

MOCUBA - BACKGROUND RESEARCH (vers.01)

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MOTIVATION

In real life interactions with objects are usually recognizable and clear.

With the use of computers, it seems more limited. Much useful things, which makes us the computer available, we learn through the output screen, although this is not always the ideal output device. The interaction is divided among different devices. (I see something on the screen - answer with the mouse and keyboard - see the result on the screen).

Human - computer interaction through an object that connects inputs and outputs in a meaningful way and is different playable, thus provides the benefits of a computer system in a physical object.

I wanna feel the information on the object with which I interact directly and thus avoid a multiple transcoding of different sensory and interfaces. Using the example of a learning object for children, I want to show the advantages and opportunities that shape the human-machine and human-human interaction provides. The best of both worlds combined makes the user experience virtually and physically. *It will become an open system with different roles and refillable content. Mocuba, an informal play and learning object.*



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TANGIBLES

Tangibles, in the form of physical artefacts that are electronically augmented and enhanced to trigger various digital events to happen, have the potential for providing innovative ways for children to play and learn, through novel forms of interacting and discovering. ¹

TANGIBLE-MEDIATED LEARNING

Tangible-mediated learning also has the potential to allow children to combine and recombine the known and familiar in new and unfamiliar ways (Hoyles and Noss 1999).

FUN AND ENJOYMENT

Fun and enjoyment are well known to be effective in children's development (Clements 1995), both supporting and deepening learning (Resnick et. al. 1999) as well as facilitating engagement and motivation. ¹

MAKING THE INVISIBLE VISIBLE BRINGING THE FAR TO THE NEAR

BEHAVIOR OF MOST MAMALS

Play is a basic part of the behavior of most mamals, include people. Although play is easy to recognize, it can be hard to define. ³

MOTOR PATTERNS

Play generally includes motor patterns that are taken from other functions, such as eating, fighting, and exploring, but in play they don't serve the same end. The motor patterns are thus generally performed out of context ³

INTER-RELATED LEARNING ACTIVITIES

In addition to fun, we believe that playful learning should encompass the following five core inter-related learning activities:

Exploration through interaction

Engagement

Reflection

Imagination, creativity and think ing at different levels of abstraction

Colaboration

Engagement also comprises cognitive engagement which increase attention to the activity, concentration and promotes "useful" learning (Stoney and Oliver 1999). ²

IMAGINATION

In people, imagination plays a particularly important role in all play activities. Children attach different meanings to objects and assume changing roles during play, and fantasy becomes superimposed on reality ³

AQUIRING INFORMATION

Brunner (1972) views play as a means for acquiring information about and experience with the environment. Play provides opportunities to try combinations of behaviors that would otherwise never be tried. The experiences with these behaviors then can serve as the basic for later learning. ⁴

EXPERIENCES AND LEARNING

Play provides both adults and children with experiences on which to build later learning;
play promotes flexibility and possibly creativity in problem solving, which may or may not lead to more successful problem solving;
and play can relieve factors that inhibit learning, such as stress. ⁵

MAGIC

The design of interactive artefacts always includes thinking about transforming interactions into useful experiences. To promote curiosity and playfulness in interactive objects for children, we have to include thinking about astonishing and magical interactions, which are yet based on very logical rules. Thus, magic is provoking curiosity, curiosity leads to engagement and engagement leads to knowledge ⁶

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- 1 Price S, Rogers Y, Scaife M in Using Tangibles to Promote Novel Forms of Playful Learning, 1999X, p.1
- 1 Price S, Rogers Y, Scaife M in Using Tangibles to Promote Novel Forms of Playful Learning, 1999X, p.2
- 3 Judy Diamond, ASTC - Resource Center - Education - Learning, Playing and Learning p.1
- 4 Judy Diamond, ASTC - Resource Center - Education - Learning, Playing and Learning p.3
- 5 Judy Diamond, ASTC - Resource Center - Education - Learning, Playing and Learning p.4
- 6 Moritz Kemper, BOXED - Zürcher Hochschule der Künste, 2011, p.12

RE-INVENT

"Children should be able to do their own experimenting and their own research. Teachers, of course, can guide them by providing appropriate materials, but the essential thing is that in order for a child to understand something, he or she must **construct it by him or herself, they must re-invent.**" (Piaget, 1972).

MAKING SENSE OF THE WORLD

"Making sense of the world is a basic human activity in which we all engage. It means figuring out **how things work, and why things are the way they are [...]** that's why children play". (Ackermann, 2004).

SMALL SCIENTIST

Jean Piaget, and after him many other researchers in the area of constructivism, see the child as a small scientist who is **constantly exploring and experimenting** to find simple and sometimes naive explanations for perceived phenomena. ⁸

LEARNING BY DOING

Learning by Doing. Only through acting the child is able to gain tactile knowledge about the environment and things situated in it. ⁸

FOUR MAJOR CRITERIA

Play is defined through four major criteria: **material, context, people and limitation.** (Howard P. Chudacoff (2007)) ⁷

SELF AND OBJECT

"Experience is constituted by the relationship between self and object" (McCarthy & Wright, 2004).

INTERPLAY

"The thing about playing is always the precariousness of the interplay of personal psychic reality and the experience of control of actual objects" (Winnicott, 2005).

SIMPLICITY

Simple interactive objects focus on the interaction itself and more complex systems focus in the use of the system itself. ⁹

THE FUTURE OF PLAY

Play is a timeless feature of human societies, and when combined with 21st century learning provides children and adults with opportunities to experiment with their surroundings as a form of problem solving. ¹⁰

WHAT IS PLAY?

To play is to engage. When we play, we pick up objects, ideas, or themes and do whatever we want with them. We **turn them upside down and we experiment with them.** We may arrive at something inspiring and amazing, but that is not necessarily the point. We play anyway - this is play for its own sake. Play is a vital part of development. What is more often forgotten is that **play is not for children alone but is good for all people, young and old alike.** ¹¹

REFERENCES

⁷ D.W. Winnicott, 2005, p. 69-70

⁸ Moritz Kemper, BOXED - Zürcher Hochschule der Künste, 2011, p.20

⁹ Moritz Kemper, BOXED - Zürcher Hochschule der Künste, 2011, p.29

¹⁰ The future of play, LEGO Learning Institute, 2009, p.5

¹¹ The future of play, LEGO Learning Institute, 2009, p.9

THE PURPOSE OF PLAY

The purpose of play is to provide stimulation for proper perceptual, motor and neural development. ¹¹

FLEXIBILITY OF THOUGHT

Bruner argued that humans have been a successful species because of our adaptability to new circumstances and our ability to solve new problems. Children's play, crucially, enables them to develop this 'flexibility of thought' because it allows them to try out different ways of looking at the world, **different strategies to deal with problems and difficulties, and different ways of thinking, all within a safe context with no consequences.** ¹¹

QUOTES

CONSTRAINTS

As we play with the constraints of a situation while respecting or transgressing rules, we **feel free to move, engage with new contexts**, and we treat our own experience as an object of play. ¹¹

NEW WAYS

We do know that play allows children to use their creativity while developing their imagination, dexterity and physical, cognitive and emotional strength. **Adults also play to break from conventions to experiment, to shift from normality into a rich world of imagination, to push themselves in new ways.** ¹³

BRAIN DEVELOPMENT

Play is important to healthy brain development (Shonkoff and Philipps, 2000; Tamis-LeMonda et al., 2004). **Adults also use play to make connections and meanings, and for mental and physical stimulation.** ¹³

MOST IMPORTANT WORK

Children's play - Why is play children's most important work?

