Designing for Children
- With focus on 'Play + Learn'

Play, Design, Education: a mutually beneficial ménage à trois.

A model of epistemology and ontology for designers, educators, and… players.

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Abstract: This paper introduces a model charting the mutually beneficial relationships connecting Play, Design, and Education, and proposes that attempting to define each field as a 'principle' gains in being understood in the light of the other two. Synthesising professional, teaching, and research practice in these three fields, the model demonstrates the epistemological and ontological value (ways of knowing and ways of being and becoming) of this conceptual 'ménage à trois'. It is aimed at educators, designers, and… players, to inform their work in generating products, environments, systems, and experiences for children growing in a technological world.

Key words: Design, play and education, Designing for children, Learning through play, Epistemology, Ontology.

1. Design's sociocultural agency

Design is a practice core to being human that organizes material environment for our survival. Over the years its focus has shifted from a form-giving business servicing industry to that which articulates human-, environmental-, and social-centred product-service systems (PSS) (Diehl & Christiaans 2015). This empowers designers to 1) establish strategies to frame problems and propose desirable, feasible, and viable solutions for complex problems; and 2) harmonize tensions latent in diverse stakeholder groups to facilitate co-creation experiences; while 3) articulating coherent narratives and visualizing culturally transformative processes and outcomes; that 4) address broader concerns, including education, sustainability, and social service (Manzini & Vezzoli 2002).

Significant developments include critical design and its narrative pendant speculative design, and social design. Dunne and Raby (2013) see design as a tool to create not only things but ideas, partly inspired by science-fiction, to generate experimental products to

test ‘what if’ future scenarios. They contend that as we speculate more - about everything - reality will “’become more malleable”, and that ideas thus freed will increase the odds of achieving desirable futures. For Koskinen and Hush (2016), social design derives its aim from convictions that give meaning to design outcomes (e.g., leveraging play-enhanced design to improve education); it advances social agendas through incremental changes rationalized by the specifics of focus issues (e.g., experimental educational projects implemented to ascertain feasibility); and, informed by theory, may provide “insight into the social structures that produce and maintain the situations they try to change” (e.g., awareness of traditional education’s stifling power dynamics, from which play-enhanced design can liberate).

Design’s ambiguous relationship with industry makes it a critical agent (i.e. crucial for its development and discriminating in its analysis) of the development of our techno-industrial consumer society. Thus it is both a discipline and a ‘Principle’. Inadvertently heeding Marx’s call for philosophers to not only “understand the world but to change it” (1845), it pulled the rug under philosophers’ feet to flip priorities upside down, and is now recognised as a way of knowing, as it works at creating desirable futures. In so doing it is involved in another ménage à trois, harmonizing the natural and social sciences (humanities), hereby arrogating their methods (Archer 1979, Cross 1982).

2. Facilitating desirable futures: knowing, becoming, and being through Play, Design, and Education

In this paper, epistemology refers to ‘ways of knowing’ to achieve ‘cognitive success’, or the validation of learning; and ontology as the ‘nature of being, existing, and becoming’. Play, design, and education share common epistemological and ontological functions such as inquiry, experimentation, discovery, assimilation, actualisation, and dissemination of knowledge. Agents of transformation, they promote both individual (biological) and social (cultural) development with a view to better humanity: they are humanistic principles.

In an increasingly technological world, what is it to be ‘human’? How do we ‘know’ we ‘are’? Is it worth our while? Proponents of ‘transhumanism’ claim technology will soon enable us to enhance our capabilities - design better selves - with the belief freedom of choice over our own bodies, and freedom of access to technology will bring about a better world (Humanity+ 2009). Mitigating this techno-optimism, philosophers ponder over the existential implications technology’s accelerated rate of development may have for our evolution, warning of the challenges of speculating over a ‘posthuman’ radically different

from anything we know (Bostrom et al. 2003, Roden, 2018). Others see an opportunity to rewrite our socio-political narratives and speculate we could ‘make kin’ or ‘compose’ with other species to turn the tables on the existential threats posed by technology and capitalism (Haraway 2015, Latour 2017). In a designed world like ours, to know, we design, and being is by design. A critical awareness of our existence within production and consumption cycles, and the ability to connect broader political patterns dictated by technology to one’s personal reality enables us to manage the artificial while shaping our future environment. In such a world, design is ontology of the artificial.

