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Author

Lambert, Katherine

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The Loop ... *Lifecycle*: Empathy and Design for 7 omplex Drocesses.

Katherine Lambert, AIA
Associate Professor/Chair
Environment Design,
California College of the Arts
San Francisco, CA, USA
415.551.9288
klambert@cca.edu

ABSTRACT

A dynamic pedagogical shift in CCA's interdisciplinary studio curricula is exemplified by the class: *Lifecycle: Empathy and Design for Complex Processes*. Within this hybrid design studio environment, the complex interaction between an object and our material and digital environments is addressed through a life-cycle assessment. This was formulated through an analysis of traceable inventories, archives of (i/o) inputs and outputs of industrial, socio-economic and cultural processes that occurs within the life cycle of a selected object. The lifecycle of any object, the path it takes from concept, production, distribution, use, potential reuse, and ultimately as a collectible, e-waste, or landfill is critically demanding by its very nature.

Keywords

Lifecycle, e-waste, sustainable practices, design, trans-disciplinary, architecture, creative culture, design education, design thinking, divergence, convergence, economic recovery, experience design, global warming, participation economy, social impact, strategic thinking, visual design, San Francisco, recycling.

1. THE LOOP

"If we have designed our way into this mess, surely we can design our way out."

This paper addresses the recent dynamic pedagogical shift in California College of the Arts 's interdisciplinary studio curricula exemplified by the undergraduate class: LIFECYCLE: Empathy and Design for Complex Processes, 2006. Stemming from our Linkage Series courses – this class was specifically designed for, and delivered by, a collaborative academic partnership offered through the department of Environment Design at the California College of the Arts and IDEO, a recognized global design and innovation consultancy. Within this hybrid studio environment, the complex interaction between an object, it's material context and mutable digital environments is dealt with through a life-cycle assessment, the basis of which is a track able inventory and archive of (i/o) inputs and outputs of industrial, socio-economic and cultural processes that occur within the life-cycle of any selected object. The lifecycle of any object - the path it takes from concept, production, distribution, use,



Figure 1, LIFECYCLE Poster, 2006

potential reuse, and ultimately as a collectible or as landfill - is a problematical and demanding process by its very nature. Without question, the tenets of repurposing and reusing of objects are now inscribed in 21st c design and production processes.

The explosion / implosion of material objects, the digital realms, E-waste and its attendant toxic systems, have reached the point of global implosion. Such a statement is not hyperbole – it is an understatement. As we find ourselves emerging from a vortex of chaotic descent, our collective situations may strike us as starkly out of control. However, it is important to realize that these are still within our grasp and we can actualize a necessary and dramatic shift in direction. This point bears particular relevance to those of us in the academy. The precarious nature of the global, when influenced by the local, was the essential focus of LIFECYCLE. 80% of the environmental

impact of the products, services, and infrastructures around us is determined at the design stage.¹ Without question, design decisions often form the processes that serve as the back-story for the products and cultural artifacts that we purchase and consume, the materials and energy required to manufacture and produce them, their quotidian operative nature, and their disposability. What happens to them, and to us, when we no longer need them?

The best of 20th c intentions may now stand 180° in opposition to a 21st c sustainable future. However, willful blindness is no longer a viable option – as if it ever were. In the USA, we’ve designed our way into the searing situations that we face today. The need to design and execute our exit strategy is paramount. Our collective dilemma speaks to the fact that small design actions may well have significant effects - often unexpectedly. And designers, as well as other cultural producers, have only recently been placed on notice of our need to be cognizant and sensitive to the possible consequences of any path upon which we embark.

As such, pivotal questions are tethered to these design issues. Questions such as: what is at stake in today's constant bombardment of ecological culpability, corporate agendas and political ricocheting with respect to what are known as 'environmental issues'? How does one balance individuated, personal responsibility with collective consensus, and local with global, or short-term remedies that speak of prescient strategies?

