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Youth at play: some observations from a science museum

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This paper explores the nature of playfulness in young people. Observations and a small-scale questionnaire study consider the characteristics of, and dispositions towards, playfulness in a particular setting: the Thai Toy gallery of the National Science Museum in Thailand. While not initially seen to be a ‘zone of play’, the gallery has deliberately invoked a sense of play through the use of toy-making activities. A small sample of 60 young visitors to the museum was invited to make-and-play activities with traditional Thai toys as part of their family groups, and exploratory data were collected to explore their behaviours and self-ratings of playfulness. These young visitors largely enjoyed the activities, and in their responses to the questionnaire portrayed themselves as happy, funny and cheerful. A very small minority proved to be more solemn, distant and unengaged by the event. The paper discusses further work to be done in this area.

Keywords: youth; play; informal education; museum education

Introduction

Some 40 years ago, in 1973, Bruner’s book *Beyond the Information Given* made a cogent case for educators to focus on cognitive processes including problem-solving, exploration and play: play and creativity being lynchpins in such a constructivist epistemology. In the ensuing period, children’s play behaviours have been studied in considerable depth, but there it stops – there is scant literature that examines the value of play and playfulness in young adults. In their useful 2008 paper, Van Leeuwen and Westwood (2008) point out the enormity of this gap: while in the last decade there have been some 3000 psychological research papers focused on children’s play, only some 40 have addressed play in ages and stages beyond that. These authors note that even these few papers have been largely in the context of therapy rather than from any broader, more comprehensive, perspective. As Kerr and Apter (1991) argue, while play is usually associated with children, and despite all of the differences between adults and children, play is still a suitable and respectable way to promote intense and meaningful adult learning.

In this paper we explore the learning that happens when young adults are at play, what it means to be playful and just why this is ‘fun’. In our view, play – and the enjoyment of play – is context-dependent, so that some contexts invite and provide opportunities for play while, in others, play is restricted, disapproved of, curtailed or forbidden. To illustrate the former, a deliberately constructed ‘play zone’, we draw upon examples from museum education where the goal is ‘edutainment’ through hands-on activities designed both to elicit learning and enjoyment through play. Our overall research study has a broad agenda (Kanhadilok, 2013). The general thrust is to explore engagement with traditional Thai toys

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and we do this through the Traditional Technology Gallery of Thailand's National Science Museum. Within this gallery we have chosen to foster visitors' in play with traditional, locally made toys. Our ongoing research evaluates the quality of engagement with these toys, and explores the learning that ensues from the play activities provided for visitors. In this paper we discuss some of the issues involved in fostering play with young adults in particular.

Contexts for play

Adolescents commonly struggle with physical, sexual, emotional, social and intellectual growth during the teenage years and, as a result, can often be difficult, resistant, hostile and moody (Crowe & Watts, 2014). Under pressure from peers and adult expectations, childhood play is commonly abandoned for more sophisticated forms. Pressures from society for peers to 'grow up and get serious' become pervasive – even if they are commonly resisted. The thought of engaging with anything remotely childish seems uncomfortable and embarrassing, and play is commonly lost along the road to adulthood.

In our case we have worked to construct a context for play that enables young people to join with others in cooperative and collaborative activities such that they are drawn into a 'play zone'. In Figure 1 we set out some of our broad framework, in this instance a model for 'learning play' to happen.

The two zones represent those environments where play is – and is not – deemed appropriate. Zone 1 is a play zone, and is intended to encompass all of those physical, and virtual, spaces where play can commonly take place, including sporting arenas, parkland, areas of the countryside such as woodlands and beaches, youth centres, arcades, playgrounds, theme parks, a comedy show, streets, gardens, bedrooms, game-worlds, etc. Zone 2 is intended to represent the opposite, a no-play zone, those spaces where play is deemed a distraction, inappropriate, uninvited, curtailed: a three-lane motorway, a church, a busy construction site, the company boardroom, some lecture theatres, classrooms, a funeral and so on. It is clear that even within that distinction there are occasions where some play may be possible, especially where this contravenes conventions and conformity, and causes amusement.

Even when the zone is appropriate, where the people and the setting are right, play may still not take place. As Else (2009) maintains, play is personally directed, trades upon a disposition, a momentary mood, and is undertaken for its own rewards. Play must involve

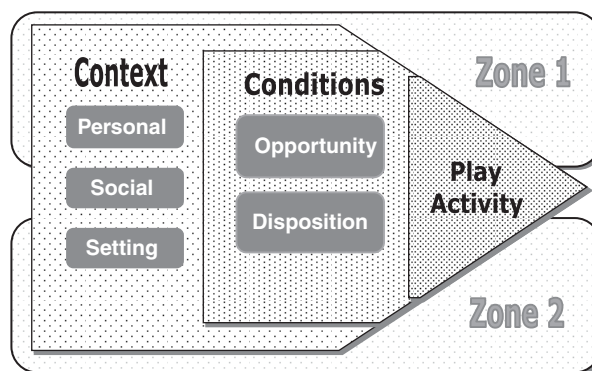


Figure 1. Two zones of play.

pleasure: where there is no pleasure, no fun, no enjoyment, there is no play. When play becomes tedious, is imposed or required, then it ceases to be play. When the fun ends, players become disillusioned, frustrated, bored – one can signal an end to play by simply leaving the play setting. Moreover, play entails an opportunity for risk – low risk in some settings, high risk in others, for example, walking along the top of a wall, swinging high on a tyre over a river, or appearing foolish playing the game of charades.