For Schiller (1793) Play is humanity’s best opportunity to express our double nature: the combined deployment of sensation and thought, promising pleasure as a reward, optimizes experience. When utilized in Design, Play enhances its knowledge-acquisition and culture-shaping functions. Designerly ways of knowing are thus characterized by motivation (play entices curiosity), enjoyment (play sustains engagement), and achievement (gameplay validates learning). Consequently, education’s emancipatory function is improved when it harnesses play-enhanced design.

In this essay, ‘change’ is a matter of desire for participation in play, empowerment to realise design, and emancipation through education. Yet it is subject to social dynamics, which are partial and often contrary, and for which a playful attitude underpins adaptability, to ensure becoming, the liminality of ontology. Play promotes, design concretizes, and education fosters a lifelong love for learning to achieve emotional, cognitive, and social actualisation. Characterized by processes of transformation, they are social, creative activities, involving participation, communication, socialization, imagination, and creativity.

As a friendly ‘Trojan Hobby Horse’, play makes design and knowing accessible: Play’s non-threatening and socially engaging dynamics bring multiple stakeholders to the table in an inclusive way, motivating behaviour conducive to sharing ideas and ‘playbouring’ toward a common goal of discovery and realisation. Just as designers explore project issues and engage with design processes much better when aware their activity is fuelled by play, so tutors’/mentors’ connection to ‘learners-as-players’ is facilitated through play. The framework of play and its multiple types (e.g., sensorimotor, imaginative, manipulative, constructive, creative, narrative, social, or cognitive play) facilitates apprehension of new concepts, as every project supposes knowledge to acquire, issues to tackle. Awareness of the similarities between the multiple types of play, design methods, and educational

approaches substantiates learning and its enjoyment, promoting growth. With culture being an outcome of play, awareness of the underlying ludic nature of design enhances children, as future adults with a lifelong curiosity for knowledge, to better apprehend and shape the world. Or break it for the better: play's subversive quality favours rule/ground-breaking ways of exploring, learning by doing, critical thinking, erring… and therefore learning.

3. Visualising Play, Design, Education

"Design is thinking made visible", famously quipped American graphic designer Saul Bass. Visual literacy, the ability to write and read in images, employs a vocabulary of design elements (such as points, lines, shapes, forms, colours) and a 'grammar' of design principles (say, position, movement, rhythm, emphasis, harmony). This helps designers articulate concepts, and readers decipher images, diagrams, objects, or environments, to organise thought and process information. Design is a line making a point.

The model posits Play, Design, and Education as 'Principles' - system foundations for a chain of reasoning and behaviour - emphasising existential conditions for participation and enjoyment (Play), creation and realisation (Design), and knowing and emancipation (Education). They converge at the core of the model to promote the Principle of 'Being', or self-actualisation, which integrates ways of knowing and harmonises ways of becoming. Ultimately, as one self-actualises, in turn one is empowered to share life experiences with others, thus transcending one's existence (again, through Play, Design, and Education). This entices one to re-engage with the process from a higher point of awareness, as being motivates the individual to engage with the social, and knowing may foster better Play, Design, Education.

Mindful of the challenge of visualising a non-animated rhizomic relationship of abstract concepts for a paper (say, a non-hierarchical dynamic system of relationships), and that such visuals should allow room for some interpretation by the reader, the following three rules and attributes inform the design of the model: 1, specifying values (Functions and Purposes) common to Play, Design, and Education Principles; 2, qualifying mutual benefits; and 3, zoning Principles.

4. Play, Design, and Education: specifying common values

Defining either Principle has repeatedly proved ambiguous and controversial. As each share with the other two certain intrinsic values, a triadic definition highlighting common

attributes could be helpful in elucidating appreciation of each Principle. Principles' values include Functions, which are informed by play categories and their agency; and Purposes, highlighting the transformative nature of each Principle. Table 1 below specifies such Functions and Purposes for input into the model:

