

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.



L O L O M A B O X

PROJECT

A thesis presented in partial fulfilment of the requirements  
for a Master in Design at Massey University, Wellington, New Zealand

ARNOLD DAVID , 2020

An initiative to provide a platform for young children to self organise learning and a means to recover from toxic stress

**L O L O M A B O X**

**PROJECT**

A thesis presented in partial fulfilment of the requirements  
for a Master in Design at Massey University, Wellington, New Zealand

**ARNOLD DAVID , 2020**

# ^ — ABSTRACT ^

The project titled 'Lolomabox' is an initiative to help add to interactive learning tools through a human-centred design approach for preschoolers, primarily those that face a dearth of explorative learning and creative pedagogy. The catalyst to undertaking Lolomabox Project is my witness to the practice of mechanical rote learning in early childhood education in my home country and its existence in multiple nations. The research is in partnership with Tearfund New Zealand with links to Homes of Hope in Fiji that rehabilitates young women from sexual abuse. Some women leave the rehabilitation centre with their children aged between 2- 4 years who have limited access to learning tools before formal schooling. Lolomabox is about creating engaging study aids that help children establish connections with their environment through interactive play-based learning.

The investigation into contextual research commences with studying Friedrich Frobel and his Kindergarten Gifts (interactive early learning tools), scientific studies conducted by numerous institutions on the role of parenting and trauma in childhood, and

learning about examples of effective preschool education. An experiential trip to Fiji led to the identification of learning opportunities in various cultural elements such as the Masi print that applies basic shapes to tell intricate stories.

The design output is an interactive kit inspired by the shapes of the Square, Triangle and Circle to help instigate storytelling by children. It starts with the characterisation of the three shapes in order to establish personal connections, through a comical approach to Bauhaus inspired aesthetics. The kit then aims to facilitate storytelling by children, after they draw knowledge from the introduction to the shapes, through interactive jigsaw pieces. The production of the kit uses minimal physical and linguistic elements to lend a universal approach.

The vision is to see children observe what is around them with curiosity and be able to form their thoughts into tangible expressions with play-based learning tools that are open-ended and non-conforming.



# ACKNOWLEDGEMENTS

I would like to present my heartfelt gratitude to all who have contributed to the fruition of The Lolomabox Project

I would like to present a special thanks to my :

**SUPERVISORS -**  
Mr Karl Kane and Ms Kerry Ann

**M.DES. COORDINATOR -**  
Ms Deb Cummings

**TEARFUND NEW ZEALAND**

**HOMES OF HOPE FIJI**

**MY FAMILY -**  
John, Abha and Christy David  
and my partner, Talia Rachel Zachariah

Fig 1. - Suva Bus Terminal (Pesonal Photo)

# STUDENT CONC

<b>1.0 INTRODUCTION</b>	<b>11</b>
1.1 Background	12
1.2 A Learning Deficit	13
1.3 Process Overview	14
<b>2.0 CONTENT REVIEW</b>	<b>16</b>
2.1 The First Kindergarten	18
2.2 Endless Possibilities	21
2.3 The Young Symbol Maker	22
2.4 Brain Development	26
2.4 Toxic Stress	28
2.5 Vroom - Case Study	32
2.6 The Shape Bias	34
2.7 Storytelling	35
<b>3.0 DESIGN PROCESS</b>	<b>36</b>
3.1 Methodology	36
3.2 Guiding Principles	40
3.3 Immersion	42
3.4 Masi Case Study	44
3.5 Affirmations	46
<b>4.0 LOLOMABOX PROJECT</b>	<b>48</b>
4.1 Shapes and Drama	50
4.2 Interactive Blocks	52
4.3 Explorations	55
4.4 Kit Inclusions	58
4.5 Who and How	62
<b>5.0 CONCLUSION</b>	<b>64</b>
<b>REFERENCES</b>	<b>66</b>



Fig. 2 - Personal Photo, teaching children



Fig. 2 - Personal Photo, in Anusaran

# INTRO

## 1.1 BACKGROUND

My passion for social design originates from personal experiences in social work at an early age and an aptitude for art and design that was honed with an undergraduate study in visual communication design from my native land, India. Growing up in a household of social workers who endeavour to help uplift educational standards for children, assisted in sensitising me towards the need for non-threatening, engaging and explorative learning environments for our young demographic.

For my final undergraduate project, I identified the rising trend in school dropout rates in India as my core problem area. According to the 2018 study by the Indian Ministry of Human Resource and Development, the dropout rates were as high as 33.7% at the secondary level (grade 9-10) and 10.1% in primary schooling (grade 1-5). The ministry states poverty or economic factors, impaired health, age, lack of focus and involvement in domestic chores as the main contributors to the statistic (The Indian Express). Further research proves that the world may be

going through an educational crisis. The World Bank quotes the need for young students to be able to interpret information, form opinions, be creative, communicate well, collaborate and be resilient (World Bank).

To facilitate engaging and explorative learning in elementary schools in India, I targeted the English Alphabet and proposed to incorporate them in an interactive self-initiated activity kit. I tried to challenge the Indian pedagogical status quo of rote learning existing in a majority of elementary public schools, through my argument that children need to be more actively involved in observations and explorations that are self-initiated and not overly imposed. My design proposal was supported by an experiment conducted by Dr Sugata Mitra called the 'Hole in the Wall' in 1990. Through a real-life observation of a prefabricated interactive space, he identified young preschoolers from a slum in Delhi accessing a computer, who had no prior operational knowledge of the device. Occasionally, Dr Mitra records children, who had self-learnt manoeuvres on the device, teaching their peers their newfound skills.

## INTRODUCTION

### Background

The six months long study concluded with children being adept at operating the mouse, downloading online content along with googling for help with their schoolwork (Mitra 71-81). The results also showcased children becoming more self-sufficient in directing their own learning process. To further refute the limited system of learning, I conducted workshops in schools to personally observe the general infirm points in primary classrooms. In order to formulate a visual language that will attract the young audience, I included art activities in the workshops to develop the sense of a child's perception of their gigantic and sometimes overwhelming surroundings. I was able to identify that rote learning limited the child's ability to explore beyond the confined text-heavy school books. My claims were solidified by numerous recorded encounters with children who believed that the alphabet letters only related to the correspondent words in their book. These experiences in the field supported my design journey in creating a toolkit that sought to unlearn 'A for Apple' and learn 'B for Boundless possibilities'.

The culmination of my undergraduate research titled 'Project Unlearn' was an economical schoolbag that promoted an organic format for learning the English alphabets. The child could pick any letter and explore what words were associated with the letter without being

instructed by a rulebook, through interactive play and activities. The design was directed by an illustration style that was developed with children of the target age group, which helped make it more relatable. A high level of excitement and engagement were noticeable outcomes from user testing of the study kit, along with the design laying the foundation for my motivation to provide creative solutions for social problems especially in the field of education for children.

Subsequently to my undergraduate study, I was involved with a Non-Governmental Organisation that aims to provide safe, interactive and fun learning environments for children. Here, I was responsible for campaign designs, crafts and above all, helping to transform the preschool syllabus into fun interactive lessons for children. As a graphic designer, I frequently incorporated illustrations and elements of design in my work. My work experience as a social worker and visual designer is an influential precedent to the selection of my postgraduate research question.



Fig. 3 - Ihsan, Ibrahim. *Malak*, 2017. <https://preemptivelove.org/blog/malak-the-girl-who-stole-our-hearts-in-fallujah/>

## 1.2 A LEARNING DEFICIT

Phineas Rueckert informs us of the barriers that exist for children who seek to learn in poverty-stricken conditions, in his detailed article for the Global Citizen. Some of the factors that he states strike a close resemblance to issues in my home country. The lack of learning materials and untrained teachers are some conditions that I have personally explored in my undergraduate study. However, what significantly influenced me was his point on the disparities that children face in countries that suffer conflict from war. He quotes, 'Conflict prevents governments from functioning, teachers and students often flee their homes, and continuity of learning is greatly disrupted.'

In total, 75 million children have had their education disrupted by conflict or crisis, including natural disasters that destroy schools and the environment around them' (Rueckert). On further research into the educational discrepancies across the globe, I was influenced to design a learning kit that could go to children who are left void of educational facilities and may be struggling with trauma. Taking inspiration from my previous design study, I was moved to create an educational aid that may help the child to self organise learning and also become a means to assist in healing from traumatic stress.

## INTRODUCTION

A Learning Deficit  
Process Overview

Tearfund New Zealand is an Auckland based subsidiary organisation of the global Tearfund that partners with NGOs who work for the growth and upliftment of communities under duress. I was able to connect with Tearfund before the commencement of my current project and discovered an organisation called Homes of Hope (HOH) in Suva, Fiji that Tearfund supports financially.

HOH is a facility for young women to recover from sexual abuse through rehabilitation programmes such as counseling, skill training, small business formation among other facilities that help in recovery from trauma. Some of the women come with toddlers and leave the organisation before the children are eligible for formal schooling resulting in a lack of educational resources for the child to prepare for school. HOH expressed interest in creating a study kit that could go to the mother and child when they leave the centre. My current thesis undertakes HOH as a case study and the children from the centre as my primary audience. I intend my design, however, to cater to a universal audience of preschoolers who face adverse environments in order to provide a platform for self-organisation of learning and self-expression.

### 1.3 PROCESS OVERVIEW

An observational research visit to Fiji at the start of 2020 provided me with a plethora of insights into cultural elements and contexts that have proved crucial to my project. One such finding is the word 'Coloma' that means Gift of Love in Fijian. I am particularly interested in the feeling of comfort and safety that the word evokes. I believe in helping to develop and maintain stress-free environments for children, and Lolomabox is a grassroots initiative to add to the resources that are building a better world for our children.

My research aim is to build a toolkit for a universal audience of preschoolers (3-4 years old) who face barriers to a healthy early learning environment in order to facilitate self-observation, self-learning and self-exploration.

In this practice-led design research, I have employed the human-centred design approach. The design outcome is intended for an audience of preschoolers (3-4 yrs.) who may have been exposed to toxic stress within the household or from external factors. The age group is at a crucial stage of brain development, and studies prove how adversity can be permanently damaging to a child's growth that shall be expounded in the latter sections of the thesis. The primary data was collected through qualitative methods utilising my undergraduate findings and interviews and observational studies from the visit to HOH in Suva Fiji. The creative process utilises 'Storytelling' as an overarching theme to the design. Further sections will discuss the secondary research that has supported my intention on involving children in dramatising their day-to-day experiences and how that can have a positive effect on early brain development. Storytelling to children and by children is my proposed design solution through the tangible interactive play kit. To make the kit open-ended and universal, I have utilised the Bauhaus aesthetic pillars; the three basic shapes of the Square, Triangle and Circle to help the young mind form connections from the most basic observations in the environment.

The final design output is an interactive kit with a storybook that follows a visual narrative scheme. Here the child uses his/her sensory pathways to draw connections with the shapes that are characterized as comical personalities with relevance to how the shapes interact and form complex objects in real life. The interactive puzzle pieces allow the child to organise their observations through open-ended Play with the pieces that could be stacked flat or built up into figures with chalkboard or coloured surfaces on either surface to enable the children to dramatis their observations through drawing.