Leading from Figure 1, we see contexts for play to be further described through the *particular setting*, *personal characteristics* and *social relationships*. The setting is important, whether playing mixed doubles on a tennis court, ‘I-spy’ in the family car, *Wii* games in the living room, *Runescape* in the bedroom or, as is the case here, toy-making in a museum. The ‘personal’ relates the individual, his or her tendencies towards play, emotions and playfulness. We return to playfulness in the next section of this paper. The ‘social’ entails a person’s feelings, beliefs and culture, as these relate to others. People find ‘playmates’ in a range of different contexts: home, school work, social venues, sports halls, a football pitch, etc. In this case it is with members of their family as they visit a Science Museum.

The setting: toy-making at the National Science Museum

The Thai Traditional Technology gallery at the National Science Museum, Bangkok, is designed specifically to inspire visitors to learn about the relationship between scientific knowledge and local Thai culture. The Traditional Thai Toys Activity (TTTA) is one highlight of the gallery borne from the collections of old toys in showcases which, in the past, visitors were prohibited from touching. Visitors, though, showed considerable interest in the old toys because they are made from natural materials, have appealing figures, fascinating movement and, these days, are relatively rare to find.

Toys are the props of play. They are the objects or equipment with which young adults will play for both enjoyment and knowledge, cognitive and imaginative (Frobose, 2008). Ovravec (2000) defines toys as objects of interest, ‘learning instruments’ that stimulate social and intellectual imagination. They can challenge the player’s abilities and respond to natural curiosity (Frobose, 2008). The classical example is Froebel’s ‘gifts’, sets of toys used for children’s development (Wright & Fuller, 2010). Most toys stimulate individuals’ play but there are particular interactive toys that promote the richest play (Frobose, 2008). For example, hands-on playthings are seen to be more fascinating for visitors (children and adults) in a museum because they can handle and practice many skills, and are interesting and enjoyable (Goolnik & Curtis, 1995). Given its role as a science museum, its purpose is to emphasise scientific knowledge and it aims, in general, to provide a ratio of 75% scientific knowledge and 25% local Thai wisdom and culture (National Science Museum, Thailand, 2007).

Arguments about the role of play in the development of human culture can be found in the play theory of Huizinga (1971). He was perhaps the most prominent scientist emphasising the role of play in culture and he writes about ‘the nature and significance of play as a cultural phenomenon’. Huizinga suggests that play is primary to and a necessary (though not sufficient) condition of the generation of culture. So he is not just proposing that play reflects and mirrors cultural environment, but play is one of the motors of the development of culture. At the museum, local wisdom is introduced in parallel to Western modern science, so that activities explore related part of local wisdom with these toys.

The TTTA space in the gallery is a ‘play zone’ (Zone 1) within the science museum. Traditional Thai toys are repositories of local knowledge that have been collected for a

long time, with the aim of providing opportunities for playfulness. In the museum, traditional Thai toys are used to stimulate learning, knowledge, imagination and construction, and encourage awareness of values in local wisdom (Kanhadilok, 2013). Traditional Thai toys are made from local or waste materials that adults and children use to make for play. Playing with traditional Thai toys reflects local wisdom, ways of life and the cultures of the community. Learning science through traditional Thai toys aims to encourage learners to seek both scientific knowledge and this local wisdom. Nearnchalearm (2005) points out that playing with traditional Thai toys helps young people to develop both learning processes and science process skills, for example, measuring, observing, predicting, making decision and inferring. He argues that learning science from such cultural tradition promotes attitudes towards science that make the link between these two forms of knowledge and understanding.

TTTA has been developed under a constructivist theory of learning (Taber & Watts, 1997; Gilbert & Watts, 1983), which focuses on understanding. Constructivism is a model of how learning takes place and implies that adults and children are always active agents in the process of meaningful learning. Children learn not simply by receiving transmitted knowledge, but by interpreting experiences and information against schemas of prior knowledge. For example, activity-based or hands-on learning allows for meaningful ‘grappling with the concepts under study’ (Cobern, 1996, p. 300). TTTA also allow participants to experience pleasure by learning-through-doing in making and playing with the toys. Learning-by-doing at the TTTA uses toys based on elementary scientific principle which closely simulate real-life scenarios, give scope for innovation, challenge and make learning science playful and exciting (Carruthers, 2011). Thus, TTTA aims to encourage people who participate in the activities to learn scientific knowledge in parallel with local wisdom through adopting a playful attitude towards making and playing with these traditional Thai toys. This aim follows the mission of the organisation to develop ‘edutainment’ learning resources in science and technology.