Today it is almost universally accepted by developmental psychologists that children develop and learn principally through play. ¹⁴

PLAY WITH OBJECTS

Manipulating and constructing with large and small objects are excellent ways of developing physical skills. For example, while younger children are making or building, they are also often **developing a story or narrative**...Children set themselves goals and challenges, monitor their progress, and develop problem-solving strategies. Experiments have demonstrated that **through play children develop more flexible ways of thinking about objects and how they can be used, but also more positive attitudes to problems and any initial setbacks.** ¹⁶

UNUSUAL WAY

Playful behaviour often involves treating objects in unusual way...One key feature of play is that we often **venture into unknown territories.** ¹²

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- 11 The future of play, LEGO Learning Institute, 2009, p.9
- 12 The future of play, LEGO Learning Institute, 2009, p.12
- 13 The future of play, LEGO Learning Institute, 2009, p.13
- 17 The future of play, LEGO Learning Institute, 2009, p.19
- 18 The future of play, LEGO Learning Institute, 2009, p.20
- 19 The future of play, LEGO Learning Institute, 2009, p.21
- 20 The future of play, LEGO Learning Institute, 2009, p.30
- 21 The future of play, LEGO Learning Institute, 2009, p.33

1.6 INTRODUCTION

A BRIEF RANT ON THE FUTURE OF INTERACTION DESIGN

<http://worrydream.com/aBriefRantOnTheFutureOfInteractionDesign>

HOW DO WE MANIPULATE THINGS?

Our fingers have an incredibly rich and expressive repertoire, and we improvise from it constantly without the slightest thought.

WHAT A TOOL IS IN THE FIRST PLACE

A tool addresses human needs by amplifying human capabilities. A tool converts what we can do into what we want to do. A great tool is designed to fit both sides.



HUMAN CAPABILITIES

What people can do. Because if a tool isn't designed to be used by a person, it can't be a very good tool, right?

HANDS

Hands feel things, and hands manipulate things. Sense objects tactile response - their texture, pliability, temperature; their distribution of weight; their edges, curves, and ridges; how the respond in your hand as you use them.

PICTURE UNDER GLASS

What you can do with a Picture Under Glass? You can slide it



FUTURE

With one entire body at your command, do you seriously think the Future Of Interaction should be a

single finger?

TO PLAY IS TO ENGAGE

To play is to engage. When we play, we pick up objects, ideas, or themes and turn them upside down, experiment with them, often arriving at something inspiring and amazing; yet we don't play for the outcome, but for its own sake. For humans and some animals, play is a vital part of development. Play allows children to use their creativity while developing their imagination, dexterity and physical, cognitive, and emotional strength. Adults also play to break from conventions, to experiment, to shift from normality into a rich world of imagination or to push themselves in new ways.

PLAY: FOUR BROAD TYPES

Play in children can be generally divided into four broad types based on the developmental purposes each serves. These are:

physical play,
play with objects,
symbolic play,
pretence and socio-
dramatic play,
games with rules.

ABILITY

We find, therefore, that play which taps into our ability to experience curiosity, competence and reciprocity and makes it possible for us to exercise autonomy, mastery and a sense of purpose offers some of the most engaging play of all.

THE FUTURE OF PLAYING

The future playing field can thus be seen to extend in three directions: firstly, children's free play is recognised as crucial for child development, and in particular for the nurturing of imagination and creativity. Secondly, adult play expands as adults come to acknowledge the importance of play within everyday life in both home and work contexts. Thirdly, digital platforms enable inspiration, communication and sharing, and new augmented reality technologies will enable the blending of the greatest opportunities provided by digital and physical tools.

PLAY IS..

.. a timeless feature of human societies, and when combined with 21st century learning it provides children and adults with opportunities to experiment with their surroundings as a form of problem solving. Using meaningful tools that expand our mental capacities, we can improvise and discover, and construct dynamic models of real world processes, taking our knowledge and understanding to unprecedented levels, enabling innovation.

THE PURPOSE OF PLAY..

..is to provide stimulation for proper perceptual, motor and neural development. Play may aid self-training or the integration of sensory and motor systems due to the unpredictable consequences of interacting with objects, social partners, and even one's own body (Spinka et al., 2001).

SUCCESSFUL SPECIES

Humans have been a successful species because of our adaptability to new circumstances and our ability to solve new problems.

Children's play, crucially, enables them to develop this 'flexibility of thought' because it allows them to try out different ways of looking at the world, different strategies to deal with problems and difficulties, and different ways of thinking, all within a safe context with no consequences.

"THROWING OFF CONSTRAINT"

To Millar, play is essentially about "throwing off constraint" (1968, p. 21). As we play with the constraints of a situation while respecting or transgressing rules, we feel free to move, engage with new contexts, and we treat our own experience as an object of play.

UNUSUAL WAYS

Playful behaviour often involves **treating objects in unusual ways**, pretending to be somebody else or even a different creature. Behaviours like these can recruit networks of neurons – often from separate structures in the brain – that would not normally be active simultaneously.

LEARNING AND MEMORY

One key feature of play is that we often **venture into unknown territories**. During play, children can try novel ways of interacting with the environment, both with the living (i.e. other children, animals) and non-living (i.e. toys) parts of it. Such behaviours can not only help a child make sense of a complex world, but in addition the novelty of the situation also has a **direct impact on learning and memory**.

WHY DO WE PLAY?

We do know that play allows children to use their creativity while developing their imagination, dexterity and physical, cognitive, and emotional strength. Adults also play to break from conventions, to experiment, to shift from normality into a rich world of imagination, to push themselves in new ways.

Play is important to healthy brain development (Shonkoff and Phillips, 2000; Tamis-LeMonda et al., 2004). Adults also use play to make connections and meanings, and for mental and physical stimulation.

CHILDREN'S PLAY

Why is play children's most important work?

Today it is almost universally accepted by developmental psychologists that children develop and learn principally through play. Figure 2.1 shows that for all aspects of development, including physical, intellectual, social and emotional, there are multiple forms of play.

5 TYPES OF PLAY

1. physical play,
2. play with objects,
3. symbolic play,
4. pretence/ socio-dramatic play,
5. games with rules.

Basic form		Detail	Examples
PHYSICAL PLAY	Gross motor	Construction Destruction	Building blocks Clay/sand/wood
	Fine motor	Manipulation Coordination	Interlocking bricks Musical instruments
	Psychomotor	Adventurous Creative movement Sensory exploration Object play	Climbing apparatus Dance Junk modelling Finding out table
INTELLECTUAL PLAY	Linguistic	Communication/function/ explanation/acquisition	Hearing/telling stories
	Scientific	Exploration/investigation/ problem solving	Water play/cooking
	Symbolic/mathematical	Representation/pretend/ mini-worlds/	Doll's house/homes/ drama/number games
	Creative	Aesthetics/imagination fantasy/reality/ innovation	Painting/drawing/ modelling/ designing
SOCIAL/ EMOTIONAL PLAY	Therapeutic	Aggression/regression/ relaxation/solitude/ parallel play	Wood/clay/music
	Linguistic	Communication/interaction cooperation	Puppets/telephone
	Repetitious	Mastery/control	Anything!
	Empathic	Sympathy/sensitivity	Pets/other children
	Self-concept	Roles/emulation/ morality/ethnicity	Home corner/service 'shop'/discussion
	Gaming	Competition/rules	Word/number games

1. PHYSICAL PLAY

This type of play includes active exercise play, rough-and-tumble and fine-motor practice.

Exercise play is related to children's developing whole body and hand-eye-coordination, and is important in building strength and endurance.

2. PLAY WITH OBJECTS

This second type of play concerns children's exploration, as young scientists, of the world and the objects they find within it.

Manipulating and constructing with large and small objects are excellent ways of developing physical skills.

Play with objects also supports the development of creativity (when associated with symbolic or pretence and socio-dramatic play). For example, while young children are making or building, they are also often developing a story or narrative.

Children set themselves goals and challenges, monitor their progress, and develop problem-solving strategies. Experiments have demonstrated that through play children develop more flexible ways of thinking about objects and how they can be used, but also more positive attitudes to problems and any initial setbacks.

3. SYMBOLIC PLAY

In general, symbolic play supports children developing technical abilities to express ideas, feelings and experiences through language, painting, drawing, collage, numbers, music and so on. Pound (2010) has argued persuasively that musical play supports children's abilities in social interaction, communication, emotional understanding, memory, self-regulation and creativity.

4. PRETENCE PLAY

Pretence and socio-dramatic play are perhaps the most common types of play. As well as dressing-up and role-playing (fantasy and real-world), this type of play includes all forms of pretence, arguably including playing with pets.

Two aspects of this kind of play are often a cause for concern, however, and involve play with imaginary friends and play with guns.