Indeed, there are no easy answers for any of us. As academics and design practitioners it is vital to re-envision, research and initiate processes utilizing our intellect, social ethos and compassion. This is also true of our need to negotiate innovative relationships that may well test the boundaries of our comfort zones. At CCA we have done so choosing to use the mechanism of collaboratively based projects, specifically with partners such as IDEO. In so doing, we continue to engage in a meaningful, productive and sustained dialogue which interrogates notions of design, its constituent parts, our environment, specificities and implications of context. In turn, this fosters unexpected relationships between those who create and produce “stuff“ and those who consume it.

The all encompassing “we” is a crucial component in this discussion. In our world of complex integrated global systems, unfathomable speed and constant change, we are all, inextricably, “mashed-up.” Our challenge then is to be simultaneously mashed-up and yet remain hovering above the chaos —to be as responsible to the global, and to the destinations we envision, as we are to the smallest details of the here and the now and to how we got/get there. These directives underlined our experiences and informed the delivery of this trans-disciplinary based pedagogical approach with respect to its aims and objectives.

This paper will focus upon the design and implementation of the LIFECYCLE course - which was a modest attempt to materially explore a variety of design principles in relation to socio-economic-cultural texts. Design then served as a vehicle for both the articulated and materialized field for the visual and, often, the digital.

The composition of CCA’s trans-disciplinary course is notable for its integrated perspective. This approach encompasses the relationships of design language, media technologies, and socio-economic-culture issues, thus enabling students to achieve broad-based perspectives and methodologies. Fundamental to being a productive member of this trans-disciplinary design team was the knowledge and skill-set necessary to manipulate digital

technologies as mechanisms of communications, to visualize and realize design proposals, and to share, network and archive information.



Figure 2 LIFECYCLE Class Presentation, CCA, 2006

Principles often taught in design schools such as CCA invariably bleed into the forces of consumerism and corporate landscape that students often inhabit post-graduation. With business entities increasingly looking to design to offer a competitive advantage in a merciless marketplace – one that is literally gasping for air these days - the risk factor can be extreme. A primary directive of our design program is to lend support to those students who also conceptualize within a wider socio-economic-cultural frame. We encourage those who wish to impart a smaller footprint than those looking to solely create the next bit of product esoterica or yet another over-the-top, limited shelf life, fetish object. We all know far too well the cliché that design is good for business – and that is true enough. So to, we desperately need to move on ... to something that is more expansive. The pedagogical tenet governing LIFECYCLES is that design can be reciprocally beneficial to our societies and cultures. Indeed, it will meet the searing challenges that we presently face - ranging from global urbanization to sustainable practices. It was true in 2006 and more pressing today.

John Thackara has stated that the corporate world is obsessed with the notion of “design thinking” -- which relies on data, databases and digital process for inspiration – basically positing “good” digital design as simply a graphically concise and pleasing Power Point presentation. And, yes, we recognize that there is a bit more to it. As mentioned, the digital was simply assumed within this hybrid studio class environment. The digital technologies – hardware, software, applications, digital processes, networked, mind-sets, assumptions, etc. were normalized and intimately embedded in the various disciplines and methodologies brought to bear by all of the participants. Point in fact, the digital inhabited much of the interstitial space and was an I/O driver for the sustained momentum, production and afterlife of LIFECYCLE. We realize that technologies are enabling a wide spectrum of material uses from 3-D laser to tracking mechanisms. Consequentially, our goal was to establish – to actually fuse together - a mutable pedagogical design environment fostering a

complex synthesis of analytical, technical, strategic and intuitive processes.