Traditional toys, two examples

The ‘Thai kite activity’

This kite example is drawn from traditional kite festivals that occur historically in Thailand in March every year, at the Royal Park near the Palace. The aim of the festival is to celebrate the first winds of the year, important for local transportation. Kites from each part of Thailand present their unique designs and compete either in terms of their creativity or their fighting capacities. The fighting of two traditional Thai kites has long been a famous activity. The two types of kites, the ‘male’ Chula kite and the ‘female’ Pakpao kite, are of different shape and size (see Figure 2). These kites are created in the middle of Thailand, a Chula almost twice as large as a Pakpao (a ratio of about 3:5 to be exact). The Chula is star-shaped, generally five to seven feet in length, and bamboo grappling hooks called champah are placed at strategic intervals along the string. These are the weapons of the Chula, between three and five champah allowed per kite. The smaller of the two kites, the Pakpao is diamond-shaped, usually two and a half feet in length. The Pakpao, too, is armed for battle, the weapons being the long starched tail and a loop, which hangs from the string. Being the smaller kite, the Pakpao is significantly faster and more manoeuvrable than the Chula.

The rule of the competition is to separate the field into two parts, the first for the Chula team, the other for the Pakpao team. The young (commonly men) on the Chula team use one kite to fight five Pakpao kites, the winner is the team that pulls the opponent (using a hook on the string) into their part of the field. The event itself is impressive. During a fight,

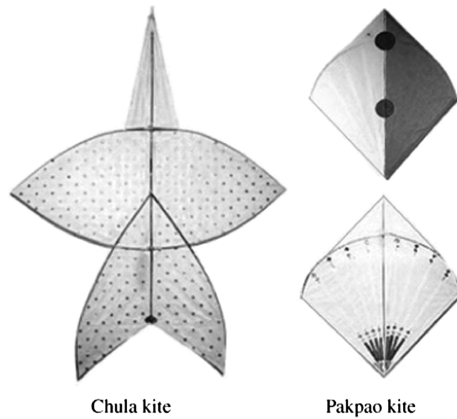


Figure 2. Thai kites. Source: Thaigoodview.com (2007).

kites are flown with a very high degree of skill, diving and climbing in an aerial battle. Thousands of people gather each year to witness these contests and, in the past, the King Chulalongkorn, Rama V of Thailand, watched the competition every year and provided the prize to the winning team.

Bamboo ‘cicadas’ and whistles

Cicadas are made from short sections of the trunk of a bamboo plant, a bamboo stick, paper, string and resin. To ‘play’ the ‘bamboo cicada’ is to swing the trunk of bamboo around the resin, the string rubs the resin and makes a noise, this then vibrates through the string, and the piece of bamboo trunk itself amplifies a sound like a tree Cicada. In the past, people created the bamboo toy to imitate the sound of cicada. They are entirely playful, friends competing with each other – each cicada toy makes a different sound through different shapes and sizes of material. The players learn the best way to construct the toy and the most suitable materials for making a ‘good’ sound. They also learn scientific principles about the nature of sound through these activities.

The whistles are also made from the trunk of bamboo but are smaller and longer. The components comprise bamboo trunk, a bamboo stick and a wooden ‘tongue’ to make the sound when air is blown through it. The bamboo stick changes the volume of air inside the



Figure 3. The ‘sound’ toys. Source: National Science Museum, Thailand (2007).

trunk of bamboo. In the West they are sometimes known as a whoopie whistle. The player pulls the stick in and out while blowing, making different sounds, not unlike sound of bird song. Here again, participants enjoy playing with these because of the interesting sounds they make. In the past, local hunters would use this toy to lure birds into traps. Some musicians in the northeast of Thailand have developed this toy to be the local instrument, called a 'vode' (see Figure 3).

Personal characteristics, young people's playfulness

Play itself has typically been characterised by researchers as an enjoyable activity that keeps participants actively involved and intrinsically motivated (Glynn & Webster, 1992). For example, a recent, nationally representative sample of teens in the USA found that 99% of boys and 94% of girls enjoyed playing video games (Lenhart et al., 2008). The amount of time spent playing such games has increased over time (Escobar-Chaves & Anderson, 2008; Gentile & Anderson, 2003). Many children and adolescents play more than 20 hours each week; 40 hours of gaming per week is not uncommon among males (e.g. Bailey, West, & Anderson, 2011). Our current interests, though, are concerned with more prosaic issues in developing imagination, creativity and problem-solving abilities, principally in 'brainstorming' sessions, and playful moves – fooling around, crazy ideas, heavy irony – that are engaged within an overarching commitment to come up with good solutions to a problem activity.