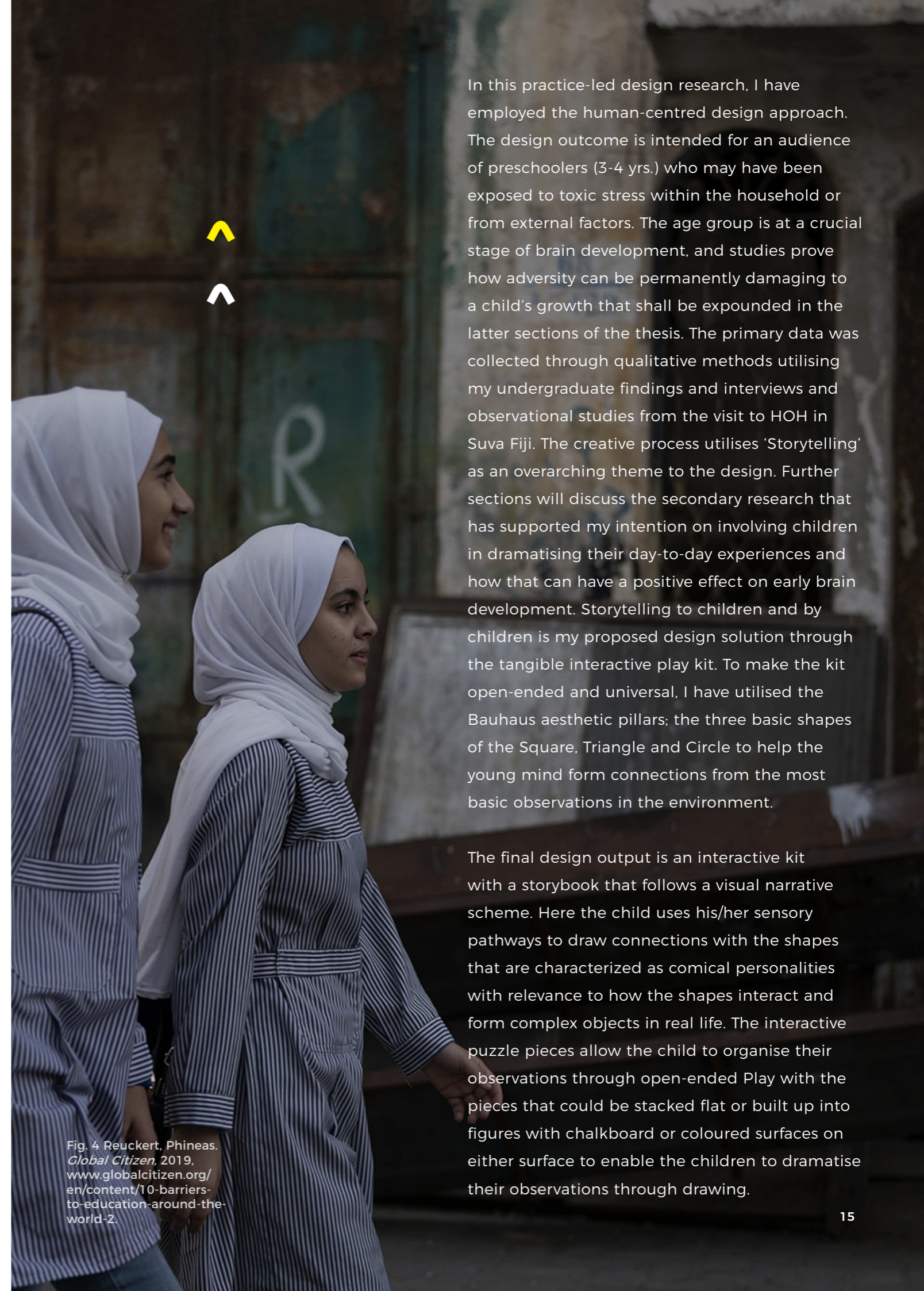


Fig. 4 Reuckert, Phineas.  
*Global Citizen*, 2019,  
[www.globalcitizen.org/en/content/10-barriers-to-education-around-the-world-2](http://www.globalcitizen.org/en/content/10-barriers-to-education-around-the-world-2).

# CONTENT

## REVIEW

The conceptual framework for the design process was guided by observations of innovative early learning practices that have revolutionary impacts in the field of education. The foundational principles of the first kindergarten establishment by Friedrich Froebel are utilised across my design journey with a focus on his open-ended play theories and emphasis on learning from the outdoors. Scholarly papers by modern-day educationists Annie Woods and Tina Bruce also attest to the efficacy of Froebelian tenets that supports the all-round development of children. Case studies of Vroom and Froebel's Gifts supported a further investigation into explorative learning with findings on learning tools that can assist in recovery from trauma through interactive educational Play.



Fig. 5 :Brosterman, Norman. *New York Kindergarten 1899*. Inventing Kindergarten. 1st ed., Harry N. Abrams, 1997, p. 42

**2.1 THE FIRST KINDERGARTEN**

“Kindergarten’s universal, perfect, alternative language of geometric form cultivated children’s innate ability to observe, reason, express, and create” (Brosterman 12).

The modern-day embarkation to education known as ‘The Kindergarten’ is the brainchild of Friedrich Froebel, German crystallographer and a revolutionary in play-based pedagogy. Froebel has a primary influence on this thesis through his theories on free play and self-organisation of learning. Raised in a Lutheran minister’s household, Froebel was inclined to preach the “Kindergarten Gospel” about the universal and fundamental language of God (Brosterman 13). Despite its radical metaphysical essence and spiritual nature, children in the early kindergarten were encouraged to explore and experiment. Brosterman, in his account on Froebel, quotes that the exuberant innate curiosity is a child’s most important asset and that it was not acknowledged until Froebel’s time.

As a teenager, Froebel recognised his talents for geometry, surveying, map drawing, and other endeavours that rely on the graphic communication of data ‘independent of language’. In his work, he consistently emphasises on the visual exploration of a

system’s underlying structure. His deeply religious aspirations contributed to his unusually fervent love for nature with which he shared a deep spiritual connection (Brosterman 16). His notions about the fundamental unity that exists between man and nature are among the foundational stones for Froebelian pedagogical ideologies.

Like Froebel, another celebrated personality in the field of early education is Johann Heinrich Pestalozzi, who also made constant connections with ‘mother nature’ in his teachings. Brosterman states about the frequency at which Pestalozzi compared the development of the mind to that of a tree. Through this analogy, it is encouraged to make gradual additions to a child’s knowledge like a tree that grows incrementally from a single seed. In the early 19th century, Pestalozzi emphasised on the role of an educational facilitator within an elementary classroom whose role was primarily accorded to women, as the emblem for nurturing children and an apparent human manifestation of mother nature (Brosterman 20).



Fig. 6 :Brosterman, Norman. *Froebel Gifts Inventing Kindergarten*. 1st ed., Harry N. Abrams, 1997, p. 42

It is essential to note the Pestalozzian theories that still guide today’s kindergarten teaching infrastructure and has guided this research as well.

4. The trust and love manifested between a mother and child are foundational for ethical and moral education (Brosterman 21).

1. Learning needs to be meaningful and be self-generated. Pestalozzi refutes the methods of rote memorisation and mechanical drills.
2. The fundamental source of all learning is ‘Perception’ that is developed by means of number, form and language.
3. Physical activity that progresses from simple to complex movements must be included in daily coursework.

## CONTENT REVIEW

### The First Kindergarten

Brosterman's account supports the idea that both Froebel and Pestalozzi believed in organic pedagogy styles that promoted interactive objects being used in classes and the reduction of the primacy of books. Tools of perception, such as fruits and stones, were used to develop distinct mathematical techniques of grouping and separating. It is also crucial to note that Pestalozzi was first to introduce singing into the primary school curriculum as an aid to moral education (21). Froebel's iconic 'Gifts', one of which were the play blocks, paved the way for the development of interactive, open-ended toys that are extensively used today to teach complex ideas through free Play with the tools. He recognised a child's innate ability to make connections and comparisons through analogies. The 20 Gifts comprised of forms, shapes, puzzles that sparked self-activity among children, and each gift was meant to be a catalyst in understanding a complex idea. Through Brosterman's example of the First Gift - A stringed ball, it is deduced that Froebel intended on teaching children about the general expression of every independent object. 'Perfect in form, the ball or sphere, was the practical expression of stability and the material expression of motion'. His second gift, which is considered to be the most profound of all led Froebel to theorize that learning is only accomplished by comparison (Brosterman 46). Froebel's law of opposites is solidified through

this gift that comprises of a cylinder, sphere and a cube. Froebel's remarkable contribution to the area of self-initiated learning through free play tools provided me with insights on exploring 'Play' as a means to recover from early childhood trauma and promote healthy brain development.

Froebel's initiatives to teach through nature and his accounts of nature led geometrical and mathematical experiments provided me with an impetus to study the importance of outdoor Play in my initial research process. It led me to brainstorm in the direction where nature and free Play are a means of sustainable early learning. In my nascent explorations, I inquired into play activities that can be conducted in the outdoors with a trusted facilitator. Froebel's tenets of Physical Movement, creation through Free Play and learning in a Plastic Fashion were guiding principles for my initial study. On further investigation, I was prompted to focus on the term "Open Ended Learning" that is spoken of throughout the Froebelian style of pedagogy. Designing a sustainable kit with tools that promote open-ended learning with endless possible outcomes that could also be self-initiated was my first hypothetical aim for the creative output.

## CONTENT REVIEW

### Endless Possibilities

## 2.2 ENDLESS POSSIBILITIES

**"In planning for endless possibilities, we do not ask what it is but what it could be"(Woods 11).**

In her study about planning endless learning possibilities for children, Annie woods proposes many socio constructivist perspectives into considering children as the protagonists and adults as catalysts in a learning activity. This approach is widely adopted by Reggio Emilia (student-centred educational philosophy) followers and New Zealand early learning systems. Woods' investigation leads to the observation that the child is seen as a leader learning independently. She further observes that a child has a distinct voice, autonomy and competence, and can learn within environments that afford an infinite number of possibilities (Woods 2). Through practice-led experiments, Annie Woods also identifies the critical role that practitioners and the learning environment play. Woods states that the learning environment can act as a conduit of learning for the child where planning for the context of learning has a directly proportional effect on planning for endless possibilities. According to Woods, practitioners need to believe in the infinite possibilities and encourage children to explore them with accessible open-ended resources, the facilitation of secure relationships; following the children's interests and extended periods of free Play (Woods 11).

In connection with Froebel's principles, Woods' studies on infinite possibilities also affirm that open-ended learning resources carry the potential to form infinite representations. She argues that resources that have limited uses and possibilities will limit and narrow children's thinking further limiting the possibilities for "Symbolic Learning"(Woods 11). The Lolomabox is essentially guided by the Froebel's free play concept and the Endless possibilities that arise from it as supported by Woods. The following section on symbol making provides another guiding pillar for this thesis that endorses storytelling as a means for self-expression.

## 2.3 THE YOUNG SYMBOL MAKER

Woods' analysis from her study on free-play with endless possibilities led me to discover another Froebelian principle of 'symbol making' that is, directly and indirectly, taught in today's elementary classroom. From arranging, identifying and comparing play tools to drawing simple caricatures, an effective kindergarten would encourage children to associate what they perceive with relatable symbols; as propagated by Froebelian pedagogy. Prof. Tina Bruce, a highly respected academic and theorist in the field of play-based learning, elucidates this principle in her Froebel inspired observations. Bruce claims that Froebel's kindergarten philosophy is of lasting value and is a navigational tool for the modern era's preschool.

Bruce is a strong proponent of the idea that a child needs to be a 'Symbol User' and a 'Symbol Maker'. According to Bruce, a symbol is something that stands for and represents something else. A child needs to be able to pretend and make connections from what they already know to learn something new. For example, when apple is considered as a sweet-tasting round symbol that grows on trees, the child could form associations and infer that an orange grows on a tree as well (Bruce 10).

Through his early learning experiences with nature, Froebel concluded that a child needs to grow as a 'whole' person because of which many activities with real plants and trees were conducted in the first kindergarten. Bruce argues that this concept of interconnected experiences is less valued today. She proposes, through an analogy of an apple in a fruit and vegetable lesson, that children should be given a holistic experience of the taught subject. While learning about an apple, children could be taken to incursions where they witness other phenomena like bees, cross-pollination, the weather and also be able to share observations with their peers by sharing or even working on a basic apple recipe. Through this example, which shows just a few of the possibilities through which children learn to be whole people, the importance of unity of experience, which is interconnected is understood (Bruce 8). Lolomabox seeks to apply this principle by creating a learning tool that is unrestrictive and allows the child to use cognitive and motor skills along with abstract thinking, that allows for forming interconnections between perceptions.

Fig. 7 :Brosterman, Norman. *Early Kindergarten. Inventing Kindergarten*. 1st ed., Harry N. Abrams, 1997, p. 42

"Once a child is free from being rooted in the present, and can go back and forward in time, the symbolic life takes off"(Bruce 9).

Bruce further expands about a 'symbolic life' stating that it burgeons as children begin to walk, talk and 'pretend'. By realising that you can walk around a chair, but only parallel to the wall, children are sensitised towards straight lines and round movements. Bruce suggests that the involvement of adults who have creative aptitudes is vital as children depend on them to learn about participation in their culture (10). Inspired by Froebel, Bruce uses the Froebel gifts to inform about symbol making for a young child. The second gift teaches children about the law of opposites for which they need to form connections from prior experiences with the first gift, which is a sphere. The wooden blocks are another example of Froebelian tools that encourage learning about linking and building, making connections through free-play.

'Free Flow Play' as coined by Froebel, is believed to orchestrate holistic learning and which today is an integrated mechanism. Bruce details in 12 features that are central to Play:

1. Children draw upon first-hand experiences. The richer their experiences, thoughts, feelings, relationships and their physical bodies, the richer the Play can be.
2. Play shows what children understand about rules. When they play, the children can make their own rules as they are in control.

