsiner, Kevin J, *Handbook of Developmental Psychology*. London: Sage Publications, 2003.
- [10] B. Morrongiello and S. Matheis, "Determinants of children's risk taking in different social-situational contexts: The role of cognitions and emotions in predicting children's decisions," *Applied Developmental Psychology*, vol. 25, pp. 303-326, 2004.
- [11] B. Morrongiello and K. Major, "Influence of safety gear on parental perceptions of injury risk and tolerance for children's risk taking," *Injury Prevention*, vol. 8, pp. 27-31, 2002.
- [12] C. Norton, J. Nixon, and J. R. Sibert, "Playground injuries to children," *Archives of Disease in Childhood*, vol. 89, pp. 103-108, 2004.
- [13] A. Jameson, "Review of literature and research on employment and disability," presented at A & EEO Trust, Auckland, 2005.
- [14] D. Abrams, M. A. Hogg, and J. M. Marques, *Social Psychology of Social Exclusion*. East Sussex: Psychology Press, 2005.
- [15] B. Pink, "New Zealand Disability Survey Snapshot 5 (Children) - Media Release," Statistics, Ed.: Statistics New Zealand, 2001.
- [16] K. Popper, *The Lesson of this Century*. London: Routledge, 1997.