A number of researchers have generated evidence to argue that play, and playfulness, is actually an observable and measurable construct (for example, Barnett, 1991; Harris, 1989; Rogers et al., 1998). Lieberman (1977) has offered a formal definition of playfulness, concluding that it is a disposition and describing it as a 'light-heartedness' that goes well beyond the childhood years through its component parts of sense of humour, manifest pleasure and spontaneity. From his numerous studies, Barnett (2007) generated the flowing definition of playfulness as:

the predisposition to frame (or reframe) a situation in such a way as to provide oneself (and possibly others) with amusement, humor, and/or entertainment. Individuals who have such a heightened predisposition are typically funny, humorous, spontaneous, unpredictable, impulsive, active, energetic, adventurous, sociable, outgoing, cheerful, and happy, and are likely to manifest playful behavior by joking, teasing, clowning, and acting silly. (p. 955)

Several of these qualities have been found in previous work exploring playfulness in young adults, and three of these in particular (being adventurous, impulsive and/or spontaneous) have been highlighted by Glynn and Webster (1992, 1993). It is worth noting that only one, impulsiveness, has been found to be a component of both children's and adults' playfulness, supporting the literature where impulsivity is seen generally to remain consistent from childhood to adulthood (Kagan, 2002). Glynn and Webster (1992) define early adult playfulness as:

... an individual trait, a propensity to define (or redefine) an activity in an imaginative, non-serious or metaphoric manner so as to enhance intrinsic enjoyment, involvement, and satisfaction. Playfulness is a multidimensional construct encompassing cognitive, affective, and behavioural components, which together constitute a continuum along which individuals range from low to high. (p. 85)

Methods 1: the playfulness questionnaire

In February 2012 the playfulness questionnaire was conducted face-to-face with 93 families, a total 179 people of whom 60 were in the target group: adolescents between the

ages of 13 and 20. Of this group, 55% were young women and 45% young men. These families were visitors to the Science Museum; they were invited to participate in completion of the questionnaire as they reached the museum's Reception Area. All were Thai nationals and were mixed in the educational attainments and aspirations (Kanhadilok, 2013). The purpose of the survey was to study the significant characteristics that this cohort relates to playfulness.

The playfulness questionnaire we used was adapted from Barnett's (2007) Young Adult Playfulness Questionnaire. The first part aimed to gather straightforward personal background details of respondents. The second part sought their characteristics of playfulness in relation to themselves. This self-reporting instrument lists 15 adjectival items where the respondents are invited to say to what extent these adjectives apply to themselves. The questionnaire uses a four-point Likert-style rating scale (Oppenheim, 2001) and the range of answers used here was:

- 1 = Not at all like me.
- 2 = Not quite like me.
- 3 = Quite like me.
- 4 = Very like me.

We translated the rubric and all items into Thai and gave this version to language experts at the National Science Museum for approval and validation. In their amendments they suggested that, when translated to Thai written language, some words with distinguishably meanings in English resulted in expressions with almost identical meanings to each other in Thai. For example, the word 'funny' in Thai language covers those characteristics on the list that included 'Clowns around', 'Jokes/teases' and 'Humorous'. The Thai version, then, cut three adjectives from the original 15 to leave 12 items in total.

Methods 2: observing and recording playfulness

In this section we report on observations of the activities as they took place in the activity space of the Traditional Thai Technology gallery (TTTA). The families in this study are multi-generational groups, with one or more adults accompanying either a single child or several children and young people as they visit the museum. In this part of the study we have chosen to examine their social interactions from the perspective of Bandura's (1986, 2001) social learning theories. Bandura (2005) contends that 'vicarious learning' through familial role modelling involves learning through observing the actions of others in the family, and its effectiveness depends upon how well such people are able to support the play-learning taking place. Support from 'trusted others' is important, not least because they are able to share concerns about their own lack of confidence and how common it is to have difficulties in certain areas. In our case, the young people are copying or emulating others, and then developing to a level of self-control, self-maintenance (Zimmerman & Schunk, 2001). Bandura (2005) suggests four levels:

Level 1: An observational level during which learners watch a role model performing the skill to be acquired. Within the context of our own study, this may be a young person watching a parent, older sibling or younger child initiate a construction task, and follow it as the task unfolds

Level 2: The other members of the family then begin tasks of their own, guided by the better, more accomplished, more experienced members of the group. In our case, the

young people now begin to take up the task themselves; they try to adopt the model behaviour and move to the 'emulation level'. In making a working toy themselves, they become supported by the help of the initiator, often newly experienced nimble fingers guiding older ones.