Play, Design, and Education functions and purposes			
Functions & purposes	**Principles**		
	Play	**Design**	**Education**
Participation Acting in experiences, in time (when), place (where), with people, things (who, what), and process and motivations (how, why)	Engaging with others in open, curious, connected, empathic, sharing, transgressive, non-judgemental experiences	Engaging with stakeholders in framing background, context, issues, problems, solutions	Learning with peers and mentors, to discover, remember, understand, apply, analyse, evaluate, create
Communication The art of sharing ideas, facts, emotions, and persuading	Convincing if imaginary feels real and absurdity makes sense	Convincing if desirable, feasible, and viable	Convincing if knowing, believing, and empathising
Socialization Engaging in a communal activity	Self with self and others	Self with and for others	Others to and with self
Imagination An abstract projection of reality	Magic circle	Desirable futures	Future self
Creativity A re-creation of the world	Imagining different nows	Constructing futures	Developing self
Epistemology Ways of knowing, achieving 'cognitive success'	For fun, so it is about me, hence it is real	For real, so it is about me, and should be fun	For me, so it is real, and best be fun
Ontology Being (conscious existence), and becoming (individual, social actualisation)	Empowers self-actualisation by challenging power structures latent in society	Asserts appropriateness of desirable futures in projects by bridging science and the humanities	Emancipates by benchmarking knowledge against wisdom of lived experiences

Table 1: Play, Design, and Education Principles' Functions and Purposes.

5. 3 dyads underpinning a triad and a core: qualifying mutually beneficial relationships connecting Play, Design, and Education

The Play, Design, Education triad is underpinned by three mutually beneficial dyadic relationships, whereby each Principle enhances the value of the other two: play/design, design/education, and play/education. Table 2 below qualifies such reciprocal dynamics. It also highlights how the ambiguity residing in the 'sleight of hand' consisting, say, in substituting play for education (to make learning enjoyable), play for design (to engage stakeholders in creative endeavour), design for education (to contextualise experiential

learning in project-based problem-solving) is paradoxically helping to better define the scope and function of each Principle.

Mutually beneficial relationships between play, design, and education			
How X → benefits Y ↓	**Play**	**Design**	**Education**
Play	- - - - -	*Feel, Imagine, Create* Design contextualizes play by applying its sensorimotor, imaginary, creative, and social functions.	*Nurture, Develop, Actualize* Education nurtures play's developmental function and actualizes its narratives.
Design	*Open, Access, Enrich* Play opens design, makes it accessible, and its multiple types enriches design's cultural agency.	- - - - -	*Structure, Inquire, Discover* Education provides structure to design's research functions (inquiry and discovery).
Education	*Engage, Sustain, Enjoy* Play's pleasure-rewarding principle entices learners to engage, sustain interest in, and enjoy learning.	*Experience, Concretize, Solve* Design concretizes experiential learning's project-based and problem-solving functions.	- - - - -

Table 2: Mutually beneficial relationships between Play, Design, and Education.

The model synthesizes professional, teaching, and research practice in play, design, and education, that has evolved from 'design for play' to 'play for design' (Leclerc 2016, 2018). Mutually beneficial relationships identified in the overlap of these fields in Table 2 were also derived from reflective practice of various motivational, development, and framing instruments, including:

Play's multiple forms: chance, sensorimotor, imaginative, construction, creative, cognitive, social, or competition play; play's structure: Paidia – Ludus (Caillois 1958); and rhetorics of play: Frivolity, Fate, Power, Identity, Imaginary, Progress, and Selfhood (Sutton-Smith 1997) qualifying the motivation to satisfy existential needs: Physiological, Safety, Belongingness, Esteem, Cognitive, Aesthetic, Self-actualisation, and Transcendence (Maslow 1971).

Design approaches such as divergent – convergent diamonds (UK Design Council 2005); contextualization tools such as contextmapping (Sleeswijk Visser et al.); culture probes (Gaver et al. 1999); and STEEPLE strategic frameworks helping designers scope Social, Technological, Economic, Environmental, Political, Legal, Ethical issues employed to define project value.

Education models such as the Taxonomy of Leaning Objectives (Bloom 1956, revised 2001, in Anderson & Krathwohl), illustrating how cognitive success is achieved: Absorb and

remember knowledge, Understand and contextualise, Apply and practice, Analyse and reflect, Evaluate and discriminate, and Synthesize to create new knowledge and experiences.