With this in mind, I turned to [Gretchen Addi](#) of IDEO. Originating in the heart of Silicon Valley, IDEO now spans the globe, employing a migratory nomadic staff characterized by the sort of jet setting work/lifestyle rivaled only by academics and multinational corporations. Their projects range from human-centered design and research to industrial designed consumer products - from Peek Mobile Devices, Palm Pilots to TiVo boxes. LIFECYCLE was taught in partnership with IDEO. Far from offering a conventional “Peter Drucker” approach, IDEO offered our students their influential approach to innovation in the marketplace. They could offer the “translation” of corporate language to a comparable design language while all the time assisting the students to generate ideas that were not typically traversed within the boundaries of design practices. The question was how far could the teams extend the economic and cultural aspects of sustainable practices by introducing a different conceptual approach than what is stereotypically inscribed as an “on the job” experience. IDEO delves into sociological, anthropological research and consumer experiences, offering up potential solutions to everyday problems – grafting their design process onto other disciplines. Their influential range within design disciplines from industrial design to experience design is without question. To be sure, this is a type of partnering common to research universities and academic institutes as a whole, but is rather atypical to visual art programs, as perhaps, they are considered by some as antithetical to one another.

Specific to the conceptual underpinning of LIFECYCLE, IDEO champions behavioral research as it relates to the designed environment. Within their evolved methodologies their firm claims responsibility for such items as the “mouse,” with which you may have a love/hate relationship. Relative to this DAC conference is the significance that the digital was simply assumed. “THE DIGITAL” has become intimately embedded into not only the mechanisms of production but systemically as to how “we” live our lives.

It’s important to note that we collectively viewed this course as a frame for the possibility of reflection as opposed to a mechanism for simply filling the world with more stuff for an expiring market and bio-spherical locales. The inherent currency of reparation was central to our considerations of sustainable practices. The course was conceived in 2006, when our students in California were grappling with the pre-meltdown stages of the current global economic crisis. At the same time, student designers are often experiencing a degree of collective “culpability” associated with merely being perceived as a cog in the wheel of capitalism while no longer desiring to unwittingly participate in a broken system - one itself in need of re-design.

It was incumbent upon our students to analyze and recast the myriad of cultural assumptions and expectations brought to bear upon objectification, consumption, branding and production strategies. Within the last decade objects produced through these digitally rendered and industrial processes proliferated and are located, tracked and sited throughout our global brandscapes. In response to this reality, the design discipline has witnessed a rupture in its paradigm. It has shifted at break neck speed to address this significant “closing of the loop,” this inclusiveness of the entire cycle within the design process and its consequential

impact on cross-disciplinary design, pedagogical practices and, of course, the marketplace itself.

Working in collaborative groups of five, students from distinct disciplines - architecture, digital media, environment design and industrial design - selected iconic representations of waste production ranging from mobile phones, [PDAs](#), [Compact Discs/DVDs](#), to hipster Converse Hi-tops, and the inevitable, disposable diaper. Initially, they conducted extensive cultural research and formed an analysis of public(s) perception and user behavior(s) around their chosen product. They then took on the challenge of reinventing each product within the context of its discreet LIFECYCLE, making it “smart,” user centered, culturally specific, and ecologically responsive. The depth, creative passion, and energy brought to bear on this design process were noteworthy. Each project resulted in unique and imaginative designs that traversed disciplines and boundaries. The unifying goal of prioritizing design as a tool to realize change was based upon principles of social ethos and a communal responsibility to our shared global environment.

Environmentalists have long despised the ecological implications of Smart Phones, PDA’s, PC’s as well as disposable diapers, with a passion equal to that of the consumers who blindly embrace their respective convenience. The students who took on these controversial icons of the everyday, found it necessary to seek solutions beyond the obvious, linear, banal expectations, i.e. a “green” disposable diaper alternative. They met the challenge of definitively improving the products, the process for consuming them, breaking through their decomposition – their (EOL) End of Life, and simultaneously increasing the value to the consumer while decreasing its environmental impact – an aspect, which hopefully melded into one. Their projects resulted in an innovative analysis and approach as well as a feasible solution.