Level 3: The young people gain achievement in their tasks supported by, but largely independent of, their family role models. At this third level – the level of self-control – they practice the behaviours independently of the role model, but still in the supportive, structured environment.

Indications of Level 4: The young people will take learning derived from the activity, and repeat, adapt and improve on it elsewhere. In our case, we are unable to witness Bandura's fourth level, the self-regulated level, simply because these young adults take their learning out of the immediate setting and replicate it, for instance, at home and essentially outside our purview.

In addition to Bandura's levels, we also used Lieberman's (1977) categories to make general observations of playfulness. As discussed earlier, Lieberman identified the following categories: (1) physical spontaneity, (2) social spontaneity, (3) cognitive spontaneity, (4) a sense of humour, and (5) manifest joy. We sought examples of each of these categories within the Bandura levels, as depicted in Table 1.

On each occasion, one of us (PK) worked closely with a team of museum Explainers, the museum staff employed within the activity area and, for this study, acted as research assistants. In general, the activity space held sufficient room and facilities for about 40 people to work comfortably at any one time. This commonly meant that there would be between 12 and 14 families in the room, within which there were 15–20 young people in the age range of 13–20 years. The observations we describe here took place over four

Table 1. Bandura levels and Lieberman categories.

Bandura levels	Lieberman categories	Assessed measure
Level 1	1. Physical spontaneity	1. Always 2. Often 3. Seldom 4. Never
	2. Social spontaneity	1. Always 2. Often 3. Seldom 4. Never
	3. Cognitive spontaneity	1. Always 2. Often 3. Seldom 4. Never
	4. Humour	1. Always 2. Often 3. Seldom 4. Never
	5. Manifest joy	1. Always 2. Often 3. Seldom 4. Never
Level 2	Categories above repeated here	As above repeated here
Level 3	Categories above repeated here	As above repeated here
Level 4	Categories above repeated here	As above repeated here

activity sessions during two separate days, allowing us to build a picture of the 60 respondents.

First, the families were invited to explore the toys exhibition and play with the collections of toys already there. Then participants were invited into the toy-making activity, led by the Explainers. The activity began with an introduction to traditional kite-making technology and demonstrated the methods used to make the two different kites. Throughout, there were task sheets, written guides and diagrams, help was provided on request and, most usually, participants gained information and ideas from the museum's Explainers. The Explainers' were inducted into the research and their brief was clear; while being available to help and support the construction work, they also undertook structured observations of the family groups using an observation schedule, noting obvious and manifest behaviours, for example, which of the toys engaged the participants most, which elicited most fascination and curiosity and how the visitors reacted.

The Explainers paid close attention to the families throughout the session, made notes of people's comments and remarks, took photographs (with permission) and supported the observations and theory-building during the analysis of the data. The initial analysis of the data took place at the end of each session, first by the researchers and then in discussion with the Explainers. Our key interest lay in the ways we could identify playfulness, and we spent considerable time both before and after each sessions on elaboration, explaining to each other what both the Bandura levels and the Lieberman categories meant and looked like when observed. We succeeded in generating only broad operational definitions of these categories, and were wary of trying to stipulate or measure the degree to which each category was observed. We were conscious that while as observers we could observe behaviours that may be indicative of understanding, enjoyment, etc., we were not actually measuring how much subjects have learned or how much they enjoyed it. The observations and the photographs allowed some examination of how grandparents, parents, adolescent sisters and brothers and younger children all communicated – not just verbally but through gaze, touch and action as well.

Intergenerational activities like these comprise numerous examples of reciprocal learning. In all the interactions we observed between children, adolescents and adults, knowledge and skills were shared sensitively in an atmosphere of warmth and trust. At times, when they were unsure what to do, they all asked questions of each other while simultaneously engaging the other's gaze.

Research outcomes

The questionnaire

The data suggest that this cohort of 60 respondents saw all these characteristics as broadly positive. The majority of children and teenagers chose the character closest to their self-perceptions. They would label themselves, first, as friendly (Mean = 3.66); second as happy (Mean = 3.62) and third as cheerful (Mean = 3.58). They were less likely to describe themselves as outgoing and active, and the characteristics 'least like me' were being impulsive (Mean = 2.77), unpredictable (Mean = 2.87) and spontaneous (Mean = 2.97) (see Figure 4 and Table 2).

The observations

For the sake of clarity, in this section we report first the observations under the four 'Bandura levels' above, and then discuss the observations under the Lieberman categories.