5. GAMES WITH RULES

Young children are strongly motivated by the need to make sense of their world and, as part of this, they are very interested in rules. From a very young age children begin to enjoy games with rules, and to invent their own.

While playing games with their friends, siblings and parents, young children are learning a range of social skills related to sharing, taking turns, understanding others' perspectives and so on.

SUPPORTING CHILDREN'S PLAY

Participating in play, especially with infants, is important. Mother-infant interactions in particular have been proven to greatly affect the child's emotional responses later in life and can have an impact on their cognitive and social development, as well as their tendency to be fearful or show positive emotions more often.

PARENTS AND ADULTS

Beyond participating in play with infants, there is much that parents and adults can do to enhance the educational and developmental benefits of play; these can be categorised as follows:

1. Creating a supportive environment
2. Providing a range of opportunities
3. Structuring
4. Participating

1. SUPPORTIVE ENVIRONMENT

Children are likely to engage in the most complex forms of play, involving risk and challenge, and so derive the most educational and developmental benefit when they feel emotionally secure.

2. RANGE OF OPPORTUNITIES

Children benefit from experiencing a good mix of the various types of play. This involves providing appropriate equipment and materials, which inspire and support young children to engage in the various types.

3. STRUCTURING

This is a term first coined by Manning & Sharp (1977) and refers to the idea of developing playful projects within educational contexts in which the adult responds to the children's interests and provides opportunities for various types of play incorporated within a developing meaningful or narrative context.

4. PARTICIPATING

It is well established that, if adults are able to play alongside children (e.g. playing with modeling clay or take on a role (e.g. a customer in the hairdressers) this can enormously enhance the quality of the play, the language that it supports and so on.

However, this requires great sensitivity – for example, it is far more engaging to describe.

What you are doing than to ask the children what they are doing – but can be extremely productive (and informative about the children's real level of understanding).

SUCCESSFUL PLAY INTERACTIONS

Successful play interactions depend on the players' ability to signal to each other whether they are seeking play or not. These unspoken negotiations provide the most striking evidence of the intimate connection between play, expressivity and communication.

ADULT'S PLAY

Over recent years the notion of play has been broadened to embrace a positive idea of adult play and its value.

“Our consumer society exploits our aspirations towards a more beautiful, more meaningful existence – while our working lives rarely allow us the opportunity to actively pursue that, in a constructive and lasting way. The identity of the worker, pursuing a work ethic... is simply too cramped and limited to address this gap between our desires and dreams, and our ability to realise them... Play – as a biological fact, as a cultural tradition, as a technological possibility, as a way of behaving – is one way to bridge that gap. The player submits their entire life to the basic test of play: can this be changed? Why does this have to be this way? Can we try something different, more fulfilling? Can we put this, literally, into play?” (Kane, 2004)

5 TYPES OF ADULT'S PLAY

1. Physical play,
2. Play with objects,
3. Symbolic play, Pretence/ socio-dramatic play,
4. Games with rules.

1. PHYSICAL PLAY

This includes sport and physical activity of all kinds, including those which:

- represent a physical challenge, risk and danger and are mostly individual, e.g. rock climbing, skateboarding, free running (urban acrobatics), and other extreme sports
- involve playing in a team (and include a social/emotional aspect), e.g. football, cricket, rugby, hockey
- include physical combat (an extension of rough and tumble play), e.g. martial arts, boxing, wrestling
- include an aesthetic element, e.g. walking, dancing, gymnastics
- give pleasure through physical exercise, e.g. aerobics, running, working out

2. PLAY WITH OBJECTS

Many adults enjoy and spend hours making things and, as we discuss later, this activity has increased considerably in popularity in modern post-industrial societies. The intense drive for perfection often seen in this kind of activity and the common loss of a sense of time when engaged in them are also powerful clues that this type of adult activity is essentially playful.

3. SYMBOLIC PLAY

Symbolic play and pretence/socio-dramatic play are at the root of all of human culture, including the whole range of artistic expression involving music, singing, dance, the visual arts, literature and drama. Adult play includes active involvement in these activities as well as being, rather less playfully, a consumer of them as a listener or spectator

4. GAMES WITH RULES

Finally, “games with rules” expand enormously as a play type amongst adults, while also enjoyed by children. These expressions of adult playfulness are the least concerned with alternatives and imagination and are most concerned with rules and realities. The predominant driving psychological purpose of game playing in adults appears to be enjoyment of intellectual challenge. This is play which can be engaged in individually but is often social and communal and, like adult physical play, nearly always involves competition.

PLAY ACROSS AGES (FRAMEWORK)

As we have seen, the five types of children's play (physical play, play with objects, symbolic play, pretence play, and games with rules) correspond with adult play. However, adult play is especially celebrated for its free and disruptive potential.

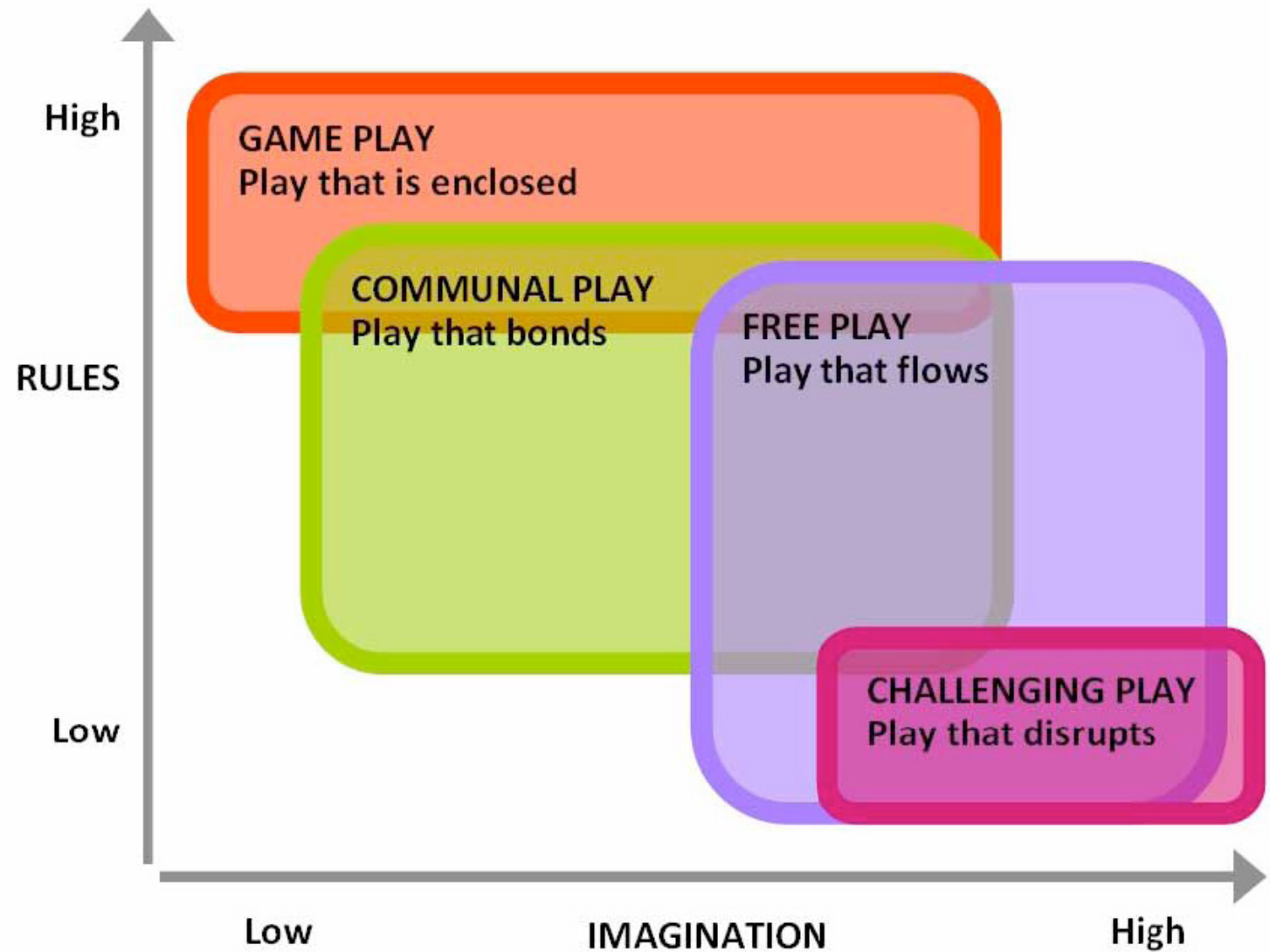
DIAGRAM

If we synthesise all of this we arrive at the following diagram, capturing different types of play in relation to rules (y-axis), and imagination (x-axis).