Students crave a degree of agency in contributing to the formulation of the discourse and materialization of our future world (s)– replete with the need for the design and construction of real and virtual objects, space and environments. “We need to design for the death of an object now”; a student in the class exclaimed after having noted that the commercial life of a cell phone is only 8 months and rapidly becoming shorter. A slightly varied sleek cell phone exterior is unable to truly mask the toxic electronic components that comprise its “hidden” interiority. The underbelly of the technology sector is the limited and shortening lifecycle of hardware/software, the fetishized cyclical, technological object itself, and the rapid growth in the industry that has fostered a reduction in production costs and increased revenue stream. However it has left an increasing environmental disaster and legacy of toxic neo-liberal colonialism in its wake. The pervasive presence of e-waste and toxicity entering the waste stream is a growing and burgeoning problem. The statistics are, quite simply, terrifying in their implications. The explosion of our e-waste exports to China and other developing countries in Asia are replete with their horrendous impact on human and animal health as well as the environment.

Another inhibitor of collective change in the USA is our readily acknowledged cultural addiction to consumerism. After conducting explicit research and placing their subjects under prolonged observation, the design teams were convinced that consumer “guilt” does not result nor motivate changes in consumer desire, behavior or patterns of purchasing. The consumer is inscribed with a complex co-mingling of desire and

liability that enshrouds every purchase. This permuted desire has enabled the market strategies associated with [greenwashing](#) and in so doing has rejuvenated the marketplace. As Konrad Becker has astutely noted: “[Greenwashing](#) ...is the order of the day.”



Figure 3, LIFECYCLE student, 2006

To gain a degree of perspective into the reality of everyday habits of a broad base of Bay Area consumers, the students conducted market research, establishing that “most consumers are loyal to trusted brands, that aesthetics trump virtue, and that consumers ideally want brands to act ethically. The resulting design principles reinforced desire over sacrifice and included such concepts as a guerrilla marketing campaigns (long fostered by artist activists) and an environmental impact evaluation program.”

We then turned the mirror upon ourselves. We identified our own complicity as consumers and attempted to allay our discomfort by visiting the San Francisco Dump and Recycle Center.

[San Francisco](#) has developed one of the most successful recycling and composting programs in the country, with the public recycling 80% of it's generated waste. In a bewildering Terry Gilliam's Brazil-like fantasy of mechanization, this enormous facility has been engineered to separate paper, plastic, batteries e-waste and other recyclables. A measure of its truly surreal dimensionality involved a stop at the “pit”, a stand alone building dedicated to an enormous depression in the earth – a truly imposing cavity that is topped off daily with the remaining 20% of rotting trash that will make it's daily trek to the landfill 60 miles from San Francisco - the key word here is daily. Bearing witness to this stunning materialization of our own waste proved to be a seminal motivation in shifting one's behavior.



Figure 4, San Francisco Disposal and Recycling, 2006

Following this collective experience, the Lifecycle analysis of identifiable objects that figured prominently in a glimpse of our own waste provided a compelling case for design intervention. It turns out that two of the objects selected by the students, the mobile phone/PDA and the CD/DVD forged new channels and pathways for the consideration of digital technologies and their respective delivery systems. Other selected products such as Converse Shoes and disposable plastic diapers invited alterations in prescribed consumer behaviors and modified business models that supported shifts in their Lifecycles.

The research phase for each object of study comprised of a generative list of items including raw materials utilized in the manufacturing process, energy requirements necessary to manufacture, toxicity of materials and processes, distribution chain distances, manufacturing costs, product pricing and an analysis of the consumer experience, use behavior and finally, the “end of life” issues for the product. Where does the object finally end up if there are negative long-term consequences to its demise? This information created a densely packed decentralized web of information that was digitally rendered. The students then used this database as the basis for a graphic analysis of energies expended. The goal of this investigation was to generate considerable insight into the “real” and perceived value and cost of these objects.



