DESIGN PLAY - INTERACTIVE EDUCATION TOOLKIT FOR DESIGN PROJECT PLANNING AND MANAGEMENT

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ABSTRACT:

Through learning by doing, School of Design (SD) students at The Hong Kong Polytechnic University (PolyU) acquire the skills necessary for defining such foundational project components as a design brief, or planning and managing a design process.

A preliminary enquiry into the reality of students' experience of initial project development phases leading up to a formulation of a design statement and design concept specifications has lent insight into the critical process within student projects. It focused on the way students link design project developmental steps, and how disruptions occur in this fundamental stage of the project.

The project probed into the reality of SD's desi gn methodology educational experiences, and considered the value of Play in enriching such practices. While design shapes culture, according to cultural theorist Johan Huizinga, the latter is the outcome of Play. Hence Play appeared to be an appropriate cognitive and experiential framework reference to structure design methodology education.

Based on findings from this preliminary study, and an appropriate contextualization of play elements and principles into design, a series of models were defined to specify and produce a design education toolkit.

This paper describes how the toolkit integrates fundamental design and play elements to better guide apprentices and professionals in their appreciation

of design methodology's multidimensional and immanent nature. More specifically it will describe how play narratives are intrinsically woven into what we call the Design Continuum, in which free play and rule based play nurture divergent and convergent design thinking cycles.

1. INTRODUCTION/BACKGROUND: DESIGN PLAY PROJECT OBJECTIVES

DISRUPTIONS

Laying appropriate foundations for the development of a design project (such as planning research and development on the basis of a shrewd project brief analysis) is perceived and generally accepted in the design field as insurance for a successful outcome, a guarantee of success.

Through learning by doing, SD students are acquiring the skills necessary for defining such foundational project components as a project brief or a design process. Or so it seems.

However, while they should be enjoying the process, many struggle to produce outcomes that are relevant to these processes, thus failing to create appropriate learning and design value from their projects. This suggests there may be discontinuities in their network of ambitions and perspectives, which threaten their attainment of learning outcomes, more specifically in capstone (aka graduation, or final year) projects, where students are required to holistically demonstrate their competence in line with programme learning outcomes, integrating generic competences such as design brief analysis, project planning, or research and analysis into formal academic knowledge and professional skills.

PRELIMINARY INQUIRIES

A preliminary pilot research project (*Design Play – An Inquiry into Design Education Processes in Hong Kong's Multicultural Contexts*), funded by the Departmental General Research Fund (DGRF), enquired into the reality of students' experience of the preliminary project development phases leading up to a formulation of a design statement and early specifications for a design concept, lent insight into the critical process within student projects. More specifically, this research project focused on the way students link

developmental steps, and how disruptions occur in this fundamental initial stage of the project.

Based on findings from this preliminary research project, a PolyU Outcome-Based Assessment Fund (OBA) was granted to support an implementation project intended to build on a set of specifications to produce an interactive design education toolkit. Its initial aim was to enhance student learning experiences of project development processes for SD cross-cultural contexts.

More specifically the project's objectives are to:

- Assist SD educators in facilitating students' attainment of Client and Capstone Projects' complex set of subject Learning Outcomes, and integrating generic skills with professional outcomes.

- Assist SD students in contextualizing the relevance of integrating both process and outcome in design's holistic cultural practice.

- Support SD's transition from teaching-centred to student-centred learning practices

- Enhance SD students' ability to ascertain the relevance and limitations of their control over the creative process.

- Improve the alignment of SD's sub-degree and undergraduate learning outcomes to facilitate student articulation to higher studies

- Enhance Capstone Project development learning experiences for SD cross-cultural contexts.