Game play – play that is enclosed by rules and standards – is the 'opposite' of free play in that the player must operate within strict boundaries. Depending on the game, however, they may be able to exercise their imagination in play.

Free play can sometimes overlap with some kinds of game play, but describes the most straightforward 'playful' play which is often advocated as healthy and inspirational for children and adults alike.

Play very effectively brings people together, as highlighted in the communal play element, but also it can be a positive disruptive force, indicated as challenging play in the diagram, during which rules are disregarded and levels of imagination are high.



ENGAGEMENT IN PLAY

Modes of engagement:

1. The 'immersion' orientation – also known as 'messing around' (a non-competitive mode of exploration).
2. The 'social' orientation – also known as 'hanging out' (a more relaxed and social or collaborative attitude).
3. the 'mastery' orientation – also known as 'geeking out' (an intense and committed approach).

THREE KEY HUMAN MOTIVATIONS

Jerome Bruner, in his seminal article 'The Will to Learn' (1966), identifies three key human motivations underlying playful behaviour:

curiosity,
competence and
reciprocity.

Each of these feature in the modes of engagement mentioned above, although in each instance one of the motivations plays a dominant role.

1. THE 'IMMERSION' ORIENTATION

In the immersion orientation, players are motivated primarily by curiosity, playing within the constraints of the medium, situation or context, and exploring where the boundaries are for their own ability and for the medium.

2. THE 'SOCIAL' ORIENTATION

In the social orientation, reciprocity is the driving motivation, whereas in the mastery orientation it is the attainment of competence. In this instance, play moves from exploring constraints to play beyond constraints, where one's realisation of ideas is supported and magnified by one's mastery of the medium.

3. INTEREST AS MOTIVATION

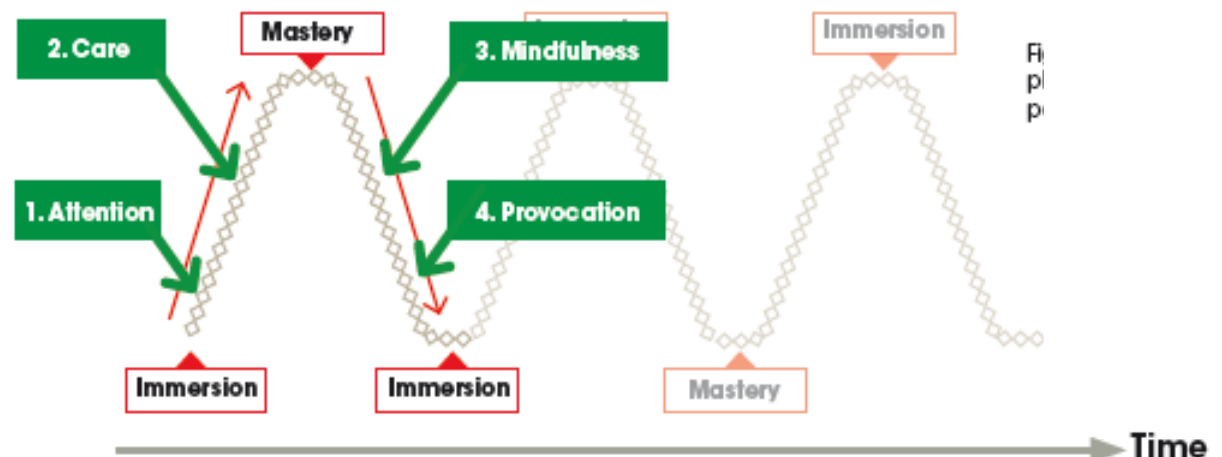
Interest in an activity has been linked to intrinsic motivation, flow and mastery goal orientation. Situational interest, arising from particular experiences, has also been distinguished from individual interest, which arises from the personal trait of curiosity. Hidi argues that individual interest develops through the repeated experience of situational interest, pointing to the value of contexts and situations that inspire our interest. According to Hidi, interest develops according to four phases, moving from the external (situational) gradually to the internal (individual) as follows:

- triggered situational interest
- maintained situational interest
- emerging individual interest
- developed individual interest

QUALITIES OF A PLAYFUL MIND

Building on the research on Flow, interest and motivation, the 'spiral' process outlined above links with a set of qualities, which are at the heart of approach to creativity and

- Attention and the
 - Care - the way of
 - Mindfulness and
 - set
 - Provocation and t
- Although each of tl
significant at any ti
part of play, they
can be positioned i
points of strongest
Fig. 5:



PLAY IS FLOW

Play is Flow, then, on more than one level. The simplest understanding of Flow – the experience of being enjoyably immersed in a challenging task – is a good description of what play is. But the richer detail offered by Csikszentmihalyi regarding what Flow means, why human beings seek it out and why we find Flow experiences to be our most enjoyable moments also adds to our understanding of play.

PLAY, LIKE FLOW

Play, like Flow, is about working towards a sense of unity and wholeness. It necessitates being stretched and taking an active role in making an impact on something; this may be a 'trivial' object (a toy, model, or website) but may represent something greater. Play, like flow, centres around achieving mastery, which heightens self-esteem, as well as creating and integrating meanings, bringing a sense of wholeness and unity. This is why, when a person reflects on the events of their life, they often remember the greatest pleasures as being moments of Flow or moments of play – the sense of total engagement and of everything making sense because it is unified in a positive experience of unlimited possibility or unlimited pleasure, rich with social or personal meaning even if it is 'just' a fun, playful activity.

DESIGNING FOR ENGAGING PLAY

Csikszentmihalyi's research on Flow and optimal experience leads him to list the 'elements of enjoyment' – that is, the things that make enjoyable activities gratifying (2002: 48-67):

CLEAR GOALS AND FEEDBACK

THE LOSS OF SELF-CONSCIOUSNESS

A CHALLENGING ACTIVITY THAT REQUIRES SKILLS

THE SENSE OF COMPLETE CONTROL OVER THE TASK IN HAND

THE TRANSFORMATION OF TIME (LOSING TRACK OF CLOCK TIME)

THE MERGING OF ACTION AND AWARENESS IN COMPLETE CONCENTRATION

MATERIALS AND PLATFORMS

Materials which encourage play and playfulness are likely to be:

PLEASING TO MANIPULATE, AND OFFERING IMMEDIATE FEEDBACK.

ATTRACTIVE IN DESIGN, SO THAT WE WANT TO WORK WITH THEM.

WELL MADE, SO THAT WE CAN SEE THAT THE PRODUCER RESPECTS OUR NEED FOR TOOLS OF GOOD QUALITY.

EASY TO PICK UP, BUT GROWING IN COMPLEXITY AS THE USER BECOMES MORE EXPERIENCED –THE IDEA OF ‘LOW FLOOR’ AND ‘HIGH CEILING’.

RIPE WITH POSSIBILITIES TO BE EXPLORED AND TAKEN IN NEW DIRECTIONS – A CONCEPT WHICH RESNICK AND SILVERMAN (2005) HAS CALLED ‘WIDE WALLS’.

OPEN IN MEANING AND OPEN TO POSSIBILITIES: ‘DOES IT WANT YOU TO DO YOUR OWN THING, OR DOES IT WANT YOU TO DO ITS THING?’, AS DAVID GAUNTLETT HAS PUT IT (2011: 176).

THE GIFTS OF ENGAGING PLAY

it appears that engaging play offers distinct ‘gifts’, experiences that are valuable and pleasurable to participants of all ages. There are, of course, many motivations for play, and therefore many gifts.

REFLECTION, AWARENESS AND INTEGRATION

The player is immersed in ideas, feelings and relationships, reflecting on and becoming aware of what they know. Play makes sense of previous experience and enables rehearsal of future experience. Play is an integrating mechanism, which brings together everything we learn, know, feel and understand.