Figure 5, Chris Jordan, Recycling Yard #6, 2004



Figure 6, Chris Jordan, e-Bank, Tacoma 2004

To answer the demands of behavioral research, the students had to first locate consumers willing to participate and be placed under observation during their daily activities. This anthropological data

fostered the research necessary to propose design alternatives that would address the full lifecycle of the objects.

1.1 Mobile Phones, PDA's

The research phase uncovered the inconvenient truth that most used Mobile Phones/PDA's are shipped to China for reuse, or, they are disassembled there with a fraction of their components being recycled. The majority of exported materials that become landfill material are toxic (e-waste), do not decompose and their presence proves noxious to these communities and environments. Most consumers expect to upgrade their PDA either when it breaks, or when the cyclical, newer, better, faster version hits the market. A majority of consumers do NOT want to pay to upgrade, and they expect their service providers to offer them Mobile Phones/PDA's at greatly reduced prices, or free of charge. However, a substantial number of customers are consistently dismayed by the quality of the materials, interface design and workmanship.

Most customers do not recycle their phones, they simply toss them off or surrender them when they upgrade. This leads to unprecedented degree of material waste and is, certainly, disillusioning relative to the ideals and aspirations underlying human behavior. It was not uncommon for many younger consumers of approximately 25 years of age to cycle through 3 phones annually.



Figure 7, Chris Jordan, Cell phones #2, 2005

Concurrently, our students observed and studied how Mobile Phones/PDA's plans are currently marketed, distributed and purchased at the local retail outlets of Sprint, AT&T, Verizon and T-Mobile. This end user purchasing experience surprisingly engendered a high degree of confusion for the consumer relative to the plans, as well to the issues endemic to the lifecycle itself. As a result a decision was collectively reached: these retail outlets needed to be fully re-conceptualized. Indeed, the retail experience was in dire need of simplification. A consideration from any vantage point pointed to the fact that the consumer needed to be provided with clearly delineated information pertinent to the lifecycle issues at hand.

The students identified solutions: they could either design a better Mobile Phone/PDA that had long term value or design a better distribution process thus altering consumer behavior and current anticipated business models. They identified that the manufacturing cycle should create a closed loop for itself, requiring that consumers "lease" their PDA's from the service carrier. By removing consumer's expectations of disposable

Mobile Phones/PDA's, the students chose to focus upon the mobile phone companies manufacturing processes and retail experience.

Existing stores would be fully equipped with a plethora of digital upgrades to extend the life of their Mobile Phones/PDA's use from months to years along with extensive consumer outreach awareness programs. This notable shift transposes the sale of disposable phones to the provision of lease programs for encasements, replaceable housing and updated constituent components and interfaces.

Additionally, a program develops recycling programs for outmoded and unfixable phones, ensuring that phones exchanged and/or surrendered at the retail outlets had a direct path back to the manufacturers factory thus enabling repurposing. Creating a consumer awareness campaign about reverse engineering was instrumental in distributing knowledge of the lifecycle - how the phone had been designed, how it could be easily upgraded, what materials were recyclable, what was the result of its e-waste, and the process by which the remaining materials would be repurposed into the manufacturing of a new Mobile Phones/PDA.

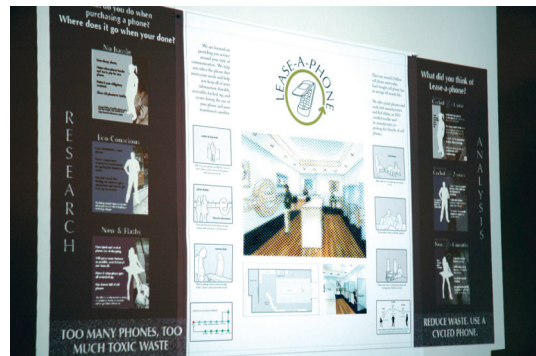


Figure 8, The Lifecycle Concept Phone

Reverse engineering served as the basis of a design aesthetic unto itself with potential break-apart components capturing the imagination. This conceptualization was the direct result of the student's attempts to reconcile the implications of images depicting women and children in Asia standing atop a mountain of obsolete cell phones gashing their hands in an attempt to tear apart these components. The design response spoke to a rather "Get Smart" concept. It was one that ensured a phone's self-destruct mechanism would be detonated. By pushing the right series of numbers on the keypad, that the phone bursts apart, disassembles itself into a few simple components, glass, aluminum and circuitry, and then repurposes itself into an amalgam of recycled parts.