2. THE RELEVANCE OF PLAY TO DESIGN
PLAY GOOD FOR GOOD DESIGN CULTURES

In our Design Play pilot study we probed into the reality of design teaching and learning experiences at SD, focusing on students' appreciation of the initial design process stages. We were concerned with students' lack of

appreciation of design's complex processes within a cultural context that is just as complex: Hong Kong's historically unique geo-political, social and cross-cultural context. We felt play could make sense of and bridge these cultural complexities. While in *Homo Ludens* Huizinga contends that culture is the outcome of play, one could easily see designers as shapers of culture... we argue that designers' practice is akin to play; and that a cross-cultural, humanistic approach to design education may lie in its inspiration from play and game processes. We asked…

How to address the ever-changing, organic nature of design's variable geometry within the context of globally shifting geographies of thought? (…) In our first Design Play paper (Leclerc and Wan, 2007), we drew parallels between design processes, play, and game structures that could be reflected upon by design students as narratives that transcend cultural differences and cognitive diversity.

While Nisbett (2003) asserts "If social practices, values, beliefs, and scientific themes are to converge, then we can expect that changes in thought processes would begin to evaporate. There is in fact evidence that changes in social practices, and even changes in temporary states of social orientations, can change the way people perceive and think.", Salen and Zimmerman (2003) lay out the "interactive, representational, social and cultural aspects (of play) as simultaneously contributing to the experience of play". Here, "games are complex forms of designed culture to be understood from multiple perspectives". Addressing students' levels of motivation, there appeared to be a need for educational methods that could help maintain their enthusiasm for design: students need to sustain a sense of creative enjoyment – play, game, flow – in order to self-actualise and transcend the perceived limits of their (cultural) realm. Play therefore emerges as a framework enabling design students, usually more comfortable with 'tame' projects (Rittel and Webber, 1973) to adapt to the 'wicked' dynamics of cultural transformations inherent in design projects. Study findings indicated a readiness in students and teachers alike to adopt playful design education interactions; and that indeed play would be an appropriate framework to

support the accruement of design skills. Hence... A relevant humanistic [1] approach to (cross-cultural) design education at SD may emerge from inspiration from playful practices. (Leclerc and Wan, 2008)

Arguing for Play's relevance to today's design practice, one could refer to Alexander Manu's *Tool Toys* and see how 'Beyond its environmental imperative, sustainable design will have to be engaging, challenging, rewarding, absorbing, non-frustrating, and of repeat experience value.' – in other words playful – "The future of design will have to integrate Play as a central criterion into any relevant method for innovation." As if need be Manu strengthens his argument by quoting Carl Jung: "The creation of something new is not accomplished by the intellect, but by the play instinct acting from inner necessity." More recently IDEO's Tim Brown added at the 2008 Serious Play Conference that in order to be authentic or stay relevant 'designers need to transition in out of play". We take Brown's recognition of play's relevance of play to design and suggest one does not go in and out of play, rather, one oscillates between the unstructured 'right brain' free play and its structured rule-based counterpart 'left brain' game play.

If, as Edward Tufte once mused, 'Good design is a lot like clear thinking made visual.', then design could be seen as a purposeful play of semiotics, and following Umberto Eco's response to a request to define the domain of semiotics; some way into his answer it became apparent that he was implying it was the whole of history (Cobley and Jansz, 1997)… and so, as designers play at forging culture, they are literally 'making' history.

PLANNING AND DESIGNING, GAME AND PLAY

While John Dewey's quote, "It is a familiar and significant saying that a problem well put is half-solved" seems to dovetail strategic design's promise, the quote should also be understood (in the context of design's uncertain premises) through the metaphor of the half-full glass. The uncertainty of design projects, or their often 'wicked' nature sets the more synthetic

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[1] Humanistic design has been one of SD's pedagogical core values over the past decade. It combines user-centred design imperatives with the mindfulness (a gestalt-like holistic sensitivity towards one's natural, social, and cultural environment) characterising East Asian philosophical precepts.

practice of design apart from the more analytical, or process-control-focused engineering discipline; or the goal-achieving, objective-driven marketing discipline. While design is said to be solution-oriented, it nevertheless thrives on uncertainty: *you make plans, plans change*. The glass is half-full... designers' solution-driven objective is to fill it up with experience, so that all stakeholders enjoy a fulfilling product-system.