THE PLEASURE OF FLOW

the deep engagement in a task, oblivious to distractions, which is both challenging and relaxing in its purity. This includes a sense of control, where the player sets their own goals and their own process, free from external rules or demands.

SELF-EXPRESSION

The individual is able to make their mark on an imaginative world, and express themselves within it.

INNOVATION

as the player operates at a level of heightened engagement and creativity he generates ideas and things that are surprising and valuable for the self and others.

POSITIVE EMOTIONS

As mentioned above, play enables the individual to feel proud of their imaginative and creative powers, building self-esteem through ‘feeling smart’, satisfying personal interests, and by creating and integrating new meanings throughout the cycle.

NEW WAYS OF SEEING

Play unlocks new perspectives and reveals hidden truths for the individual.

MASTERY

Technical expertise, broad understanding of a domain and complete control.

CONNECTION WITH AND LEARNING ABOUT OTHERS

Through play, we share others’ imagined worlds and possibilities, learning about them at the same time. Play is a rich process of relating to and coming to understand other people.

SELF-REALISATION

Play helps to develop the individual to make the best of what one has and to reach towards self-realisation, fulfillment of one’s potential, a condition and outcome of growth and societal well-being.

2.1 CONCEPTS

SIMON SAY'S

OVERVIEW

Simon's says is a computer controlled game that challenges you to repeat its sequences of flashing lights and sounds. Test your powers of concentration in 3 fascinating games and 4 varying skill levels. It's for solo play or group competition. There are 5 ways to play for 1 or more challengers.¹

ORIGINAL GAME PLAY_ A command starting with "Simon says" means the players must obey that command. A command without the beginning "Simon says" means do not do this action. Anyone who breaks 1 of these 2 rules is eliminated from the remainder of the game. Often, anyone who speaks is also eliminated. There can be very complex and difficult command chains, such as "Simon says: Arms up. Simon says: Arms down. Arms up." Anyone ending with their arms up is eliminated, because you cannot obey a command that doesn't begin with "Simon says".²

SCIENTIFIC BENEFIT_ A recent psychological study found that the game can be a healthy way to help children to improve self-control and restraint of impulsive behavior.⁴

CHALLENGE

Repeat sequences in varying skill levels. Test your powers of concentration. Win the group competition.

PROS AND CONS

Pros:

- Original Game Logic
- Direct feedback
- Group play
- Increasing levels & competition
- Testing the users concentration
- Improve self-control and restraint of impulsive behavior.
- Group play

Cons:

- Formal toy, fixed system
- Fixed buttons
- Sounddesign

INTERACTION

Push the 4 buttons with hands, play with other people or against Simon.

Inputs:

Handgestures

Outputs:

- Visual (LED's in big buttons)
- Audio (Highlightsound for each big button, start- and end of game, win - and lose signals.



REFERENCES

- ¹ Mb Senso, [http://de.wikipedia.org/wiki/Senso_\(Spiel\)](http://de.wikipedia.org/wiki/Senso_(Spiel))
- ² Original Game, [Http://En.Wikipedia.Org/Wiki/Simon_says](http://En.Wikipedia.Org/Wiki/Simon_says)
- ³ All Variations Incl.Pocket Simon Manual: <http://www.handheldmuseum.com/MB/Simon.htm>
- ⁴ <http://forums.ivillage.com/t5/Parenting-TTC-and-Beyond/Classic-games-help-limit-impulsivity/td-p/88422937>

2.2 CONCEPTS

CUBELETS

OVERVIEW

Cubelets is a robot construction kit. By combining sensor, logic and actuator blocks, young kids can create simple reconfigurable robots that exhibit surprisingly complex behavior.

Cubelets are magnetic blocks that can be snapped together to make an endless variety of robots with no programming and no wires. You can build robots that drive around on a tabletop, respond to light, sound, and temperature, and have surprisingly lifelike behavior. But instead of programming that behavior, you snap the cubelets together and watch the behavior emerge like with a flock of birds or a swarm of bees.

Each cubelet in the kit has different equipment on board and a different default behavior. There are Sense Blocks that act like our eyes and ears, Action blocks, and Think blocks. Just like with people, the senses are the inputs to the system.¹

CHALLENGE

Build new robots by trying out new combinations with this 15 available blocks. new and unexpected constructs are surprisingly and a kind of magic.

PROS AND CONS

Pros:

- Modularity
- Combine and see whats happen
- The magic inside the objects.
- Many different sensors and actuators
- Magnetic connection
- 3-dimensional connections
- Vocabulary of electronics
- Playing alone or in groups
- No wires, no programming
- Formal or informal use
- Invites experimentation

Cons:

- Restricted to technical play and robots creation
- Closed system, each cube has one function

INTERACTION

Combining blocks in different ways. Each new combination gives you new interactions & possibilities.

Inputs:

Body, Hands,

Outputs:

Sound, motion, light



REFERENCES

¹ <http://www.modrobotics.com/>

Video Cubelets Engineering Prototypes:
<http://vimeo.com/19712586>

OVERVIEW

Sifteo cubes are a brand new way to play games using wireless 1.5-inch blocks with full-color screens that respond to motion and start interacting with the player and each other, as soon as they are picked up and moved around.

“Traditional game consoles have lost the tangible and interactive nature of classic tabletop games like Mahjong and dominoes, that bring people together,” said Jeevan Kalanithi, co-founder of Sifteo. “Players tell us that Sifteo cubes reduce ‘screen stare’, banish tired thumbs and give families and individuals a more ‘natural’ way to have fun,” said Kalanithi.

How to Play with Sifteo Cubes

To play with Sifteo cubes, players first install Sifteo's software (Mac, Windows) onto an internet-connected computer and then buy games and apps from Sifteo's online library which is accessible through the software. A USB wireless link enables games and apps to be downloaded on to the Sifteo cubes for play. For best performance, users should play within a few feet of the USB wireless link. In optimal conditions, the range may extend up to 20 feet. Sifteo's game studio has built an initial collection of titles that will include challenging games for adults, learning puzzles for kids and games people can play together.¹

CHALLENGE

Truly Hands-on play for all ages. Get your hand on the interactive game cubes and move them.

PROS AND CONS

Pros:

- Modularity
- Half open system (content can be changed)
- Accelerator can change parameters of other prism
- Display information

Cons:

- Screen viewing on all blocks.
- Combinations 1-dimensional
- Connections only on prism side
- Pay for each new games.

INTERACTION

Combining prism with hands on 4 sides. Move, turn and shake prism to control something.

Inputs:

Hands

Outputs:

Visual (Screen), Audio



REFERENCES

¹ Product site: <https://www.sifteo.com/>

TED Video of David Merrill: Siftables, the toy blocks that think
<http://www.youtube.com/watch?v=JP0w9IZoLwU>

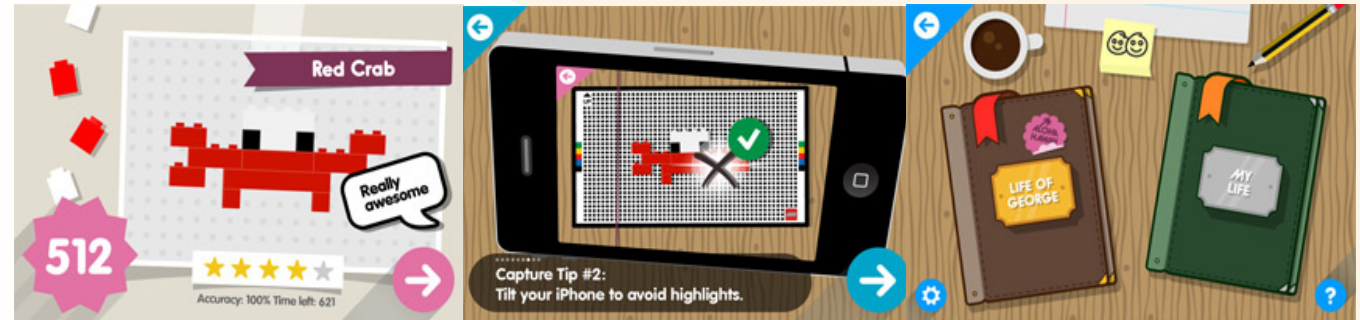
¹ Install instructions: <http://vimeo.com/31656360>

2.4 CONCEPTS

LIFE OF GEORGE (LEGO)

OVERVIEW

Introducing Life of George: the world's first interactive game combining real LEGO bricks with apps for your iPhone/iPod Touch. Follow George around the world as he challenges you to a series of fun building tasks. Build as fast as possible, capture your model with your iPhone/iPod camera and get scored on your building skills.