3. Children find props or make them when they play, which lend themselves to the development of imagination and creativity.
4. Play cannot be forced upon children. Play needs the right circumstances, conditions and atmosphere.
5. Play is an escape from the here and now. Children can transform the past and shape the future to their liking, experiment with situations, rearrange, reflect, create alternatives, feel healthier and equipped and deal with things differently.
6. Children pretend when they play, to be the character that they make up.
7. Play is about interconnection and reflection.
8. Children often mirror and imitate each other as they play.
9. Children develop their own play agenda; sometimes playing alone and sometimes in parallel companionship. Co-operative Play requires them to be sensitive to the needs, thoughts and feelings of other players.
10. Children play well when they are deeply involved in it. Focus and concentration in play are one of the hallmarks and predictors of successful future learning in the school system.
11. Play can lead to the application of knowledge. Development and learning come together, resulting in technical competence and skills.
12. Play predicts the future inner life of a child and encourages adult creativity, problem-solving and imagination, and dispositions conducive to the development of future learning (14).

'Wholesome' learning may be an appropriate term to summarise Froebel's initiatives and its analysis by today's theorists as expanded above. Children learn from free play, which depends on several external factors, most importantly trusted adult supervision and care. Philosophies and systems inspired by play-based pedagogy like Reggio Emilia and the Montessori school are gaining further recognition today in many countries. The world-renowned early learning curriculum of New Zealand is a relevant example of impactful learning through philosophies of and learning as a 'whole'. The Ministry of Education, New Zealand Government, in the Te Whāriki (Early Childhood Curriculum), enthuses socio-cultural theorising and Māori thinking through four principles that resonate with Froebel. First is empowerment by giving the child agency and enhancing their mana. Holistic development is the second principle with a

focus on cognitive (hinengaro), physical (tinana), emotional (whatumanawa), spiritual (wairua), and social and cultural dimensions. Family and community are considered vital, and finally, the curriculum and pedagogy recognise that children learn through responsive and reciprocal relationships with people, places and things (MOE 60). In sharp contrast to such advanced pedagogy, communities in some countries are unable to provide for basic learning facilities. Rueckert elaborates on factors that can be responsible such as poverty, gender bias, security, war, and household trauma, among others. In my research, I was led to consider the effects of early childhood stress in brain development and a holistic learning experience.

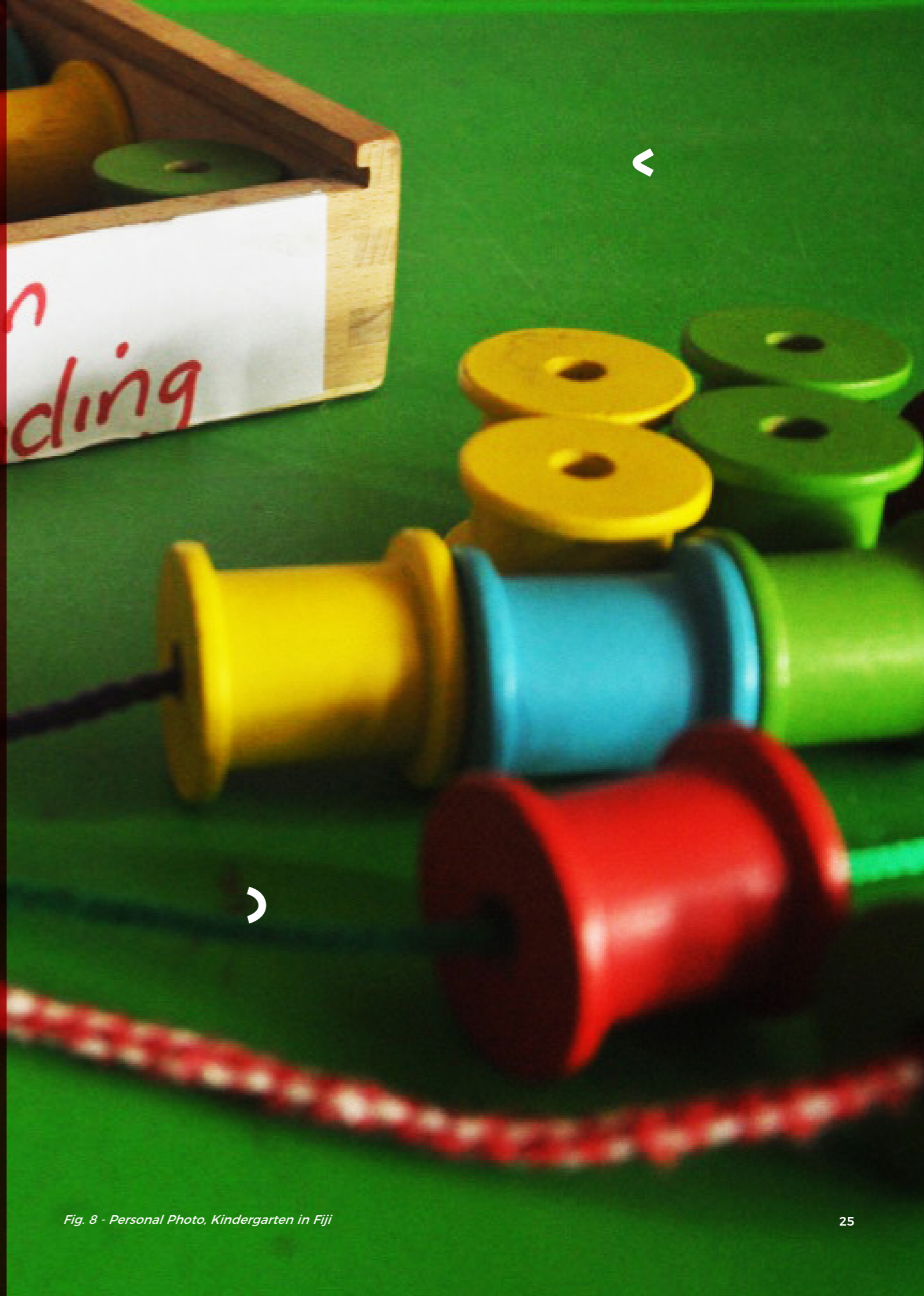


Fig. 8 - Personal Photo, Kindergarten in Fiji

## CONTENT REVIEW

### Brain Development

#### 2.4 BRAIN DEVELOPMENT

“The science of early brain development can inform investments in early childhood. These basic concepts, established over decades of neuroscience and behavioural research, help illustrate why child development—particularly from birth to early years—is a foundation for a prosperous and sustainable society”(Centre on the Developing Child at Harvard University)

Ministry of Education New Zealand, in their latest report on the early childhood curriculum, describe preschoolers characteristics and learning capacities.

1. Toddlers are active, curious and seeking to make sense of the world. They enjoy testing limits, causes and effects as they develop and refine their working theories.
2. Toddlers communicate both verbally and non-verbally and are developing both receptive and productive language skills.
3. Toddlers are learning to self-regulate, amidst feelings that are sometimes intense and unpredictable.
4. Toddlers participate and learn through observation, exploration and social interaction. They take increasing leadership in cultural practices and everyday routines and activities (MOE 14).

The National Centre on Birth Defects and Developmental Disabilities in the USA, in their empirical data on parenting, elucidates the existence of developmental milestones. They mention skills such as naming colours, showing affection, hopping on one foot, are examples of developmental milestones. Children reach milestones in how they play, learn, speak, behave and move (CDC). The Centre for Disease Control (CDC) encourages healthy interactions with family at this stage of development that will shape their personality and ways of living. Some parenting tips proposed by CDC are to continue to read with children, encourage Play with peers, be clear and consistent with disciplining the child, give a limited number of simple choices and help in problem-solving. Center on the Developing Child at Harvard University acknowledges Bottoms Up approach to brain development. The science-based study suggests that early experiences would determine either a sturdy or a fragile foundation for all of the learning.



Fig. 9- Personal Photo, Kindergarten in Fiji

In the first few years of life, more than 1 million new neural connections are formed every second. After this period of rapid proliferation, connections are reduced through a process called pruning, so that brain circuits become more efficient. Sensory pathways like those for essential vision and hearing are the first to develop, followed by language skills and higher cognitive functions. However, in the case of compromised household environments, the basic principles of neuroscience indicate that early preventive intervention should be effective in producing more favourable outcomes than remediation later in life. For children experiencing toxic stress, specialised early care is needed to target the cause of the stress and protect the child from its consequences (Centre

on the Developing Child at Harvard University). Studying about childhood trauma is foundational to Lolomabox as most of the target audience may arise from challenging situations.

## 2.5 TOXIC STRESS

Early childhood studies conducted by Harvard University conclude that the brain is most flexible or 'plastic', early which accommodates a wide range of environmental experiences and interactions. The emotional and physical health, social skills and cognitive-linguistic capacities that emerge in the early years are all critical prerequisites for success in school and later in the workplace and community. Research from the university coins the term 'Toxic Stress'. Early Traumatic experiences can damage developing brain architecture leading to life-long problems in learning, behaviour and physical and mental health. Scientists now know that chronic, unrelenting stress in early childhood, caused by extreme poverty. Repeated abuse, or severe maternal depression, for example, can be toxic to the developing brain. Research shows that later interventions are likely to be less successful. An example quoted by the team at Harvard is of children who experiences neglect but were placed in foster care families before the age of two, their IQs increased substantially, and their brain activity and attachment relationships were more likely to develop naturally.

Children develop in an environment of relationships that begin in the home and include extended family members, early care and education providers, and members of the

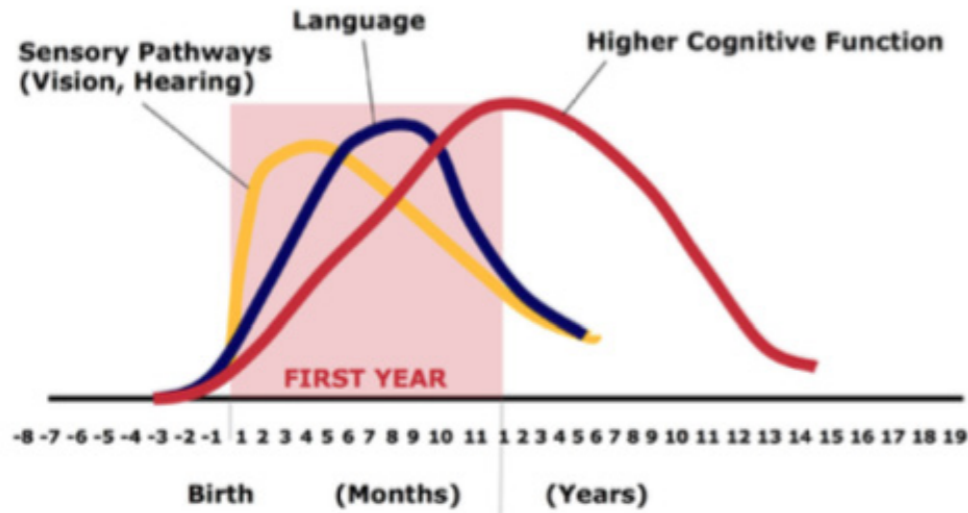
community(Center on the Developing Child at Harvard University). The children need to be emotionally secure; this security comes from the parents and the environment around them. They need time and space to form strong attachments within the setting which will occur at a quicker rate when the children witness their parents at ease and who are eager to form positive, respectful relationships with their child (Woods 25). In her advice to practitioners in the education field, Woods suggests that every child needs to be perceived as competent, which will empower the children to have a voice (39). Early theorists also acknowledge the importance of parental affection in early childhood. Rousseau caused a revolution in childcare by encouraging mothers to breastfeed their babies, rather than giving them to a wet nurse. Jane Austen's mother was typical at this as readings prove that her children were breastfed until they became mobile, and then they lived with their foster parents in the village until they could walk, talk and were toilet trained, post which they returned home (Bruce 19). Froebel also argues that home, kindergarten and community should be closely connected in Harmony (Bruce 53).



Fig. 10 Reuckert, Phineas. *Global Citizen*, 2019. [www.globalcitizen.org/en/content/10-barriers-to-education-around-the-world-2](http://www.globalcitizen.org/en/content/10-barriers-to-education-around-the-world-2).