THE UNCERTAINTY OF DESIGN, THE AMBIGUITY OF PLAY

In his 1977 (self-) criticism of design-as-science, John Christopher Jones candidly affirmed "design is to do with uncertainty". *If you can't take uncertainty, get out of the studio.* Unlike science, which is concerned with the truth, or humanities, which is concerned with justice, design is (playfully) concerned with appropriateness (Cross, 2006): hence designers are right for (the) now, meaning their propositions should have contemporary relevance, and also that these propositions are right... for now, and not any longer. We suggested:

As young designers recreate their environment, they develop their own individuality. To paraphrase Brian Sutton-Smith's Modern Rhetorics of Play (1997), students see design as:

1. Progress – they adapt and develop through design;
2. Selfhood – design as an expression of voluntary freedom;
3. Imaginary – design as symbolic transformation, mental energy

We proposed that an integration of play and game practices in an interactive design methodology educational tool would allow students to generate processes that would harmonize the 3 aspects of design activity Dorst (2007) laments are usually ignored (object, actors, context) within a holistic design process and focus on initial stages of the project to permit reflective self-evaluation. Young practitioners could then use this self-learning tool to consciously reflect on processes, hence creating one's own "style". UsingSutton-Smith's modern, positive rhetorics of play, aspects of design activity that tend to be ignored in design processes could be addressed in a manner

that could foster flow. Modern rhetorics of play addressing aspects of design activity:

Progress would address Context

Selfhood would address Actors

Imaginary would address Object

The tool could assist students assimilating fundamental design developmental tools. (Leclerc and Wan, 2008)

3. INTEGRATING DESIGN WITH PLAY, MAKING PLAY VISIBLE IN DESIGN: DESIGN PLAY MODELS AND TOOLS

This research project has provided us with the knowledge base necessary to substantiate the relevance of Play to Design, and define specifications for an educational toolkit. Referring to Users, Personas, and Scenarios in our development study, we probed into undergraduate and postgraduate students' appreciation of the relevance of design to play, to inform the development of a Play-inspired design educational toolkit. The following is a review of models thus created.

A series of models and tools, produced as a result of the investigations, helped specify an educational design toolkit inspired by play. The similar nature of design and play processes were emphasized as follows:

1. Alignment of design methods with play activities based on play categories such as sensory motor, manipulative and constructive, imagination and make-believe, creative and making, cognitive and problem solving, chance and randomness, vertigo and challenge, and competition.

2. Deconstruction of design's iterative process by highlighting its synchronic (sequential) and diachronic (event-based) dual nature's similarities withnarrative play's versatile characteristics. Also highlighted was the narrative tension between 'ludus' rule-based game play convergent phases of project development and 'paidia' free play aspects of its divergent phases.

DESIGN PLAY ACTIVITY TAXONOMY

The table below, updated from our 2009 paper aligning play and design activities, benchmarks a summary of play activities against common design tools, methods, and practices and experiences, so as to align play theory with design.

Activity	Types of activity	Examples of activities & experiences	
		Players	**Designers**
Play & Design	**Weighing the odds: chance**	Games Gambling	Accidental qualities Opportunity & venture
	Feeling & moving: sensory motor	Sports Sensory play Emotional experiences Pleasure seeking Synaesthetics	Ergonomics Body storming Experience design Aesthetic appreciation Haptics
	Manipulating & constructing: fine motor	Model making Construction toys Arts & crafts Dress up dolls	Model making Prototyping Craftsmanship Tools/machine operation
	Imagining and pretending: fantasy & mimicry	Story telling Role play Make believe Costume play (aka 'cosplay')	Scenario building User empathy Forecast & prospection Fashion & identity building
	Creating & making: expression and craftsmanship	Tomfooling Arts & crafts Performance arts Developing skills	Brainstorming Drawing & model making Presentation Practicing skills
	Exploring, discovering, defining & solving problems: cognition & education	Games of strategy Quizzes & puzzles Science kits Experiments Field trips	Strategic design Ill-defined problem solving Reverse engineering Primary Research Field studies
	Challenging others, pushing oneself: competition, vertigo & empowerment	Contests Games Strategy games Completing a game Altering perception	Competitions Project bids Market strategy Completing a project Blindfolding