PROS AND CONS

Pros:

Physical and digital media
Identification (George)

Cons:

Fixed challenges (tasks & time)



CHALLENGE

Create series of fun building tasks. Build and capture fast a model and get scores on your building skills.

INTERACTION

Using your hand to create and capture your build-ings.

Inputs:
Hands,

Outputs:
Visually see the rating and scores.

REFERENCES

¹ <http://george.lego.com/en-us/products/life-of-george/>

2.5 CONCEPTS

BEATBOX

OVERVIEW

The Beatbox is a physical programmable drum machine. Consisting of 5 tappers and a central hub you can teach each tapper by tapping on its top. Once taught they will faithfully re-tap your rhythms until you tell them to stop, or teach them again.

Each tapper is connected to a central control box. This has a play/pause button, a mode switch and a tempo controller. There are 2 modes: fixed loop and free. Fixed loop (as demonstrated in the video below) locks all the tappers to one loop cycle, making it easy to create coherent rhythmic sequences, even if they are random. Free mode allows you to create far more complex, phasing sequences. It takes the length of the sequence in the first tapper programmed and uses that as the base for all subsequent rhythm lengths. In this way the Beatbox is more than just a tapping toy, it can be mastered as a flexible compositional tool.¹

CHALLENGE

Experiment choosing different materials and create a beatsequence out of them. Get in time and design your toneground physically.



PROS AND CONS

Pros:

- Modularity
- Choosing any sound thru physical facing.
- Interaction is very simple, but effective.

Cons:

- Limited system
- Simple sequencer
- Objects to limited, only one control thru one button.
- Objects just outputs, no sensors

INTERACTION

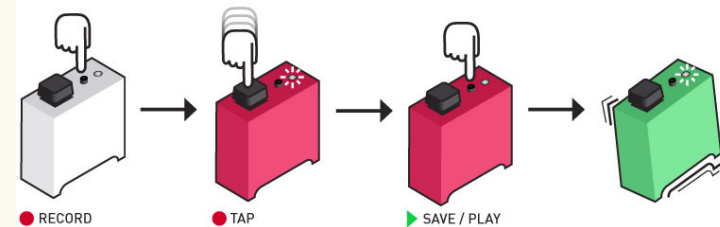
Activate thru your fingers the boxes. Control the timing, position and material.

Inputs:

Fingertips, Hands

Outputs:

Light, Sound



REFERENCES

¹ Projects site: <http://andyhuntington.co.uk/2005/beatbox/>

Project video: <http://vimeo.com/1187639>

OVERVIEW

TapTap is a modular system of rhythmic, repetitious building blocks. Knock on the top and it will repeat the pattern after a delay. The single units are able to work in a bigger system of knock boxes making the user able to stack them in sequences to create cascading rhythms.

We build two working, self-contained prototypes to get the physical feeling of the knock box. Furthermore a piece of software was created to give the idea of what a TapTap system with numerous building blocks would feel like to play with.

The Knock box TapTap grew out of an electronics workshop with Jon Rogers. Fascinated and playing around with tapping mechanisms, rhythms and repetition, we decided to keep it rather simple, without too many layers of meaning. With TapTap system we tried to take the concept of tapping and develop it into a system with multiple objects adding to the richness and playfulness.¹



PROS AND CONS

Pros:

- Modularity
- spacial placing and grouping
- different sequences thru rearrangement.
- Self-feeding system

Cons:

- Limited system
- One input, one output
- Only 2 sides of blocks in use.

CHALLENGE

Stack and tap blocks to create more interesting sequences and cascading rhythms.

INTERACTION

Building systems thru moving blocks.
Tap on the top of one block to create an output.

Inputs:

Fingertips, hands

Outputs:

Movement, sound

REFERENCES

¹ Projectsite: <http://andyhuntington.co.uk/2004/taptap/>

Projectvideo:

<http://vimeo.com/1192424>

2.7 CONCEPTS

MEMORY (RAVENSBURGER)

OVERVIEW

There are hundreds of different Memory games - starting with 24 cards for the youngest, with all kinds of animals, art, about countries, also a gay and a "Breast Memory", several free giveaway Memory games published by companies.

The most famous publisher is Ravensburger - they have the rights for the brand name Memory - and they have really nice ones.

In the Fantastic 4 Make a Match Game there is a painted "Thing" figure included. Some of the cards allow you to also take the figure, so that it switches ownership during the game. The last player with the figure at the end of the game gets bonus points towards his or her score. ¹



PROS AND CONS

Pros:

Trains concentration and memory
Physical play with hands

Cons:

Fixed cards/set
content fix

CHALLENGE

Find matching pairs of hidden cards.

INTERACTION

Using your hand to mix and turn the cards.

Inputs:
Hands

Outputs:

Visually see the right combos.

REFERENCES

¹ <http://www.boardgamegeek.com/boardgame/7688/memory>

http://de.wikipedia.org/wiki/Memory_%28Spiel%29

2.8 CONCEPTS

DESIGNING PLAYFUL INTERACTIONS FOR SOCIAL INTERACTION AND PHYSICAL PLAY

Pers Ubiquit Comput (2010) 14:385-396, DOI 10.1007/s00779-009-0264-1

PERVASIVE GAMES..

..brings the gaming experience from the world of computers and the internet into the real-world environment of the game player, by wireless and location-based technologies.

Head Up Games:
technology enhanced games that do not require screenbased interaction and therefore allow for rich social interaction.

DESIGN VALUES

1. To provide motivating feedback to player's behavior.
2. Creating opportunities for players to define their own game goals and rules.
3. Creating social player-interaction patterns

PHYSICAL ACTIVITY..

..can be broken down into various components, such as:

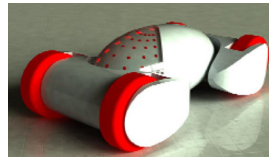
strength
endurance
speed
balance
coordination

SKILLS

Playing sports can help children develop many different skills. Apart from working on their **physical development**, e.g. strength, stamina, and motor skills, children also develop **cognitive skills**, eg. learning about rules and strategies and **social skills**, e.g. negotiation and turntaking.

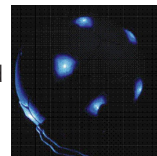
DESIGN CASE 1: BATTLE BOTS

The battle bot is controlled by the child's movement's: a vest and a glove containing motion sensors allow the children to remotely control the bot. The children were enthusiastic about controlling the tank with their body movements. Children who did not control the tanks themselves enjoyed giving advice to the players.



DESIGN CASE2: FEEDBALL

The Feedball can be kicked, thrown and caught like a normal ball. Using a tilt sensor and an accelerometer, it senses acceleration and directions and calculates the precision of a pass. Based on this information, it provides visual feedback about the quality of the movement.



We found that children were much more active in sessions with the sensor-enhanced football than in the traditional training sessions.

DESIGN CASE3: LEDTUBE

Using motion sensors, the LEDtube reacts to children's behavior by changing the color of light (red, blue, green). Two variants of the LEDtube were created: one changes color when it rolled; another when it is shaken. From this study we conclude that open-endedness is a promising concept for interactive play objects.

We found that children were able to create diverse games, with varying levels of difficulty. Often the visual feedback was not used explicitly in the games that were played



DESIGN CASE4: COLORFLARE

When children roll the ColorFlare, it will change color and when they shake it, it will start to flash. When the objects are in flash mode, they can communicate with each other using infrared

communication: when one ColorFlare is within the range of another one, it will transmit its color to the other ColorFlare. ColorFlare provides more opportunities for games and rules.

Overall, children indicated that they could use their imagination during play. Also, children indicated that they were able to create various games using the ColorFlare.