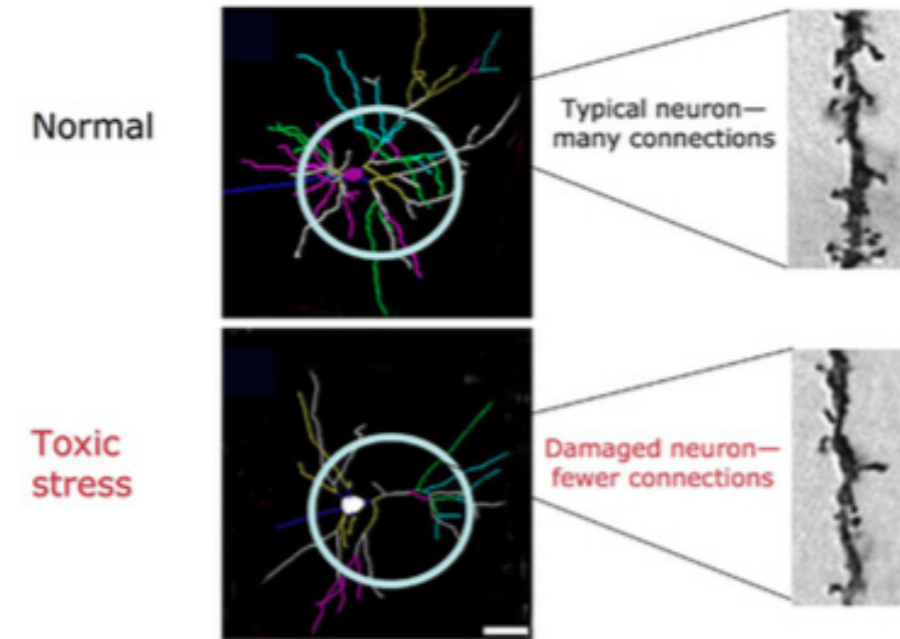
### Human Brain Development

Neural Connections for Different Functions Develop Sequentially



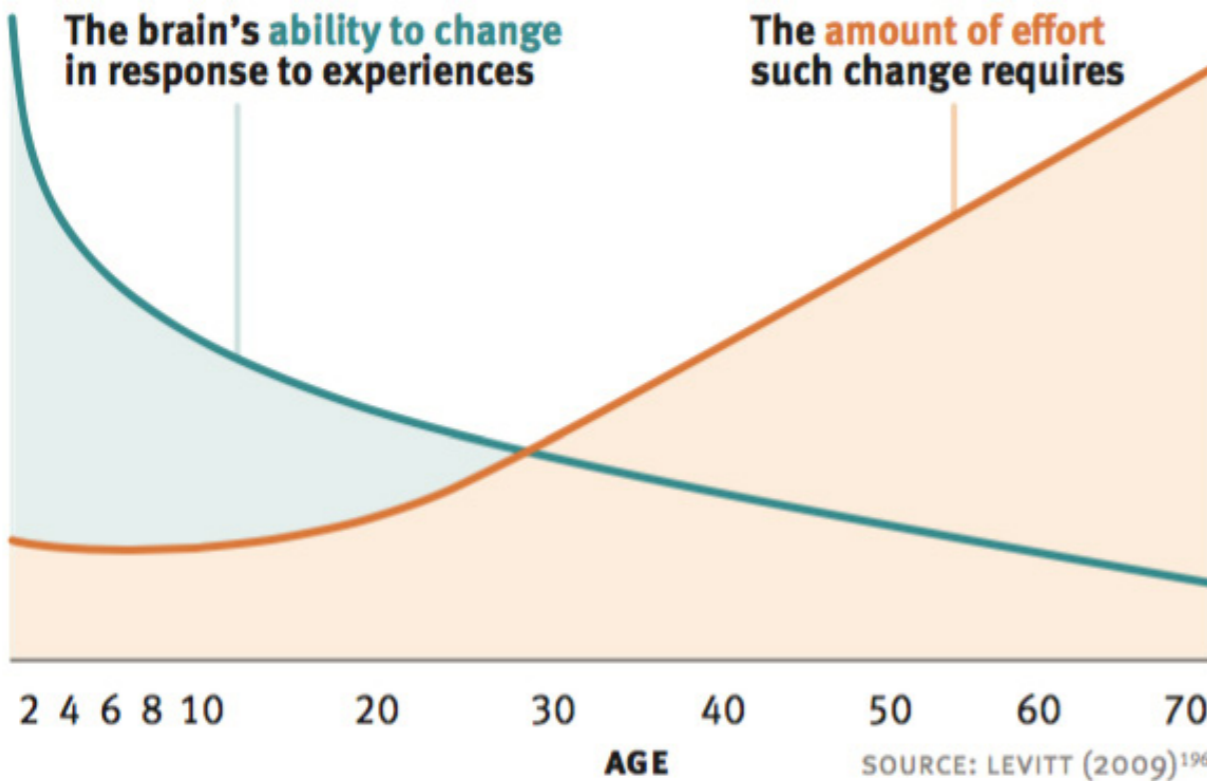
Source: C.A. Nelson (2000)

### Persistent Stress Changes Brain Architecture



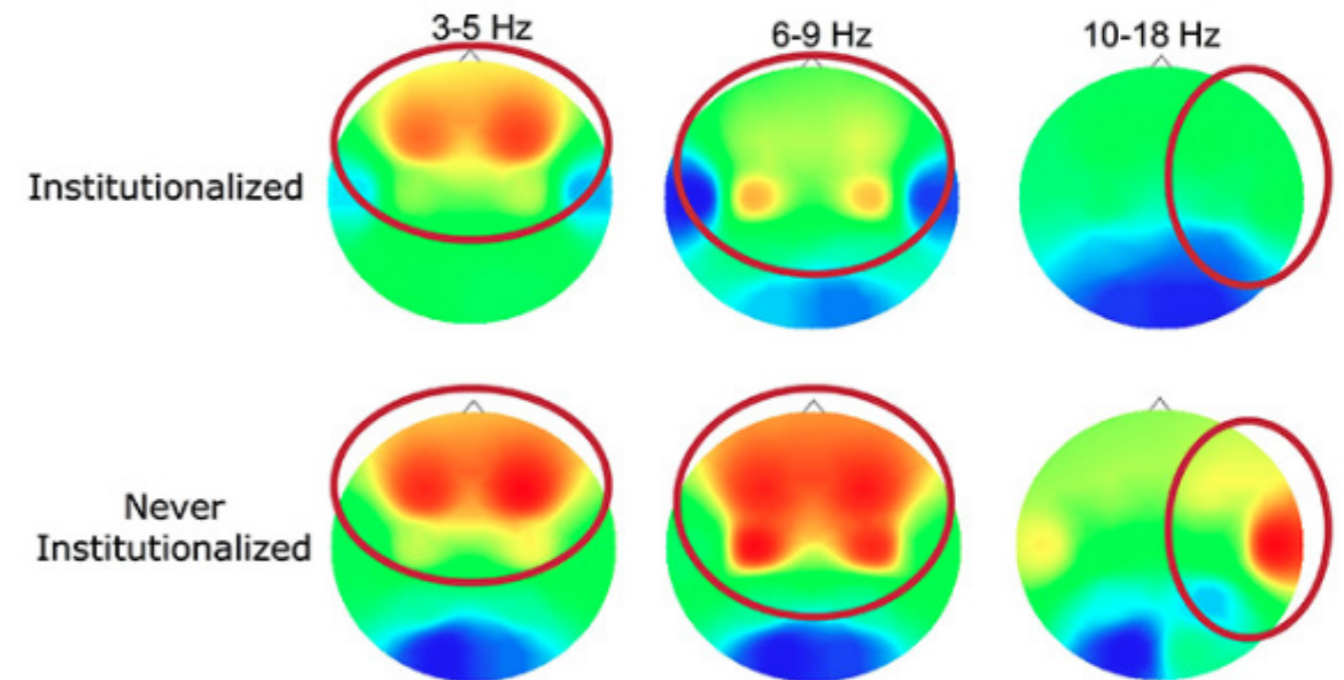
Prefrontal Cortex and Hippocampus

Sources: Radley et al. (2004)  
Book et al. (2005)



SOURCE: LEVITT (2009)<sup>196</sup>

### Extreme Neglect Diminishes Brain Power



Graphs: Harvard University Study on Impact of Toxic Stress  
<https://developingchild.harvard.edu/resources/inbrief-the-impact-of-early-adversity-on-childrens-development/>

## 2.5 VROOM - CASE STUDY

Vroom, a modern-day case study is an excellent example of how meaningful interactions and loving relationships between a trusted adult and a young child, can have positive effects on the development of the brain in early childhood.

After extensive interviews with parents, child development experts, and pediatricians around the country, the IDEO.org team developed a large-scale messaging campaign celebrating everyday moments as learning opportunities. Whether sitting in the Laundromat or shopping at the supermarket, the fundamental message was that taking advantage of the many chances to engage with a child strengthens the foundation of that child's brain development. The Bezos Family Foundation built upon the design team's key insights further developed them, and in the spring of 2014, launched Vroom. Vroom advocates for the time parents do have and using it in different ways to help build their kids' brains (IDEO 70).

The IDEO.org team undertook a highly immersive Inspiration phase, visiting low-income communities in California, New York, and Pennsylvania to conduct interviews with parents and to observe existing programs aimed at improving child development outcomes. The team learned that many of the parents they

met had very tough upbringings. These parents did not feel fully equipped to engage with their children because their own parents may not have engaged with them. One of the most successful programs the team witnessed during their research was one in which nurses went into people's homes for several hours each week to play with the children in front of the parents. By modelling play, they were able to affect behaviour change and shift the parent-child dynamic (IDEO 71).

Vroom is based on five principles that start with encouraging the parent to "Look" at what the child finds fascinating. Then let the child lead the way, and the parent may "Follow" by responding to the child's actions, words, sounds and ideas. The next step would be to talk out loud and "Chat" to engage in a mutual conversation. "Take turns" initiating back and forth interactions. Furthermore, finally, Vroom recommends to "Stretch" the moment of learning by asking follow-up questions that expand the child's thinking.



Fig. 11 Vroom, 2019, [www.brainbuildingoregon.com/project/vroom/](http://www.brainbuildingoregon.com/project/vroom/)

## CONTENT REVIEW

The Shape Bias

### 2.6 SHAPE BIAS

In addition to providing a nurturing relational experience with an adult practitioner, a successful kindergarten also uses learning tools to engage a child in play-based learning in order to appreciate curiosity and encourage exploration and expression. The history accounts for toys as play tools have existed from olden times; however, Froebel opened the window to learning from toys that were as basic as a wooden cube, now popularly used as play blocks across preschools. The open-ended geometrical blocks allowed the early kindergarten children to self-organise activities with the tools. "Perceptual Similarities" were conceived while playing with the blocks. Playing with simple geometric forms allowed for a non-linear relation between the process and the product, which led to endless explorations and derivations of new meanings.

Through a series of four experiments conducted by early learning theorists Barbara Landau, Linda Smith and Susan Jones, in learning about the importance of shape in early lexical learning; they concluded that Shape bias is detrimental to language learning. The dimensions examined were shape, size and texture. In four experiments, subjects were asked either to extend a novel count noun to new instances or, in a nonword classification task, to put together objects that

go together. The subjects were two-year-olds, 3-year-olds, and adults. The results of all four experiments indicate that all weight 'Shape' more heavily than they do size or texture (299).

An interactive toolkit by Wendy Bowkett provides insight into the dynamic learning that can arise from learning with geometric shapes. Bowkett reasons that shapes can be free and easy like doodling, or concrete and particular like classical Euclidean geometry; shapes exist in everything we see. Bowkett identifies each shape with a personality of its own referring to a circle as evoking a sense of belonging and security(23), a triangle as being edgy and sharp (34) and a square representing a stable form (42). Numerous learning opportunities can arise from interactions with shapes such as analytical learning of counting, stacking or subtracting, cognitive and motor skills development by understanding the forms of each shape and how they exist in the outside world. Lolomabox can provide such an opportunity to learn from shapes and through storytelling, be able to assimilate and express learning's.

## CONTENT REVIEW

Storytelling

### 2.7 STORYTELLING

**"When children play in a crowded classroom of 20-25 students...their play needs to be seen again, heard again, on a pretend stage, transposed into a story in their own words"(Paley 45).**

Renowned early childhood educationist Vivian Paley describes her journey as a teacher to that of an ongoing narrative that, in fact, a child's own discovery of an ongoing narrative. Paley shares her excitement of discovering 'dramatic play' occurring when children would re-enact what they learnt and recommends that one should take advantage of the storytelling abilities of young children, almost from birth on. The children must be encouraged to express their own narrative (46).

Many researchers argue that story reading can have a significant impact on literacy success later in life. Children frequently exposed to story readings are more likely to use complex sentences, have increased literal and inferential comprehension skills, gain greater story concept development, increase letter and symbol recognition, and develop positive attitudes about reading. As much as story reading is essential, storytelling also has a remarkable influence on the development of young children. When a story is read, the primary reference for communication

is the text, as fixed upon the page. In a storytelling event, the words are not memorised but are recreated through spontaneous, energetic performance, assisted by audience participation and interaction. Storytelling involves more extensive brain functions by using visual imagination (Rebecca et al. 158). Another study by Priscilla Myers found that the children and storyteller enjoyed and interacted more during storytelling rather than story reading. However, both are essential for holistic lexical, cognitive and social growth as proven by research in the field. In addition to story reading, which is a traditional activity in early childhood programs, storytelling would assist in children in expanding story comprehension, oral retelling, and recognising the elements of a story (Rebecca et al. 162).