Table 2: Design Play Activity Taxonomy

Table 2 presents the parallels between Play and Design through a selection of easily recognisable play activities and common design tools. Its structure loosely follows Jean Piaget's Developmental patterns, from sensory motor to cognitive play, through fine motor, imagination, and creative play. Roger Caillois in Man, Play and Games (1961) identified 4 fundamental play types; Agon (Competition), Alea (Chance), Mimicry (Role-play) and Illinx (Vertigo), which could be used individually or in combination to appreciate the complexity of play and games. These could then be placed against a Ludus (rule-based game play) and Paidia (free play) continuum to ascertain social

dynamics of play dynamics. Chance, an aspect of life that shapes our existence from the time of our conception, has hence been placed at the top of the list. Competition, while also being a part of existence from the very early years of our lives, requires the integration of complex skill sets and has therefore been placed at the bottom of the list.

DESIGN PLAY CONTINUUM

The Design Play Continuum (Figure 3) aims at revealing the intrinsic play nature underlying design process narratives.
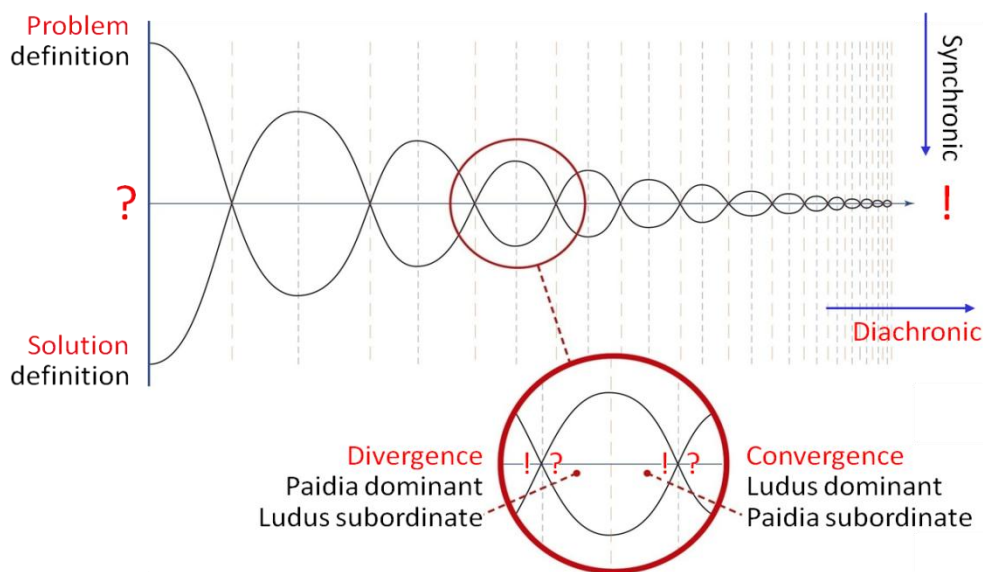

Figure 3: Design Play Continuum

WEAVING OF PROBLEM AND SOLUTION DEFINITION

The timeline model visualizes the unravelling of diverging and converging iterative steps, simultaneously weaving problem definition and solution definition towards progressive resolution (represented by a big exclamation mark) of a design brief, or 'ill-defined' problem (represented by a big question mark). Primacy is given to problem definition, signifying the importance of purpose and rationale in design, over the mere 'satisficing' (Simon, 1969, in Cross, 2006) of design problems too often seen in design solutions, and is therefore located above solution definition.