6. Zoning disciplines' main areas to map a system of abstract and dynamic relationships
How to delineate definition of either Play, Design, or Education when these are interlinked? Each Principle is represented in the model (Figure 1) as a nebulous circular zone. Radially reaching outward in a hazy gradient from a concentrated core, it overlaps onto the other two Principles and beyond the scope of the model in a continuum of diminishing definition, to increasing hybridization. Principles are designated in the model as action verbs to emphasize epistemic and ontological agency. Blue denotes the 'magic circle of play's' (Huizinga 1938) dream-like elevation beyond the reality of current time and place; red, designers' creative commitment to realise a project; and green, education's promise of growth and emancipation. Essential Functions and Purposes charted in Table 1 are organised around each Principle, which features in the model as action verb to denote agency. While Principles' zone cores are equally situated vis-à-vis their counterparts', mutually beneficial values float within overlapping areas, echoing each other's, and are organised toward the core Principle of Being, according to Table 2's narrative sequence.

The open nature of a rhizome does not deny its structure rigor; yet in this case its apparent ambiguity is necessary: designing children playthings and systems needs to account for the interpretation of ideas and emotions, by definition impermanent. Thus the model acknowledges the impermanence of knowing, allowing for:
Play's ambiguity: Oscillating between 'control and letting go' (Ludus - Paidia), going in and out of a 'magic circle of play', when is the mask of fantasy pulled off on reality, when Play can both be 'for' real and fantasy (Bateson 1955), or serious and fun (Brougère 2012) at the same time?
Design's uncertainty: How to stay solution-focused when framing ill-defined, 'wicked' problems? For Cross (1982), while science is concerned with truth, and humanities with justice, design is concerned with 'appropriateness', an outcome arrived at through abductive logic, or 'best solution at hand given present context'.
Education's ambivalence: When do teachers stop dictating and start facilitating? If we learn, we can teach, and if we teach, we'd better be ready to learn. Allowance for irony favours surprise and invention: an unexpected outcome. *Ironically*, it is in these cracks that we create, that we become, that we are.

Just as equivocal is the absence in the model of its constituents' fundamental elements: no aim, no author, no teacher. Participation in Play is motivated by an interest in the activity's process rather than a wish to generate any specific outcome; hence the non-existence of an aim, its purpose lying 'in-itself' facilitating organic emergence of narratives. Design supposes the disappearance of the author, as it is a user-centred discipline favouring the anonymity of the designer, who organizes implicit and explicit needs expressed by often diverse stakeholder groups. Learner-centred education entails the 'disappearance' of the teacher, who, stepping back from a position of power, feigns to be 'ignorant' to allow the learner to construct own experiences with peers (Rancière 1991).