DESIGN CASE5: MULTIMODAL MIXER

It is an extension to the ColorFlare. Its interaction possibilities are the same (rolling, shaking and sending), it provides feedback in 3 different modalities (sound when it is shaken, and



vibration when it receives a signal from another MultiModal Mixer). The use of color and infrared communication was used most frequently. Apparently, offering various types of feedback made it easier to implement different functionalities in the game. Tagging is much easier with a visible signal than an invisible one. When providing objects that can communicate, players are stimulated to create games with more social components. Providing too many options can be overwhelming at the start. Furthermore, it is important to find a balance between offering an abstract shape and at the same time providing clear interaction possibilities.

CONCLUSION

...Interactive play objects can extend traditional play opportunities by providing opportunities for children to allocate meaning to diverse interaction properties, such as input actions, and output properties of the play objects. For example, sending tactile output to another player's objects can extend the sense of secrecy and surprise in playing hide and seek.

In summary, providing feedback to the player's physical activity and allowing them to create their own games may lead to concepts that are fun to use and stimulate both social interaction and physical activity.

3.1 ANALYSIS - RADAR CHART 1

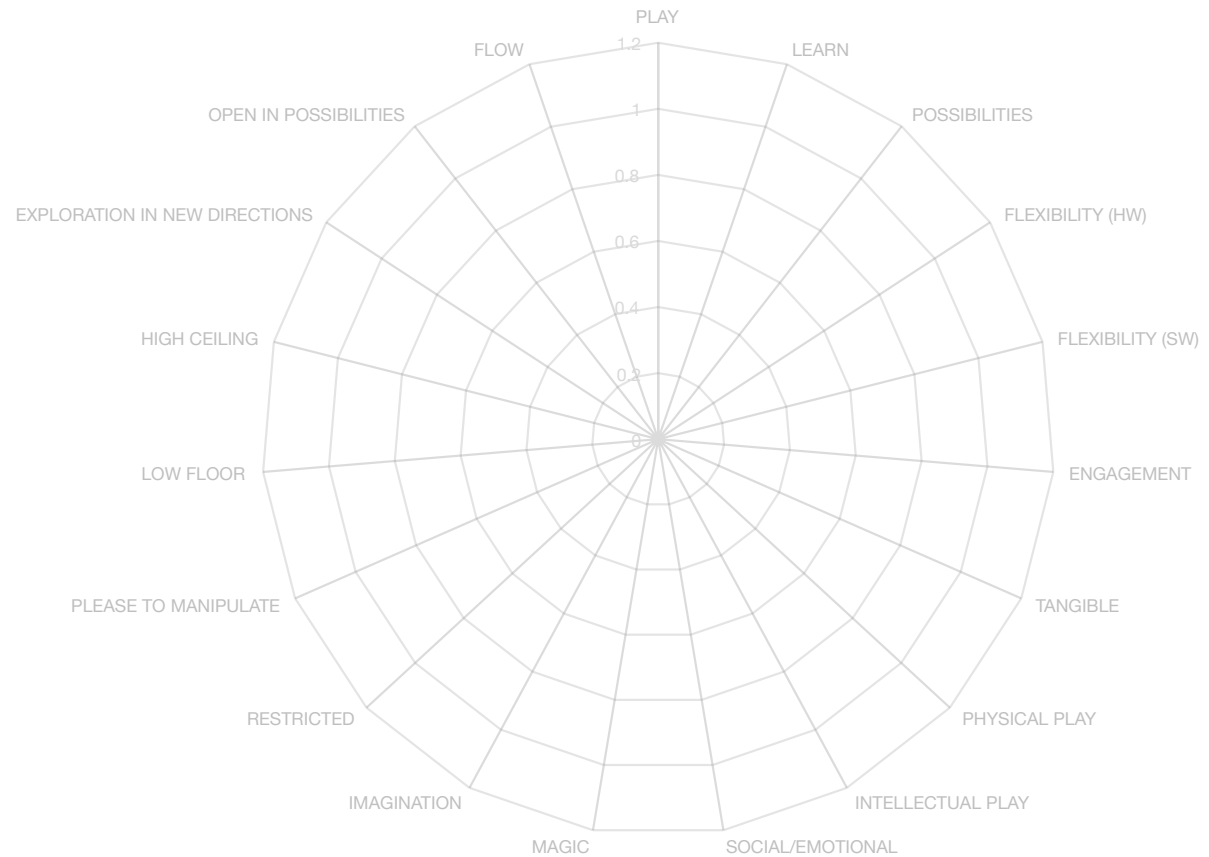
OVERALL - PARAMETERS

PROJECTS

SIMON SAY'S
CUBELETS
SIFTEO
BEATBOX
TAPTAP
BATTLE BOTS
LED TUBE
COLOR FLARE
MULTIMODAL MIXER
MEMORY
LIFE OF GEORGE

PARAMETERS

PLAY
LEARN
POSSIBILITIES
FLEXIBILITY (HW)
FLEXIBILITY (SW)
ENGAGEMENT
TANGIBLE
PHYSICAL PLAY
INTELLECTUAL PLAY
SOCIAL/EMOTIONAL
MAGIC
IMAGINATION
RESTRICTED
PLEASE TO MANIPULATE
LOW FLOOR
HIGH CEILING
EXPLORATION IN NEW DIRECTIONS
OPEN IN POSSIBILITIES
FLOW



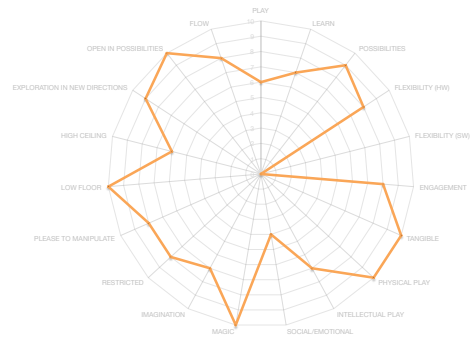
3.1 ANALYSIS

RADAR CHARTS 1 (OVERALL - PARAMETERS)

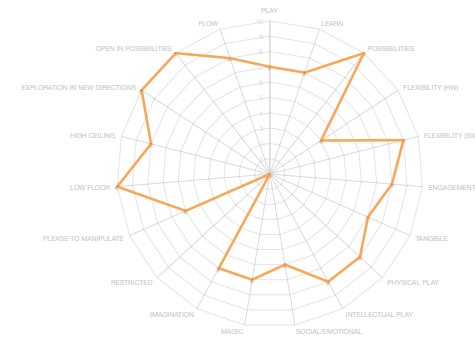
SIMON SAY'S



CUBELETS



SIFTEO



BEATBOX



TAP TAP



COLOR FLARE



MULTIMODAL MIXER



MEMORY



LIFE OF GEORGE



3.2 ANALYSIS

LINE CHART 1 (OVERALL - PARAMETERS)