INTEGRATING SYNCHRONIC AND DIACHRONIC NARRATIVE

As problem and solution redefine each other, the project reveals its dual structure: on the one hand, the time based, diachronic sequence of events plays out strategic narrative cycles of convergence and divergence, recalibrating an initial question (small '?') through iterative refined answers (small '!'). An overall syntax emerges, and so designers may post-rationalize often 'wicked' (Rittel and Webber, 1973) problems (and hence 'wicked' process developments), using the grammar of design principles, to restructure their project processes into compelling communication narratives so as to convince stakeholders of the appropriateness of their choices. Synchronic (i.e. in the moment), non-linear, or event-based activities such as tools and methods are conjured as the overall narrative unravels, for designers necessarily readjust their strategies. In response to uncertainty and the unpredictable nature of design, 'agile' tactics are used, in a similar fashion to design elements - the vocabulary of methodology - is used to address or shift paradigms.

Visual Literacy in Design	
Design Principles	Design Elements
Design Play Cognitive Literacy models	
Design Play Continuum	Design Play Taxonomy
Design Play Toolkit	
Design Play Process	Design Play Tools
Diachronic Sequential Strategies Narrative Cycles Syntax Grammar Tame	Synchronic Non-linear Tactics Event-based Agile Paradigm Vocabulary Wicked

Table 3. Design Play Continuum principles

REVEALING INHERENT PLAY CHARACTERISTICS WITHIN DESIGN PROCESSES

Caillois' Paidia (free play) / Ludus (rule-based game play) axis may be seen in the divergent/convergent design process characteristics. In each iterative cycle, initial problem and solution definition takes designers through divergent design experiences.

DIVERGENCE: PAIDIA DOMINANT

However much one wishes to strategize optimal project management, one ends up 'drifting' – indeed one needs to do so – in divergent phases of projects. The nature of qualitative research methods, or the open rules of brainstorming, or the unexpectedness of participatory or co-design processes, bears traces of the freedom characterizing Paidia.

CONVERGENCE: LUDUS DOMINANT

Once the 'tipping point' of the diverging/converging structure is reached, designers need to edit information generated and to structure specifications and synthesize experimentation and analytical processes with a view on a solution, and in response to the brief. Rules, limitations, structure, codes and protocols help measure and ascertain the appropriateness of decisions taken beyond this point. Tools that characterize these stages are analytical and testing, such as user tests, ergonomics, usage experience assessment, and High-Fidelity prototyping.

PAIDIA/LUDUS DOMINANCE AND SUBDOMINANCE

Despite its apparent dichotomy, Paidia and Ludus cannot be exclusive of one another. While in divergent stages Paidia dominates, rules always guide design innovation, and Ludus, however much tenuously, structures processes, so that sense can be made of such process to inform the project. Reversely, in convergent stages, the dominance of Ludus needs a healthy dose of Paidia, even in its strictest rational methods, to allow for synthetic appreciation of analytical outcomes – the political correctness of critical analysis.

No Ludus no sense, no Paidia no sensitivity.

By exposing the duality of design processes' playful narratives, Design Play reinforces the relevance of play to culture and to the shaping of the everyday, in a non-threatening, psychologically transformational and, ergo, engaging manner.

4. DISSEMINATION AND IMPLEMENTATION OF TOOLKIT AT SD

Sharing of models and tools for design tool identification, process visualization and project management, was made through lectures, screen presentations, seminars, workshops, and tutorials. Course contents varied from application of knowledge in group and individual workshops, or project development.