In a system where otherwise children would be expected to memorise information, storytelling provides a platform to engage in information and express freely. These factors could be essential in recovery from trauma as supported by studies from Harvard University. Lolomabox relies on Storytelling as an essential component of the experience and ethos of the design.

DISCOVER

INGREDIENTS

# DESIGN NATURE

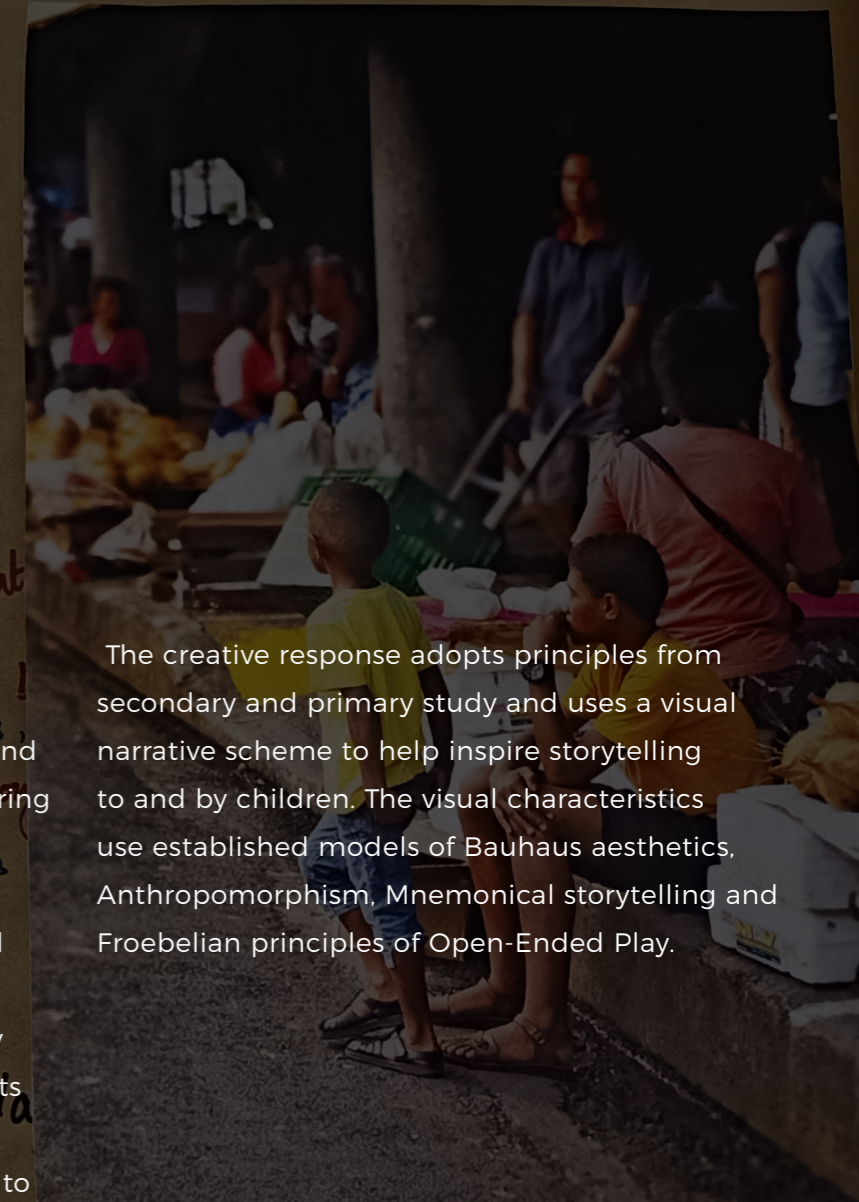
## PROCESS

### 3.1 METHODOLOGY

Through the Human-centred design approach in my research, I employed methods to study first the generic learning capacity of a child at the age of 3 to 5 years old from findings in universal case studies. Here I investigated into the different stages of brain development in toddlers (3-5 years of age) which led me to decide on a universal language for my design output because of the generic behavioural milestones of cognitive development that are expected from this age group. Since my target audience is the young demographic from economically and socially difficult backgrounds, I explored the challenges that exist to the healthy brain development of children from such communities which informed me of the life-transforming effects of trauma in early childhood. The methodology was structured



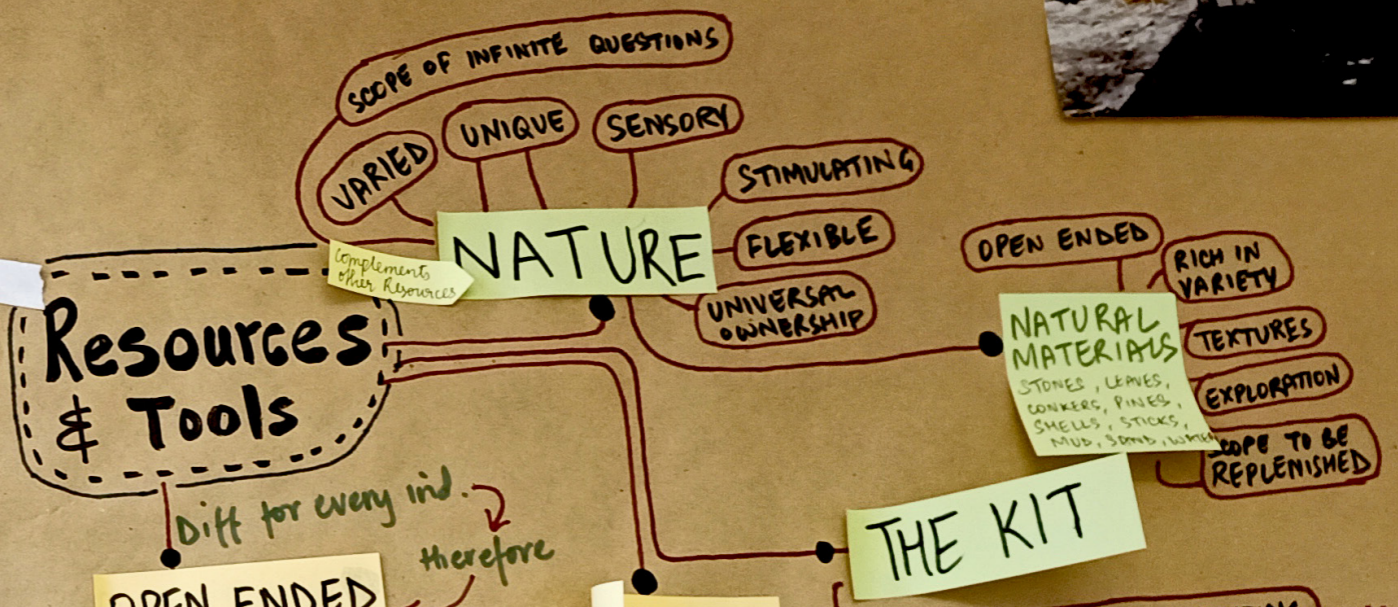
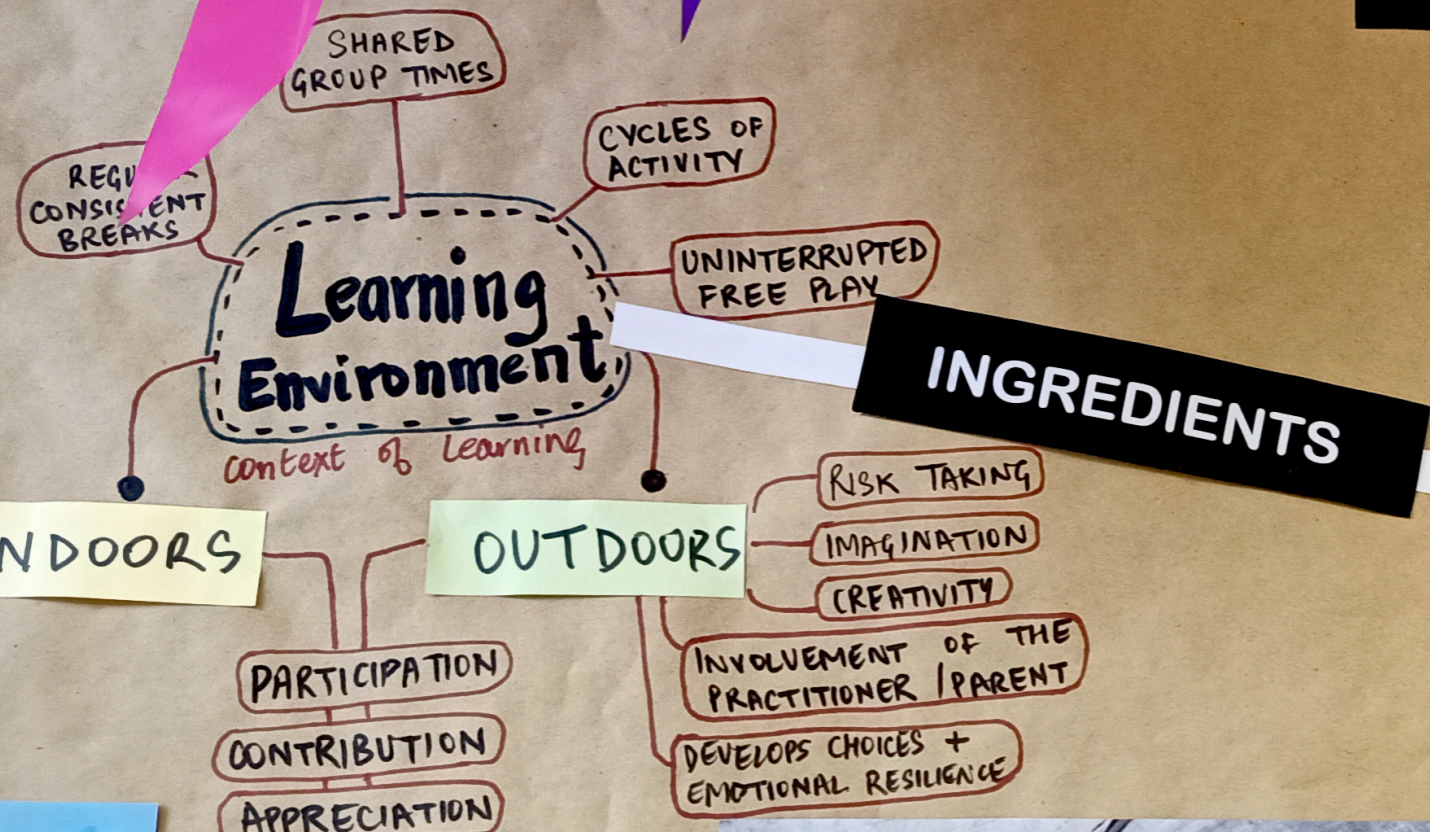
Fig 12. Personal explorations



The creative response adopts principles from secondary and primary study and uses a visual narrative scheme to help inspire storytelling to and by children. The visual characteristics use established models of Bauhaus aesthetics, Anthropomorphism, Mnemonical storytelling and Froebelian principles of Open-Ended Play.



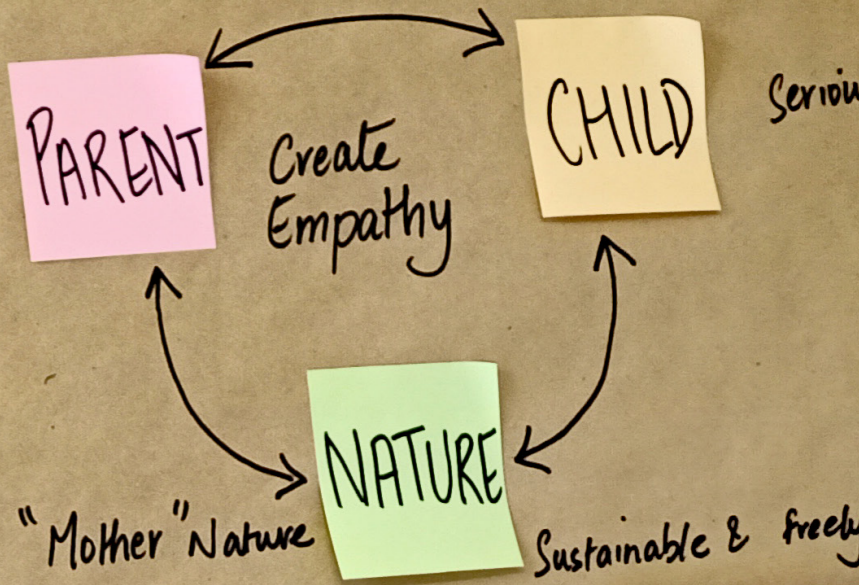
# DISCOVER



**OPEN ENDED**  
potential to become an infinite range of representations

**CHILDREN'S INTERESTS**  
are catalysts to endless possibilities

**ASK BIG QUESTIONS**  
uncertain or many answers



LOCATED WITHIN THE BOUNDARIES OF THEIR EXPERIENCES

## TARGET - FIJI

...orts that went in to ... and Education ... child to focus on his ...