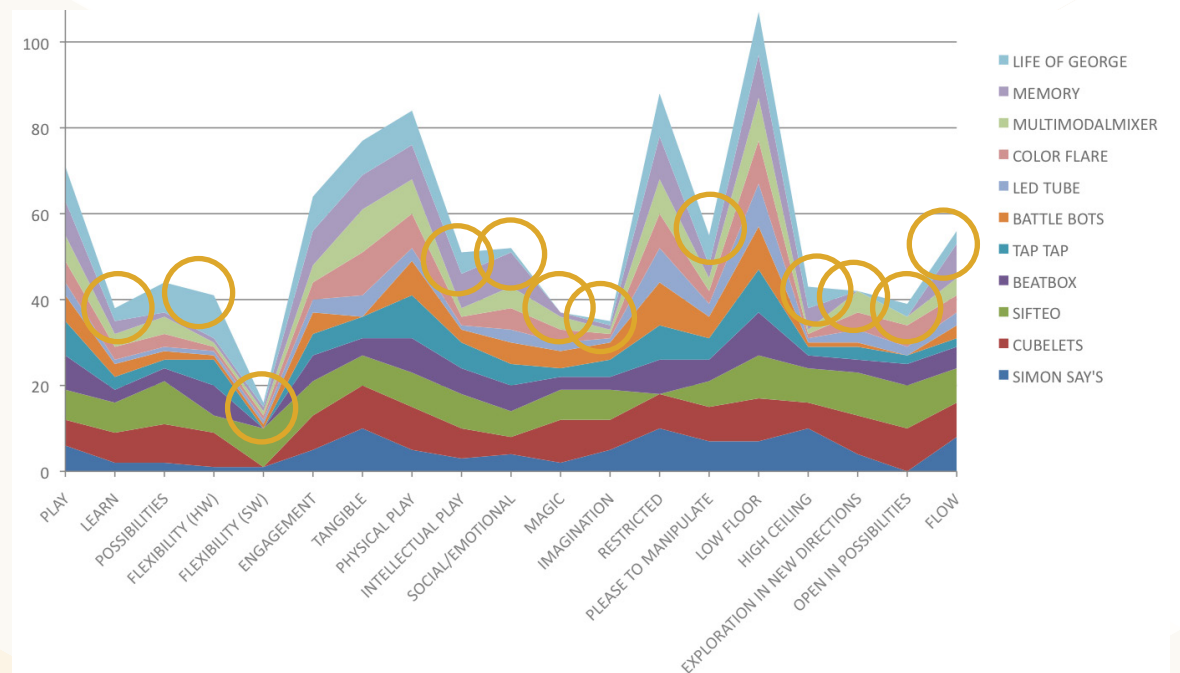
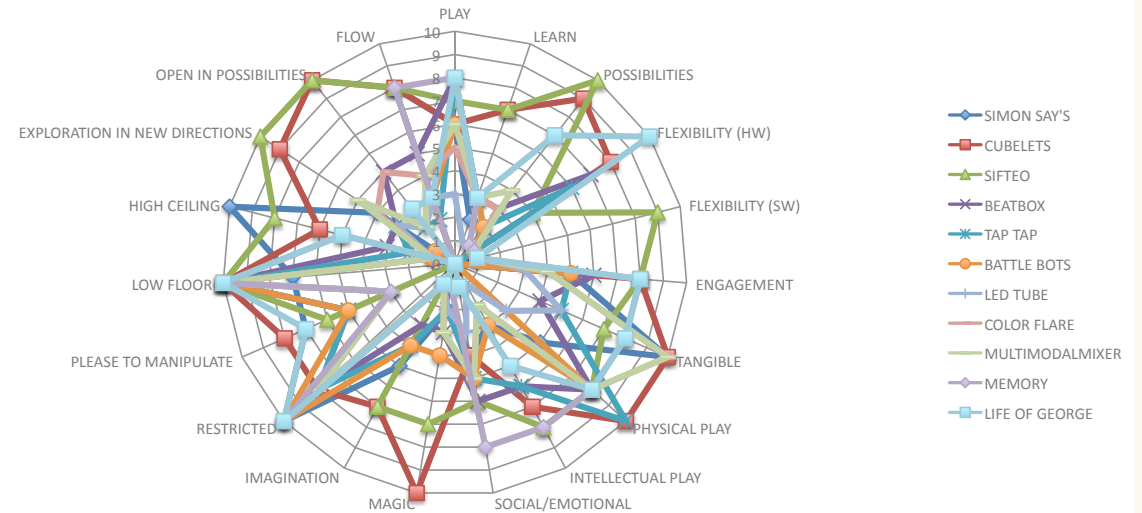
FINDINGS

The possibilities of learning are often limited to a specific content. In addition, the flexibility of the hardware and software in particular is very limited. Sifteo is an exception, but limits itself yet through his marketing strategy (buy and consume points). The system makes an open feel to the outside, but is in the end limited to the user.

I also see potential in the basic training content such as language learning, playing or understand basic arithmetic. The factor 'Magic', will be speaking on what consideration is not yet sufficiently important for the surprising and motivating in dealing with content.

The same is true for the parameter 'Imagination'. The entry-level (low floor) is usually low, but the increasing complexity also remains low. The mixed-use and explore new worlds is limited. I also see potential in the flow (flow) of the applications.

The goal is to increase these factors with already well gewerteten (play, engagement, tangible, physical play and low floor).



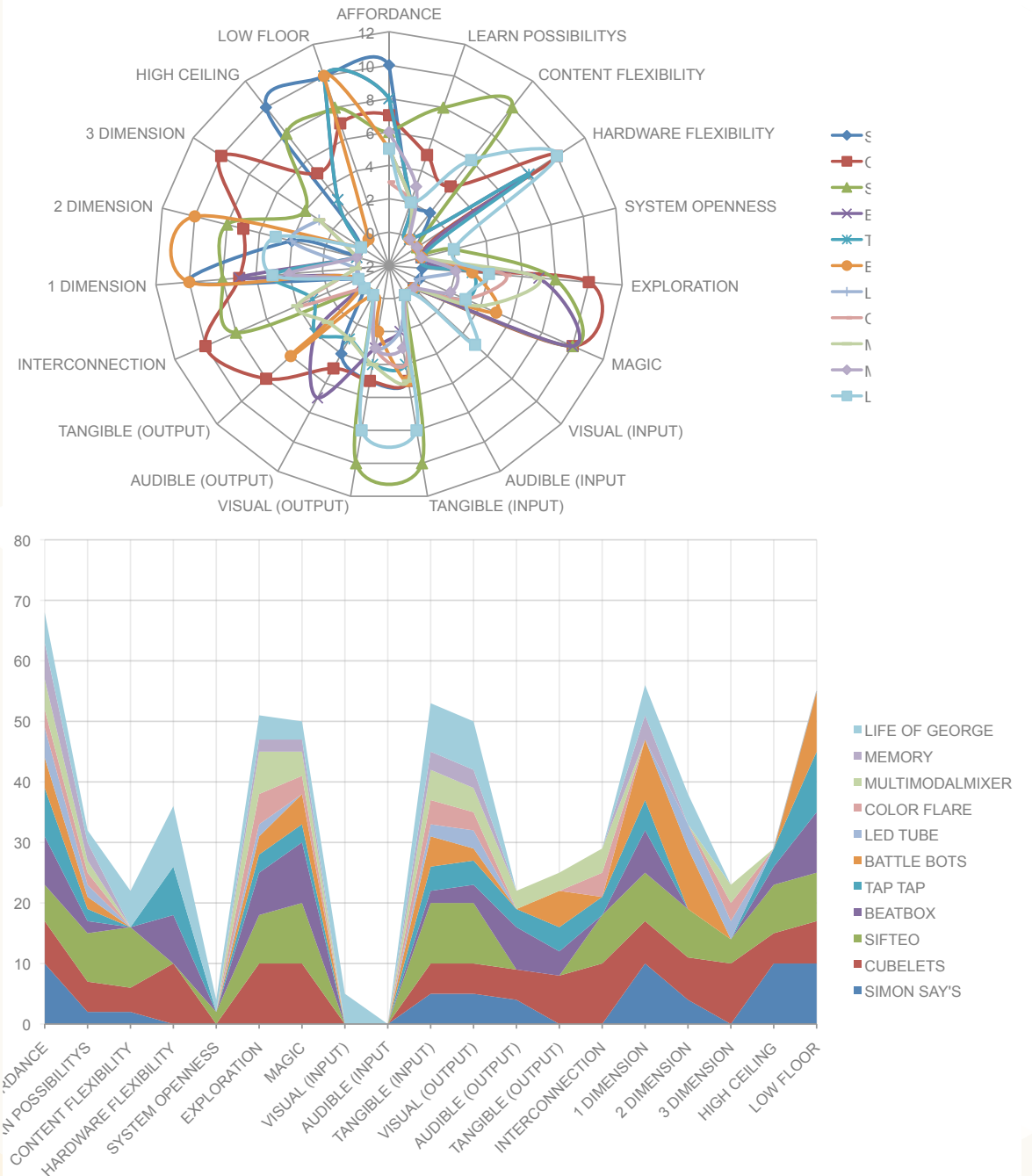
3.3 ANALYSIS

CHARTS 2 - PARAMETERS 2

FINDINGS

The second analysis with new or adapted parameters shows more clearly where the weaknesses and opportunities for improvements are.

The potential lies in the opening of applications, content and system openness. The frequent absence of visual and audible and tangible in / output illustrates another potential addition to its use in various dimensions, or the skillful combination of various dimensions.





› KEEP PLAYING