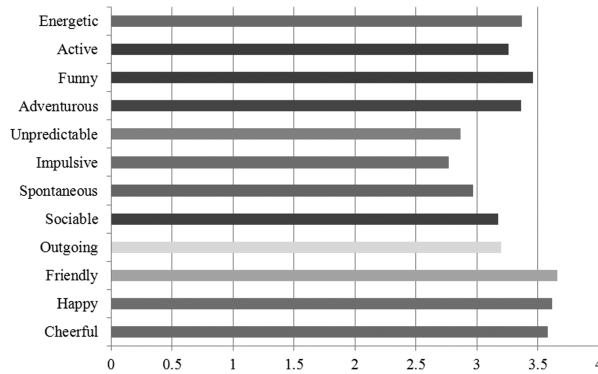


Figure 4. Respondents' mean scores.

The 'Bandura levels'

Observed Level 1 actions: members of the family group initiate a play-task and act as role models while being observed. Most participants were observed to engage readily with the making of the wickerwork toys in the TTTA. Family groups commonly began by listening to the Explainers, reading the illustrated texts made available, examining the construction materials and exploring until they understood roughly how each toy was made and how the activity worked. In general, it was the younger children who began the construction task unprompted and became quickly engaged, the key motivation being the challenge of the construction. While reacting in a free-spirited, spontaneous way, they were also counselled to be careful and disciplined and, within a short time, had accrued first experience of working with the materials of the activity. The adolescents initially seemed slower to react; they checked the instructions, tested the materials and watched their younger siblings make a start. In many instances, the young adults then insinuated themselves into the activity and took over part or all of the tasks, relegating both younger and older members of the family to becoming the onlookers to watch their problem-solving activities. In general, though, Level 1 was a prelude to handing the half-made toy back to a child or adult and beginning the construction of their own toy, as if to show how they could now undertake the task better and to their own design.

Table 2. Respondents' mean scores.

	N	Min score	Max score	Mean	Standard deviation
1. Cheerful	113	2	4	3.56	.538
2. Happy	113	2	4	3.61	.499
3. Friendly	113	2	4	3.66	.510
4. Outgoing	113	1	4	3.20	.752
5. Sociable	113	1	4	3.17	.763
6. Spontaneous	113	1	4	2.97	.793
7. Impulsive	113	1	4	2.77	.941
8. Unpredictable	113	1	4	2.87	.857
9. Adventurous	113	1	4	3.36	.846
10. Funny	113	1	4	3.46	.744
11. Active	113	1	4	3.28	.679
12. Energetic	113	1	4	3.37	.652
Valid N (listwise)	113				

Observed Level 2 actions: other members of the family then begin to take up play-tasks of their own, guided by the accomplishments of the child. At this stage, the young people tended to choose their construction materials, the paints and colours they wanted, took their own task guides and resources and began the process of assembling and making the kites for themselves. They became purposeful, diligent, and, even while it was obvious fun, they were earnest in their approach to the construction. They were observed laughing and teasing each other, interrupting each other in their tasks, joking, pointing out poor workmanship in others' designs. The level of 'didacticism' was generally low: the Explainers only intervened when asked, most other family members acted in a similar way, only providing support when help was sought. Participants seldom hesitated in asking the Explainers how to solve construction problems, to offer help to other people, often to other families and gallery visitors in the room, with similar problem, or to tell others about construction problems before they got started. So, even though overt 'didactic transmission' was low, supportive and help-orientated, this did not prevent some young people, boys usually, from becoming 'instructional', and beginning to teach-and-tell directly anyone who would listen. There was a sense that, as they grew in confidence, they needed to explain to parents and others how the activity worked in order to reinforce their own achievements.

Observed Level 3 actions: where the 'learner' members of the family gain achievement in their tasks supported by, but largely independent of, their family role models. At this point, all members of the families were acting together yet independently, cooperating but not collaborating. The young people were able to complete their constructions, largely without direct guidance or helpful intervention. Their work became expressive and, even when self-controlled and busy, they were observed to be animated and excited. The participants were seen to show considerable enthusiasm in following the activities, completing the activities in making the toys themselves, decorating them. When they finished the kites, for example, they evidently enjoyed colouring the materials imaginatively, drawing further pictures of birds, flowers. The young adults exhibited most playfulness when they demonstrated their toys to friends and family. Some family members tested and played with the toys by themselves, then invited friends and family over to join them and talk about the toys: when they found them worthy of note, they would call over and involve others in play, talk animatedly about the toys, how it worked. They took some considerable pride in their achievements, and met new people, other previously unknown participants at the gallery.

Surmised Level 4 actions: that the learners will try to take what they have learned from the setting, and repeat, adapt and improve on what they have been doing. We have no direct examples of this group of play-learning behaviours because, by definition, our participants would display these skills and competencies once away from the museum. Almost all young adults showed keen interest in the toys and said clearly that they wanted to make them again, by themselves.