Leone Cabenatabua: Ref's Red Card Call Was Wrong Admits Judiciary 2020-01-27

Leone Cabenatabua: 5 Key Points From Hamilton 2020-01-27

Editorial: Let's Continue To Pray For Australia 2020-01-07

... teachers were ... got free tuition.

... \$2.8 million has been allocated to subsidise ... and ECCE centres.

... CE centres have also been given a cash boost of ...

... e if the same momentum fails to continue to ...

... nvironment, through the free tuition scheme,

... programme for the 2018-2019 financial year.

... y and secondary school teachers in rural and ...

... gh a \$21.6 million allocation to ensure that ...

... phical location is include in national

... us fare assistance scheme (\$25 million), free ...

... l schools (\$1.36 million), Special needs ...

... tion Loans Scheme (TELS) (Increase by ...

... t Scheme (\$43.8 million) in ...

... ed online and it will increase.

stages, rolled out over a number of years. If it's implemented here it will take a big chunk of the Budget and frankly, it may not be sustainable in the long term given the size of our economy.

Sustainability is a subject of discussion in New Zealand right now because once, NZ had free university tuition. Because of the ballooning cost it had to stop it. TELS seems to be the way to go because the students are required to pay back what they borrow. It is based on the belief that graduates will qualify, get a job and repay their loan.

The worry is if they fail to graduate and they can't get a job after university. The loans and interest will accumulate.

In the current education revolution it is important that all stakeholders are on the same page. While the teachers are sorting out their grievances over the reforms against the Ministry of Education through the Employment Court, it is important that we must innovate to make our education system relevant.

Technological progress has made some of the ways we do things out of date. The teaching methods inevitably have to change to keep students interested and focused. A lot of information taught by teachers and lecturers can be easily accessed on internet. So the way we teach would have to be modified to make it interesting.

With more schools now exposing their students to internet, teaching will become more interactive. Students will become more analytical in their research projects. This is the way to the future and we need to adapt to the changing education landscape. The Government has made considerable progress in setting up the infrastructure. Students in all schools, especially those in rural and maritime areas must have access to internet as part of this revolution. They need proper computer labs where they can learn information technology and online learning and research.

have. He gives examples of empathy, communication, collaboration, things that robots won't be able to do.

Some call such skills as "soft skills" or "human" skills. Do our young people know how to work collaboratively?

Do they know how to empathise with others? Do they know how to evaluate different situations and contexts?

We need to extend their ability to imagine, dream and think outside the square. There are many examples of new products, services and technology that started with someone, thinking outside of the square, working hard and dreaming big. Are we encouraging our young children to do that? Do we ask them what their passions are and then give them the freedom and skills to make them realise those passions?

nemani.delabatiki@fjjsun.com.fj

Social Problem Areas.

Fig 13. : Personal explorations

## CASE STUDIES



## DESIGN PROCESS

### Guiding Principles

#### 3.2 GUIDING PRINCIPLES

Self-learning and recovery from trauma for young children are two impacts that I envision to create through this research. An array of theories, studies, experiments and philosophies were referred to derive the two fundamental principles that guide the design process.

1. **Open-Ended Learning**
2. **Symbol Making**

Inspired by Froebelian theories, I seek to actualise open-ended learning by creating a learning tool that allows for self-organisation and endless possibilities as outcomes from the interaction with the design. A major inspiration is the Wooden Blocks by Froebel that prove to be one of the most sustainable learning resources in today's kindergarten. In my proposed design, I hope for the child to use the tools in their self-designed fashion and not be heavily directed. Learning from the effects of storytelling, I was compelled to design facilitatory means to initiate symbol making, dramatisation and expression through drawing and free play by children. From the prior experience of my undergraduate study into interactive learning and my work experience as a drawing teacher, I have witnessed the increased level of engagement a child has with dramatised drawings that exaggerate simple forms. Using a visual narrative scheme, I seek to

tell stories to children that inform them of the interconnections that simple shapes can have around us and then allow them to express their observations of the shapes around them through drawing and play with the block inspired puzzle pieces. The Design Ethos relies on children actively expressing and be initiators of learning.



Fig. 14- Personal Photo, Kindergarten in Fiji

## DESIGN PROCESS

### Immersion

### 3.3 IMMERSION

Working with a socially motivated organisation, Anusaran that works for the upliftment of less privileged communities in India provided me with substantial empirical support for my research in early learning deficits in India. In this thesis, I made a conscious choice to link with an organisation that seeks to provide healthy learning avenues for children in traumatic conditions. Tearfund New Zealand kindly agreed to partner with me in my endeavour to design a socially relevant design solution. Homes of Hope in Suva, Fiji is a rehabilitation centre financially supported by Tearfund NZ. This thesis is undertaken with Homes of Hope as a case study to examine learning environments in households that suffer trauma and to test the design outcome with the children that attend Homes of Hope (HOH). It is the only organisation in the south pacific that provides restoration facilities and long-term care for girls, women and children who are victims of forced sex. The rehabilitation programme, ranging from four to five years, encompasses rescue and restoration, prevention and reintegration, and training and empowerment. Some of the victims are young mothers with toddlers that attend an educational facility within the campus. When the young mother is reintroduced to society, she and the child often lack learning tools to support continuous education. The design offering

through this research will be given as a gift to the mother and child leaving HOH. It is meant to help the child to continue to observe, experience and express learning.



Fig. 15- Personal photo : Fijian Kindergarten

I was able to travel to Fiji early this year (2020) to conduct an observational trip on the ground. An interview with the heads of the kindergarten at HOH led to a deeper understanding of the Fijian cultural context. Conversation with Ms. Tauranga and Ms. Eta resulted in the following observations:

- Fiji is a community-oriented nation with individuals sharing accountable relational connections with close and extended family members. The households usually function on a joint family system. In most cases, the child is never left unattended at home. There would be some adult babysitting the child in case the parent was at work, or a widespread phenomenon is to send the child to a Day-care

which is more prevalent amongst the middle and upper-middle strata.

- Fijian formal education is compulsory for all children. Formal learning in schools starts at the age of Five to Six. However, the pedagogy relies on rote learning and heavily textual material with limited interactive aspects.

- There is a need for explorative tools to be a catalyst for holistic learning. Currently, the dependence on academic approaches hinders confident expression by children.

## DESIGN PROCESS

### Masi - Case Study

#### 3.4 MASI - CASE STUDY

I was able to identify numerous parallels between India and Fiji because of the cultural bond that the two nations share. The socio-cultural sphere was surprisingly very relatable that gave me the ability to correlate this thesis with the inputs I had gained in my earlier research in India. However, on a cultural excursion in Suva, I encountered a myriad of Fiji specific practices that I never experienced before.

The visual language of Masi, an artform of dye printing on Tapa cloth, caught my eye because of its relevance to the literature of this study. The idea behind the art is to tell stories through geometric symbols that usually involve the whole family in creating an ornamental Masi piece. Masi satisfies the method of symbolic learning within a secure household environment.

From interaction with local craftsmen, I deduced that Masi was supposed to capture the essence of God from the Chief of a clan. The production only happens in two Fijian islands that are Vatulele and Ian Islands. The pigment of the dye conveys meaning in that brown denotes status, and Black is reserved for Chiefs. Masi production is yet another example of the Fijian communal essence where everyone learns to share at an early age. The women of the house perform the printing on Tapa where the

men procure the Mulberry bark and other raw materials. The motifs are often quite distinct, demonstrating incredibly ornate geometric and abstract patterns (Fulmer 7). The example of Masi strengthens my viewpoint on the use of shapes to tell stories.



Fig. 16- Self Explorations

### 3.5 AFFIRMATIONS

Lolomabox was pursued with the inputs received by professionals in the field of education and social work. Because of its high relevance to helping children in challenging situations, primary data from my undergraduate study was utilised due to the similarity in the learning objectives that is self-organised explorative learning.

Tearfund's Senior Programme Specialist Barbara-Anne Lewis (barbara@tearfund.org.nz) who manages Tearfund's anti-trafficking and child protection projects provided mentorship for the project duration. Barbara has degrees in Law and Politics and a Master's degree in International Development from Massey University. From her continuous inputs and conversations with kindergarten teachers in Wellington New Zealand, I arrived at the following observations:

- My initial explorations required for more 'child-friendliness' and interactivity.
- Teachers supported the idea of open-ended learning through Lolomabox and gave affirmations to the use of Blocks.
- Teachers pointed to the usefulness of drawing at an early age as a means to hone cognitive and motor skills development.
- Children love exaggerations and vivid colours.
- Listening to children's ideas and opinions are fundamental in early childcare.
- From my undergraduate study, I draw inputs on the importance of attractive visual languages for children and the limitations of mechanical forms of learning.



Fig. 17- Masi inspired Stencil explorations

# LOLOMABOX PROJECT

The research and its output are titled 'The Lolomabox Project'. Loloma is the Fijian term denoting a 'gift of love'. The Fijian context will remain close to me, as Fiji was the first testing ground for the learning kit. My meaningful experience in the nation encouraged me to strive harder to design for children in need. The Lolomabox Project is meant to start an initiative that hopes to continue to add on to resources that make living conditions for children across the world better and safer. The learning kit is the first step in the larger Lolomabox initiative to address the need for interactive and explorative learning in trauma stricken conditions, for preschoolers in the age of 3 to 4 years.



Fig 18. Self explorations on Storytelling tools

#### 4.1 SHAPES AND DRAMA

The versatility of simple geometric forms and their relevance in self-organised learning is proved through this thesis by studies ranging from Froebelian Gifts, empirical studies on shapes to a primitive art form that uses geometric symbols to tell intricate stories. The Triangle, The Square and The Circle are identified as the basic units to create complex learning, in this design deliverable. Existing independently and in conjunction with each other, these three primary shapes are easy to perceive and identify. These shapes also provide elemental frameworks for more abstruse forms. The colours are Yellow, Red and Blue following the Primary colour scheme again suggesting their ability to stand alone as pure and also give rise to the understanding of other colours when interposed with each other. The three shapes and colours lend a sustainable feature to the learning kit, allowing the child to interconnect and learn something new frequently.

Paley's observations prompted me to personify each shape as having personalities of their own. The children are likely to impose a narrative on the shapes when they are personified and exaggerated. The story that reads to the children in a visual narrative scheme makes the shapes more relatable and approachable.

Anthropomorphism is used in creating learning material for young children as supported by Woods and Bruce, who advocate using non-human figures when illustrating for children. Objects and animals are given human personalities based on the fact that it evokes humour and a relief from the overwhelming massive world of adults around a petite child. In this case, the Circle is given the personality of a chirpy bouncy character, and the Square is slightly slow and lazy, whereas the Triangle keeps getting stuck everywhere. The shapes are enclosed in the box as tactile figures that can be carried around and are see-through. The child can identify the existence of their Shapely Friends when they look through the tool while observing an object that resembles the shape in their hands. The visual narrative enclosed in the box sets off the process of identifying the shape characters amidst commonly seen objects.



Use of Anthropomorphism techniques to characterize the 3 shapes - Triangle, Square and Circle.

The primary colour scheme is followed to provide a window to learn about new colours in the future.

Fig. 19- Initial Explorations on Shape Characters

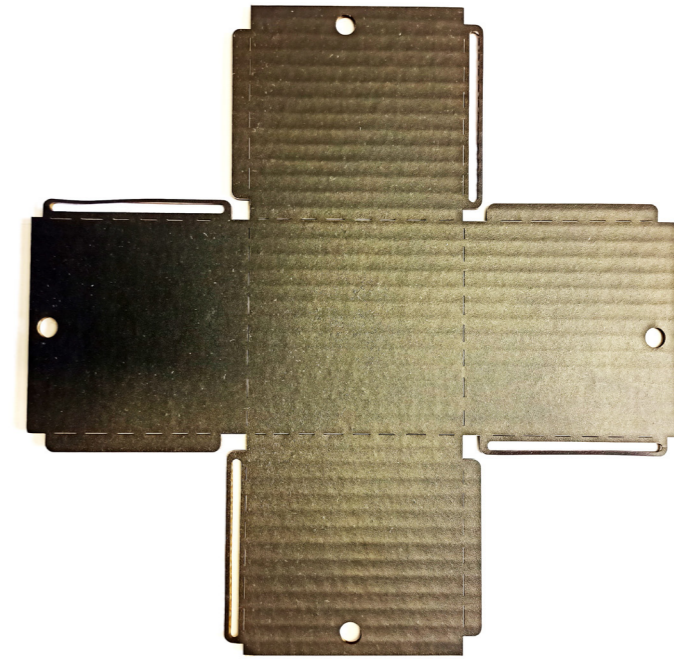
#### 4.2 INTERACTIVE BLOCKS

Another component in the learning kit is the set of puzzle pieces that can be stacked on the ground or built up vertically. The pieces have two sides, one having a chalkboard surface and the other coloured with the three shapes juxtaposed on every puzzle. The chalkboard surface allows for the occupation of motor skills by using drawing to represent observations. The coloured side allows for the development of motor skills where the child would use sight and organise the shapes on the puzzles to express a perception tangibly. Both sides of the puzzles can be utilised together to build up an elaborate scene where the child has endless possibilities through the chalkboard surface to connect the shapes with self-made symbols and drawings. One of the most trusted means to learn, play, imagine or express is that of 'Drawing', which is propagated through the interactive blocks as a means to tell stories and gain recovery from trauma.