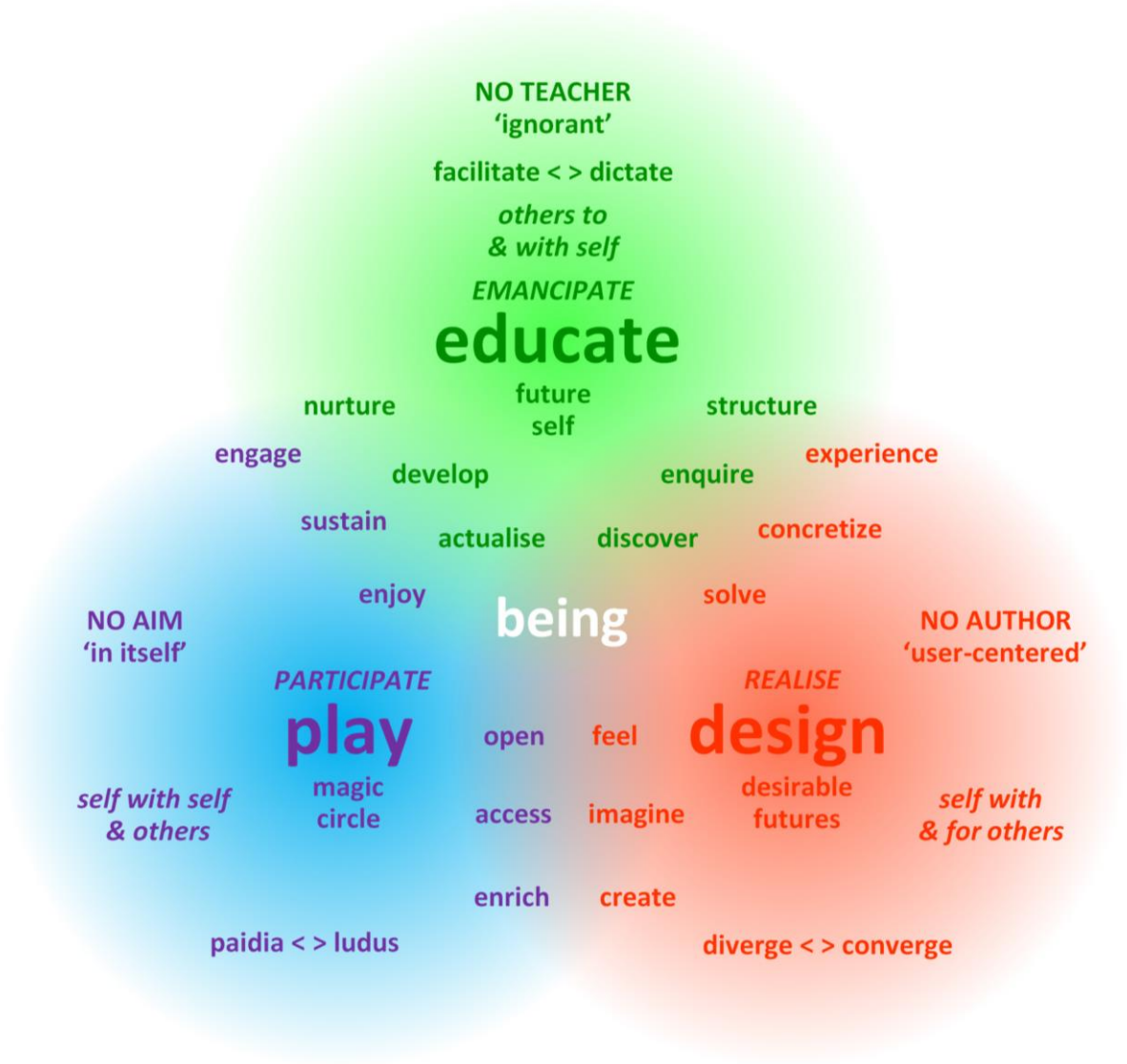

Figure 1: Play, Design, Education model of a mutually beneficial ménage à trois.

7. Model's multiple narrative configurations

The model, in rhizomic fashion, does not set an order of rank or precedence for any of the three Principles over another. Still, visualizing three interconnected objects results in a triangulation. This configuration locates two Principles at its base and places the third above. Both clockwise and anticlockwise readings of it are possible, allowing multiple entry and exit point possibilities from either three Principle, and subsequent narrative interpretations. Dyadic overlaps signify intermediate hybridization of Principles. Triadic overlap at core signifies convergence of Play, Design, and Education Principles toward that of Being.

As it visualizes abstract principles, different model configurations may signify different meanings for different readers. The triadic structure offers 6 probabilities of transformative narratives. Table 3 below lists these 6 narrative configurations and the roles Principles play in each, following a left-to-right, bottom-to-top scriptwriting convention, clockwise from bottom left (this paper's title follows the PDE configuration).

Narrative configurations for Play, Design, and Education model of mutually beneficial relationships	
 **Config.**	**Roles of Play, Design, Education (P, D, E) Principles in each narrative configuration**
P **D E**	Design's experiential learning concretizes Education, forming knowledge base for Play
P **E D**	Education is knowledge for application in Design, forming a base to structure Play's outcomes
E **D P**	Design's experiential learning structures Play experiences to open Education approaches and broaden knowledge scope
E **P D**	Play's enjoyment motivates participation in and enhances Design's experiential learning, concretizing Education, which promotes emancipation
D **E P**	Education informs Play's culture-generating agency to enhance Design's 'solution-focused' culture-shaping practice
D **P E**	Play's spontaneous, world-engaging qualities enhances Education's ability to inform Design

Table 3: Narrative configurations for Play, Design, and Education model of mutually beneficial relationships.

8. Conclusion

This paper described a model demonstrating how Play, Design, and Education Principles interrelate with the aim to assist designers, educators and others interested in harnessing their mutually beneficial relationships to enhance their work designing for children. Informed by professional, research, and educational practice, the model elucidates

intrinsic value of each Principle in the light of its relationship with the other two. It is intended to help concerned practitioners situate interdependently defined functions and purposes for each Principle. Awareness of such multiple conceptual dynamics is aimed at helping them articulate deeper understanding of the implications of children educational product-service system design, to better ascertain rationale and value of new designs, and contribute to the advancement of the study and understanding of children's ways of knowing and becoming

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