The 'Lieberman categories'

Physical spontaneity. The levels of physical spontaneity in play were mixed. Most participants engaged easily with the previously made exhibition toys for extended periods until the allotted time was up. The highlight of this activity was actually playing with the toys, with individuals saying, for example, 'I will use the bamboo whistle to call the birds near my house', 'I will give this toy to my sister' and 'I will name this toy a bird pipe'. While there was some spontaneous playfulness, the museum toys were treated with some care and considerations and so the levels of physical activity were muted.

When it came to making their own toys, their behaviour showed repetition of the movements and actions, clear facial enjoyment, often playing with some of the ready-made kites, exploring until they understood what each part did, how it worked. Some of the younger children had difficulty in binding the string when making the kite, not least because of their limited physical skills, hand–eye coordination. Older members of the family, usually the young people or the Explainers, demonstrated the physical skills involved and gave them learning and construction assistance. Making Thai kites was more difficult, for example, than the sound toys activity, because producing the kite required greater skills, not least in balancing the kite's aerodynamics and managing to actually launch it.

The greatest levels of physically spontaneous fun came in these later phases, when the overall make-and-play activity had served to break down initial social formalities and encouraged some more exuberant activity. The attempted kite-flying in the room was at times energetic and lively and, on a few occasions, competitive and high-spirited.

Social spontaneity. Levels of social spontaneity were seen to increase over time. As above, the socially spontaneous playfulness increased over the period of the make-and-play activities, as social reserve softened, informalities increased and people engaged with each other more readily. The young people in particular were observed to be more willing to engage within their own families and with other (previously unknown) young people in the room at the time. Participants exhibited most playfulness when they demonstrated their toys to friends. Some explored and played with the toys by themselves, then invited friends and family over to play with them and talk about the toys: when they found them worthy of note, they would call over and involve others in play, talk animatedly about the toys, how it works: 'It's funny', 'I like these toys', 'I want to buy it' and 'Where can I get one?' They took pride in their achievements, and met new people, other previously unknown participants at the gallery. Participants who finished early (perhaps had previous experience of the toys) provided help to the younger people. They also helped other gallery visitors with similar problems or warned them in advance of problems to come, inviting their new friends to fly kites together after this activity.

Cognitive spontaneity. Being spontaneously, cognitively playful is difficult to observe. In discussions, the research team and Explainers described this best as the ways in which the young people engaged with the demands and challenges of the tasks, the extent to which they were able to meet the challenges demanded in the construction process.

As stated above, the young people played with the old toys in the museum exhibition, some of which they had never encountered before, and engaged with them until they knew how they worked. Clear facial enjoyment was observed, often playing with some of the ready-made kites, exploring until they understood what each part did and how the parts interrelated. When it came to making their own toys, their behaviour showed considerable enthusiasm in following the activities led by the museum's Explainers, completing the activities in making the toys themselves and decorating them. When they finished, for example, the body of the kite, many clearly enjoyed colouring the materials imaginatively, and drawing pictures of birds, flowers and rockets. Some wrote their name on the kite or named them 'Thunderbird' or 'Lovebird'. Some made fanciful tails and fins for the kite, colouring them, experimenting with launching them until they worked. They did not appear to hesitate in asking the Explainers how to solve construction problems, to help other people with the same problem, or told other people about this situation before the problem.

A sense of humour. The observations provided strong evidence for the occurrence and use of humour. While it is certainly the case that the Explainers created a humorous atmosphere from the start of the make-and-play activity sessions, this was reciprocated by the participants who grew in their use of humour. As can be seen from Table 2, some 75%

of respondents described themselves as funny, and there were considerable observational data to support this. While the Explainers were successful in encouraging playfulness, motivating participants through laughter, the young people continued the mood and enjoyed teasing and joking – particularly when looking at the other toys of friends and family, and commenting:

(laughing) I think your toy sounds like a duck,

Yes, I made it to call like a duck, not a bird. I don't want to make the same toy as *you*!

That said, it must be noted that not all of the participants could be designated as openly humorously playful. A minority signalled a degree of ennui, boredom with the activity, and showed relatively low levels of interest. A number of these were young men, visiting the Science Museum with their family, who seemed reserved and unwilling to participate fully in the TTTA, especially with the younger children. Some said, 'It is a child's activity', 'I have made these toys before' and 'It's a waste of time'.

While they did take up the activity in small ways, it was more through social pressure and they did so with a degree of reserve and resistance, and almost always in isolation.

Manifest joy. Within the traditional toy collections we observed interest, fascination and curiosity. Most participants were clearly interested in the information and pictures of the toys, enjoyed the cartoon characters in the graphics panels and playing with the exhibition toys (see Figure 5). Participants played repeatedly with these and there was clear smiling enjoyment when the toys moved or made a sound. Some young people said that they had 'never made a kite before, this is the first kite in my life and I want to play it with my family'. Some young adults reminisced: 'I remember, I used to play with my kite with my parents. I'm going to bring this kite home to my brother'.