Cathy Malchiodi, an Arts and Health specialist, and Bill Steele, founder of the National Institute for Trauma and Loss in Children, conclude in

studies on child trauma that one of the best ways to begin to address the needs of children in trauma is to begin with 'Drawing' as a form of intervention. Their key findings are as follows :

- Drawing taps implicit memory because trauma and drawing are predominantly sensory experiences; drawing pictures about aspects of what happened prompts sensory memories of traumatic events.
- Drawing actively engages children in the process of repair and recovery as it provides the possibility to move from a passive to an active role in the treatment process.
- Drawing provides a symbolic representation of the trauma experienced in a concrete, external format.
- Drawing makes us witness to children's trauma experiences.
- Drawing increases children's verbal reports about emotionally laden events by self-organising their narratives.
- Through repeated visual re-exposure through a safe medium, Drawing assists in the reduction of reactivity to trauma memories (Malchiodi).



Exploring Sustainable interactive play options by reusing cardboard with a chalkboard surface

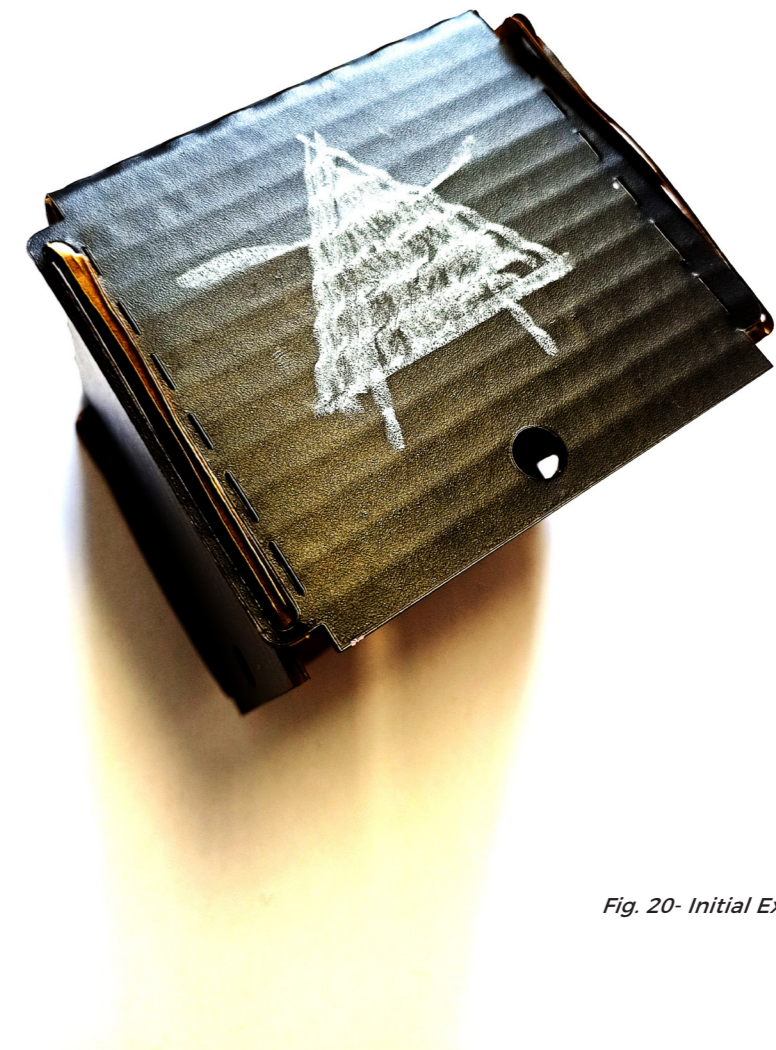


Fig. 20- Initial Explorations on Blocks



The final characters have each got personalities :  
Square : The lazy one  
Triangle : The mean guy  
Circle : The Happy friend

The rendering is in primary colors with a chalkboard effect to create relatability with explorations on chalkboard

The next page depicts the visual narrative that intends on creating a more personal relationship with the shapes

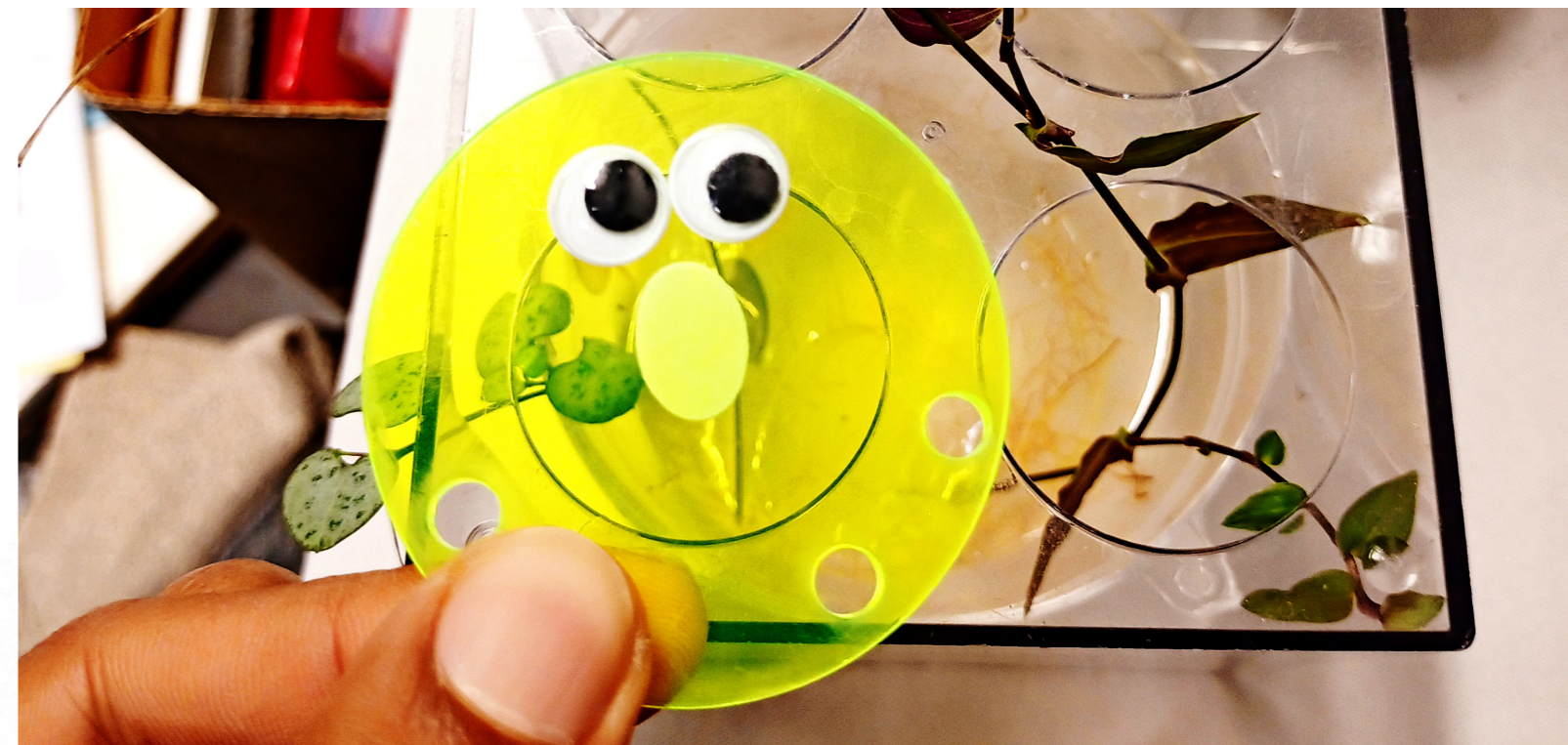


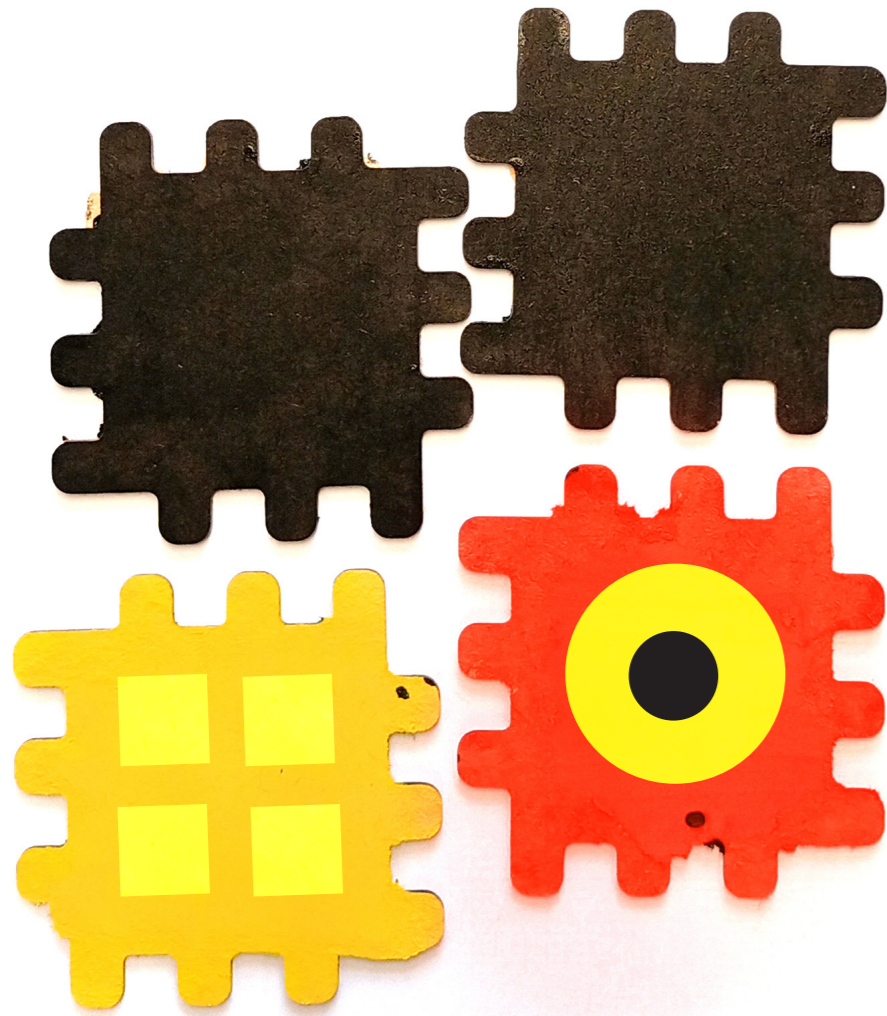
## INCLUSIONS



The clear shapes are created to establish a sense of belonging with the shapes.

They primarily assist in identifying shapes in the environment after observing the visual narrative that comically represents this idea. The figures facilitate healthy cognitive development by encouraging the child to be attentive to observations.