About 200 students from sub-degree to postgraduate programmes were introduced the toolkit over the past 4 years, in subjects such as design thinking, strategic design, client projects, and capstone projects. These included students from the following programmes:

- Higher Diploma in Multimedia Design and Technology Subjects (vocational education)

- Associate Degree in Design (Community College)
- Bachelor (Hons) in Design
- Masters in Design Strategies
- Management and Executive Development (continuous education)

5. IN CONCLUSION: VALUE OF THE TOOLKIT IN IMPROVING TEACHING AND LEARNING EXPERIENCES OF DESIGN PROCESSES AT SD TEACHING

The toolkit was instrumental in substantiating the relevance of Play to Design, through evidencing similarities in play and design events, methods, and activities (i.e. synchronic, event-based activities), and the exposure of play and game characteristics in design's integrated project narratives (i.e. diachronic, or sequential project cycles). The visual educational models nurtured best educational practices and fostered students' appreciation of design processes' mechanisms, at SD undergraduate and postgraduate levels. It assisted SD educators in ensuring students' attainment of client and capstone projects' complex set of subject learning outcomes and integrating generic skills with professional outcomes. Last but not least (!) the

development of such student-centred platforms improved teachers'
management of (i.e. saving) tutorial time.

LEARNING

The toolkit supports SD's transition from teaching-centred to student-centred
learning practices. This is achieved by providing students with a playful,
narrative-building platform enabling self-generated, independent
appreciation of the value of innovation tool search tactics and visualisation of
project development for better strategic project management practices.

Making reference to such models, the toolkit facilitated students'
appreciation of the purpose and structure of design processes and enriched
their learning experiences of design thinking, strategic design, and the
planning and management of design thinking processes, helping them take
better control over their design projects.
In reference to Roger Caillois' premise that Play is a 'safe', voluntary form of
participatory activity, its non-threatening nature enhanced SD students'
ability to ascertain the potential and limitations of their control over the
creative process in SD's complex cross-cultural contexts.

Design Play assists students in identifying key project issues and
stakeholders, and holistically articulate arguments contributing to the
success of student projects. As they select and develop appropriate tools and
methods for effective student project development, the toolkit enables
flexible means to adjust student project development to produce measurable
outcomes. As they structure and adjust their design processes, they are able
to establish appropriate criteria, facilitating the ownership of project outcome
assessment. Consequently, the toolkit provides a clear study path for
students to better reflect on their learning experiences, and identify
individual study issues to facilitate integration of professional to high-order
thinking generic skills accrued throughout the curriculum.

The integration of play as an experiential framework supports the appreciation of design thinking processes; it assists students in contextualizing the relevance of integrating both process and outcome in design's holistic cultural practice.

Much has been debated on the implementation of outcome-based assessment in design education. Indeed, if design is about uncertainty, or if it is a profession that is still defining itself, how are educators to state assessable learning outcomes? Among the Design Play project's main objectives, one is to highlight the relevance of reflective thinking to the practice of design; or the need to link the various tools and methods, or steps, (even if admittedly it is more often than not post-rationalized) to communicate compelling project narratives to diverse project stakeholder audiences.

6. P.S. PLAY SOME MORE: FURTHER DESIGN PLAY DEVELOPMENT

Models and tools described above provide the basis for a Rich Internet Application (RIA) toolkit integrating each cognitive literacy models, the taxonomy of tools-as-activities, and the continuum allowing flexibility in 'wicked' iterations. The RIA would provide apprentices and practising designers with an innovation and project management tool search engine and project visualization platform for strategic design.

While junior apprentices are given the means to visualise and communicate the co-evolutionary nature of design processes, senior apprentices excogitate the toolkit's value as a handbook checklist of means to address complex and uncertain design processes, and project management professionals see it as a means to dynamically optimize the adaptability of design strategies.

The flexibility of the toolkit (…) allows the user-designer to restructure a posteriori the ill-defined or wicked creative process and rearrange the tangled thread of decisions into a cognitive sequence of decision-making steps communicable to an audience disconnected from the reality of day to day project management. Such a representation, albeit an idealised one, would allow design apprentices and practitioners alike to reflect on individual,

situated (Gero and Kannengiesser, 2006) approaches to design through a self-directed learning educational platform. (Leclerc and Wan, 2009)

Further dissemination of Design Play at PolyU will provide students from other Departments in lectures, seminars, and/or other educational settings, with the necessary methods to integrate fundamental design strategic notions for project development management, and establish creative processes for socially relevant innovation.

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