As in the discussion above on observing humour, we observed and registered a few minor instances where the young participants indicated small examples of frustration. Some showed negative feelings when they could not follow steps in the toy-making process, such as binding the string or bending the bamboo sticks. They wanted to make the toys by themselves but could not always manage this alone. In moments of moodiness some young adults said: 'I can't do it, it is difficult for me'. As we noted earlier, when play becomes tedious, when players become frustrated or disillusioned, when the fun ends, then it ceases to be play.

Summary discussion

We began by describing the broad agenda to our work. Our intention has been to create a 'play-learning zone' within the Traditional Thai Technology gallery of Thailand's



Figure 5. Cartoon characters.

National Science Museum as a means of generating informed appreciation of both western science and local Thai culture. While not initially seen to be a 'zone of playfulness' as depicted in our Figure 1 at the start, the gallery deliberately invoked a sense of play through the use of toy-making activities. This play zone has looked to foster visitor's engagement through make-and-play activities with traditional, locally made, toys, the TTTA. As part of our ongoing research we have wanted to evaluate the quality of engagement with these toys, and any learning that ensues from the play activities provided for both child and adult visitors. This agenda has, in turn, led us to explore the playfulness of visitors (children, young adults and adults) who participated within the TTTA. Having established an appropriate play-zone setting, we looked to see how possible it was to explore the personal and social dispositions of visitors towards play.

Playfulness is observable: in general, our observations did allow us to collate observational data and identify playfulness through Bandura's (1986) levels and Lieberman's (1977) categories. In this case, these visitors to the museum could be seen to enjoy themselves within the play setting. While they may be representative of Thai people in the larger population, they were clearly that subset of the population who were visiting the museum with the intention of engaging in an enjoyably informative day with friends and family. Observational studies such as these that are conducted for research purposes do not generally require signed consent, only a notification that research is being conducted. By taking up the offered invitation to make-and-play with traditional toys, these young people were further signalling their intentions to enjoy themselves. These data, perhaps, indicate the degree to which visitors have an intrinsic desire to play with the toys. It is unsurprising, then, that the great majority enjoyed the activities and saw themselves as cheerful, happy people.

While we could identify playfulness in the great majority of the 60 young visitors during these sessions of the TTTA make-and-play activities, we could also see in a small minority a tendency to dismiss or feel distant from the play. That said, the data in Table 2 suggest that this cohort would label themselves, first, as friendly, second, as happy and funny and, third, as adventurous. The characteristics least like them are being impulsive, spontaneous or unpredictable, respectively.

Within this cohort, only a small minority would not label themselves as 'funny', 'cheerful' or 'happy'. Although the demographic data here do allow for a breakdown for age, gender, education, etc., these are not tracked in this paper. That said, our observations noted that one or two of the young men within the group felt that the play activities might bring about a loss of formality, risk their dignity and lack solemnity. Nor is it clear from our data to what extent these reservations about play are personal, individual dispositions or more closely related to these respondents' feelings and beliefs about what is appropriate in a social setting within their culture. Overall, though, while we are sensitive to cultural stereotyping, the broad outcomes are consistent with a general portrayal of Thai people's behaviour as friendly, happy and funny. Thailand pictures itself as the 'land of smiles' (Thailand Tourist Authority, 2011), where people are happy and funny. They see themselves as calm and seldom as impulsive, spontaneous or unpredictable as might characterise people in other countries. It is perhaps unsurprising from this perspective too that the great majority displayed pleasure at the activities and saw themselves as cheerful, happy people.

One goal of our work is to increase research into the nature and value of play, and of young adult play in particular, where we see an unwarranted paucity of academic study. Play is not only for children, but it also important for adults. Play has been reported to make adults feel alive, be important for their physical and mental health, and their general well-being (Kemp, Smith, Dekover, & Segal, 2013). In this paper we have focused as best

we can on the outward observable, declarable and actionable indicators of playfulness, in a specific setting. Elsewhere we have considered cognitive and affective dimensions more generally (Kanhadilok & Watts, 2012). There is considerably more work to do, for example, both to examine zones of play where the inhabitants are less predisposed to play than these we report here, and where play takes place despite the strictures that might apply in the setting involved – the mischievous play that can happen in formal arenas on solemn occasions (Crowe & Watts, 2014). We are interested to promote play, not just for its impact on learning, although that is a key element, but also for the general ‘ludic health’ of children and adults.

Finally, our discussion does offer significant comments to be helpful to readers such as parents, museum educators, museum curators and youth leaders who may have a desire to appeal to the playfulness of young adult visitors. It seems likely that fully engaging, physical make-and-play activities such as these could be have a significant impact on how many young people visit such exhibits because such adults caregivers often determine what is visited and for how long. Play-based learning can be a significant design element for contemporary informal learning spaces and there needs to be considerably more about research on not just interactive hands-on exhibits, but also play in museums.

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