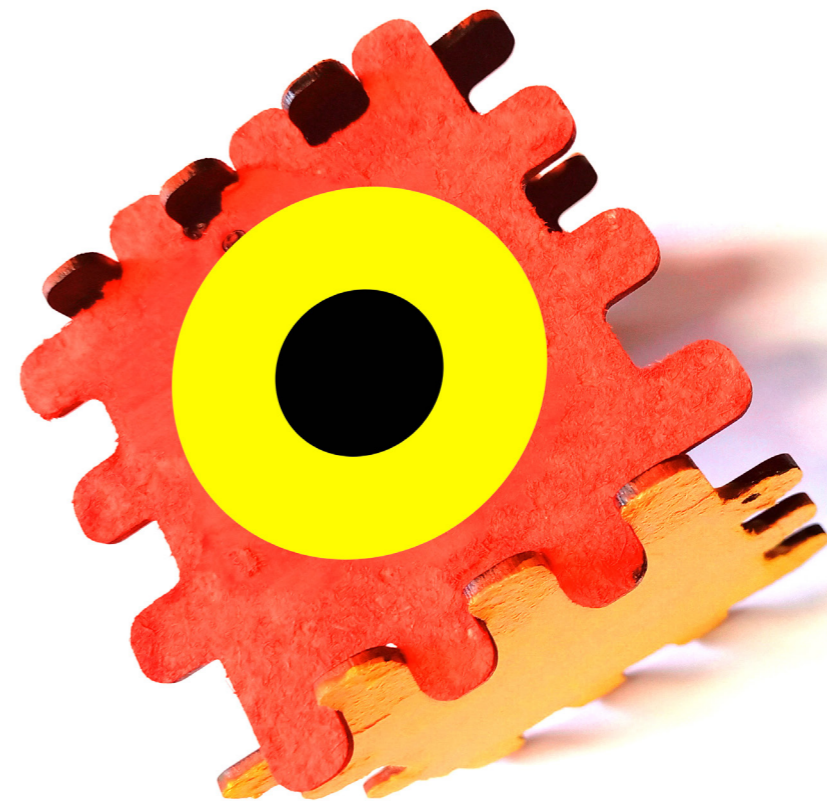




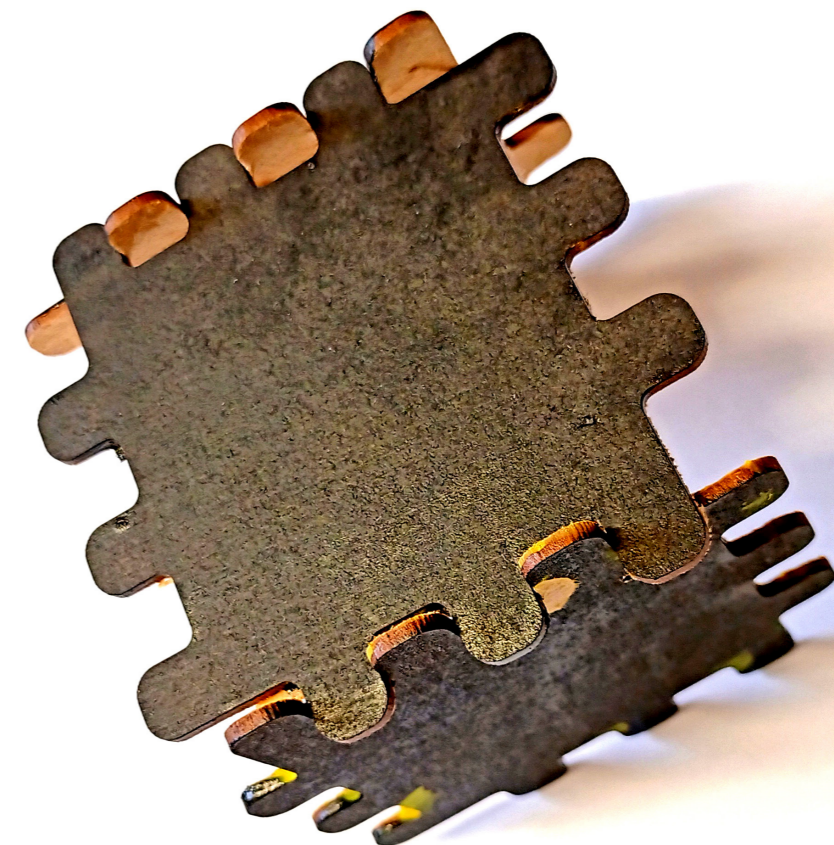
The interactive section of the kit includes :

Puzzles with a chalkboard side for customisation of thoughts and a prefabricated side to allow for arrangement of thoughts and expressions with the shapes provided.

Other utilities like chalk and thread are provided to achieve a holistic cognitive experience using motor skills enhancing techniques of drawing and threadwork.



The puzzles can also be stacked on either sides forming structures and enhancing the play experience



## LOLOMABOX PROJECT

Who and How

### 4.5 WHO AND HOW

The Lolomabox is designed to add to resources that encourage children to freely express themselves in free play. The target audience is 3 to 4-year-old children who are preparing to enter the formal schooling system. The intentional use of visual narrative makes the kit approachable by most children around the world. It is useful and not limited to children who suffer from the effects of trauma.

The personas of children from stressful environments may include :

- Children living in extreme poverty with limited adult supervision
- Children living in poverty with No adult supervision
- Children who are witness to constant conflict in the house
- Children who suffer the effects of war or calamities
- Children that go to school with poor pedagogy and untrained teachers

The above list is not exhausted but covers conditions that involve limited adult supervision, non-trustworthy adults and absence of engaging study aids. Lolomabox is accessible without constant adult supervision and can engage the child using a free play approach.

The contents of the kit include a visual narrative that unfolds into a wall hanging, a set of three shape figures, a set of puzzles and a combination of coloured chinks. The wall hanging contains comical representations of the three shapes existing with each other in the world around us. The tangible characters can assist in locating the existence of the shapes outside and finally using the interactive puzzles; the child can arrange the shapes to express their observations or draw personalised figures to fill in details that may not be included in the prefabricated puzzles. The knowledge about the shapes existing around us and their relatable personification will most likely lead the children to observe their environments with heightened cognitive abilities and then interact with the blocks to express their perceptions, a form of storytelling that proves to facilitate recovery from trauma and also lead to the healthy development of motor skills.



Fig 21. : Personal photo - Market in Fiji

# CONCLUSION

Lolomabox Project was conceived with the inspiration to add to the resources that work towards providing nurturing environments for all children. Theories and philosophies on inventive, explorative and sustainable forms of early learning, covered in this thesis, provide with a tested framework for the design concepts. The principle of Open-ended learning coined first by Froebel and advocated by modern-day practitioners provides the elements of free play to the design output that seeks to lead to endless learning opportunities. As a means to recover from stress or trauma in early childhood, the method of storytelling is used. Reading and telling stories is proven to enhance the learning curve in a child and provides a platform to express. Through the interactive puzzle pieces, the children can arrange or draw their observations or even stack up a pillar of imaginative coherence of thoughts. Drawing as

a tool for recovery from trauma is used for block interactions. From personal experiences as an art teacher and results from external studies depict the effectiveness of drawing. A brief visual narrative on the shapes is meant to set off the children to form their own narratives.

As a way forward, I will be sending the Lolomabox package to Homes of Hope in Fiji. I will continue to explore materials to make the package more sustainable and include more resources as the project develops.

I intend on venturing into the digital space and design an audiovisual format to play with the shapes. This form of access to Lolomabox would aim at a demographic that has easy access to technology or have trusted adults who know how to operate digital media.

This research is the first gear to Lolomabox. I hope to involve human resource that shares in the ethos of helping our children grow holistically. I envision this child-centred project to encompass knowledge from all relevant

spheres in designing for more age groups and for a diverse group of children who may be experiencing varied situations that stunt healthy growth and development.

Let us be kind and spread 'The Gift of Love' to our future globe shapers.

## REFERENCES

Bowkett, Wendy. *Activities for Individual Learning Through Shape and Colour*. 1st ed., Continuum, 2011.

Brosterman, Norman. *Inventing Kindergarten*. 1st ed., Harry N. Abrams, 1997.

Bruce, Tina. *Early Childhood Practice-Froebel Today*. Sage Publications, 2012.

“Child Development: Preschooler (3-5 Years Old) | CDC.” Centers for Disease Control and Prevention, 6 Mar. 2020, [www.cdc.gov/ncbddd/childdevelopment/positiveparenting/preschoolers.html](http://www.cdc.gov/ncbddd/childdevelopment/positiveparenting/preschoolers.html).

Express News Service. “Telling Numbers: In Primary and Secondary Schools, Dropout Rates Highest in Assam.” *The Indian Express* [New Delhi], 6 Feb. 2020, [indianexpress.com/article/explained/telling-numbers-in-primary-and-secondary-schools-dropout-rates-highest-in-assam-6253181](http://indianexpress.com/article/explained/telling-numbers-in-primary-and-secondary-schools-dropout-rates-highest-in-assam-6253181).

Fulmer, Mara Jeer. *Symbols and Patterns of Grassroots Culture in the Fiji Islands*. Rev. ed., Mara Jevera Fulmer and Looking Glass Design, 2001.

Govt. of India. Ministry of HRD. *Educational Statistics at a glance*. Dept. of School Education and Literacy Statistics Division, 2018

IDEO. *The Field Guide to Human-Centered Design*. 1st ed., IDEO, 2015.

“InBrief: The Impact of Early Adversity on Children’s Development.” Center on the Developing Child at Harvard University, 29 Oct. 2020, [developingchild.harvard.edu/resources/inbrief-the-impact-of-early-adversity-on-childrens-development](http://developingchild.harvard.edu/resources/inbrief-the-impact-of-early-adversity-on-childrens-development).

Landau, Barbara, et al. *Cognitive Development*. Columbia University, Indiana University, 1988.

Malchiodi, Cathy. “Helping Children Draw Out Their Traumas.” *Www.Psychologytoday.com*, Psychology Today, 15 June 2009, [www.psychologytoday.com/nz/blog/arts-and-health/200907/helping-children-draw-out-their-traumas](http://www.psychologytoday.com/nz/blog/arts-and-health/200907/helping-children-draw-out-their-traumas).

## REFERENCES

Mitra, Sugata. “Self Organising Systems for Mass Computer Literacy: Findings from the ‘Hole in the Wall’ Experiments.” *International Journal of Development Issues*, vol. 4, no. 1, 2005, pp. 71–81. Crossref, doi:10.1108/eb045849.

MOE, Ministry of Education. Te Whāriki. New Zealand Government, 2017, [www.education.govt.nz/assets/Documents/Early-Childhood/Te-Whariki-Early-Childhood-Curriculum-ENG-Web.pdf](http://www.education.govt.nz/assets/Documents/Early-Childhood/Te-Whariki-Early-Childhood-Curriculum-ENG-Web.pdf).

Myers, Priscilla. “Stories From Print.” *Language Arts*, 8th ed., vol. 67, National Council of Teachers of English, 1990, pp. 824–31.

Paley, Vivian. “Getting Back on Track.” *Learning Landscapes*, 1st ed., vol. 7, Learning Landscapes, 2013, pp. 43–49.

Rebecca Isbell, et al., editors. “Effects of Storytelling.” *Early Childhood Education Journal*, 3rd ed., vol. 32, Springer Science+Business Media, 2004, pp. 157–63.

Rueckert, Phineas. “10 Barriers to Education That Children Living in Poverty Face.” *Global Citizen*, 13 Aug. 2019, [www.globalcitizen.org/en/content/10-barriers-to-education-around-the-world-2](http://www.globalcitizen.org/en/content/10-barriers-to-education-around-the-world-2).

“The Science Behind Early Childhood Development.” Center on the Developing Child at Harvard University, 3 Nov. 2020, [developingchild.harvard.edu/resources/inbrief-the-science-of-early-childhood-development](http://developingchild.harvard.edu/resources/inbrief-the-science-of-early-childhood-development).

Woods, Annie. *Child-Initiated Play and Learning*. David Fulton, 2013.

World Bank. “The Education Crisis: Being in School Is Not the Same as Learning.” World Bank, 22 Jan. 2019, [www.worldbank.org/en/news/immersive-story/2019/01/22/pass-or-fail-how-can-the-world-do-its-homework](http://www.worldbank.org/en/news/immersive-story/2019/01/22/pass-or-fail-how-can-the-world-do-its-homework).

Date: 28 January 2020

Dear Arnold David

Re: Ethics Notification - 400022140 - Designing an early learning Kit for children in Fiji

Thank you for your notification which you have assessed as Low Risk.

Your project has been recorded in our system which is reported in the Annual Report of the Massey University Human Ethics Committee.

The low risk notification for this project is valid for a maximum of three years.

If situations subsequently occur which cause you to reconsider your ethical analysis, please contact a Research Ethics Administrator.

Please note that travel undertaken by students must be approved by the supervisor and the relevant Pro Vice-Chancellor and be in accordance with the Policy and Procedures for Course-Related Student Travel Overseas. In addition, the supervisor must advise the University's Insurance Officer.

**A reminder to include the following statement on all public documents:**

*"This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher(s) named in this document are responsible for the ethical conduct of this research."*

*If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact Professor Craig Johnson, Director - Ethics, telephone 06 3569099 ext 85271, email [humanethics@massey.ac.nz](mailto:humanethics@massey.ac.nz)."*

Please note, if a sponsoring organisation, funding authority or a journal in which you wish to publish requires evidence of committee approval (with an approval number), you will have to complete the application form again, answering "yes" to the publication question to provide more information for one of the University's Human Ethics Committees. You should also note that such an approval can only be provided prior to the commencement of the research.

Yours sincerely



Professor Craig Johnson  
Chair, Human Ethics Chairs' Committee and Director (Research Ethics)

Fig 22. : Personal photo - Kindergarten student in Fiji



Fig 23. : Personal photo - Kindergarten student in Fiji