I have noted the recent release of a new "+ LINC The Lifecycle Concept Phone" which bears a remarkable resemblance to this student project and fully utilizes its embodied lifecycle principles.

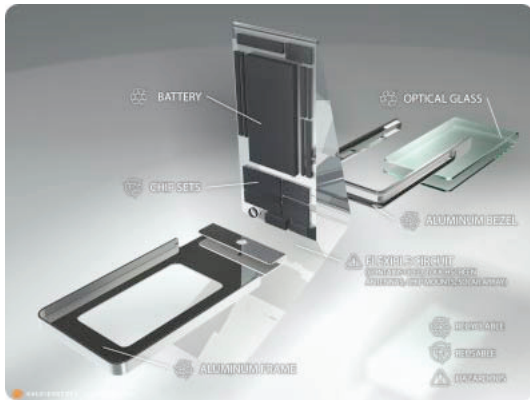


Figure 9, The Lifecycle Concept Phone Disassembly

1.2 CD/DVD

The CD has been part of our lives for over three decades and is currently being phased out in favor of the proverbial faster, better and more convenient methods of storage and music distribution. This consumer product is nearing the end of its shelf life – spiraling down the path paved by the demise of vinyl and VHS tapes.

Early in the process this team focused upon the musical CD. They determined that there was a considerable market potential for a physical store devoted solely to digital music. The team developed a series of questions tailored to the individualized use by each segment of the market. In this case, it was necessary to interview a wide range of age groups, from 10yrs – 60yrs, as the specificities of each demographic held a significant impact on any design consideration. The comments and observations were meticulously documented, organized, sorted, and evaluated.

Although somewhat expected, these results indicated widely divergent answers from the various age-based demographics. They tapped into a surprising degree of nostalgia for the physicality and presence of the “object” and its attendant aesthetization. This factor crossed all age groups. Even with the clearly declining sales of CD’s at music store, such as Virgin Megastore, it was found that if one could purchase music for less or through on line music stores, the hope for a new experience to fill that void was paramount. This group decided to address this desire and to fill this void by focusing on the creation, sharing and networking of personal music libraries, mapping regional/national/global music trends, and basically allowing for a new user experience to grow from a desire fueled by this nostalgia. The goal of the project would be to satisfy the longings of that material desire, without creating more consumer objects.



Figure 9, LIFECYCLE Class Presentation, CCA, 2006

An additional widespread problem that challenged our students was the fact that numerous consumers were incensed at the prospect of yet another format for music storage. Having had cycled through vinyl, 8 track cassettes, cassette tape, and now CD’s, consumers seemed to revolt against the strategy of planned obsolescence advanced by technological development. Then again, certain definitions of “revolt” do not find their native habitat within the consumer lexicon.



Figure 10, LIFECYCLE Class Project Board, CCA, 2006

Nonetheless, a younger consumer demographic is predictably shaping the music marketplace, as its short-term memory extends only to the ruins of the CD. The conceptual underpinnings emerged for a physical spatial construct that accommodated group sharing, listening rooms supplemented by collective and personal listening experiences, and one that placed the overt dynamics of retail transaction at a minimum. Purchasing and uploading music within that collective setting was seen as desirable, most notably if it could be seamless woven into the listening experience. Any rupture of this seamless subtext of a transactional experience would detract from the atmosphere. Therefore, the design strategies implemented resulted in the rendering of an invisible conventional retail sales operation. In the student's vision of this "new music" environment, embedded technologies, sensors and user interface would be of primary importance, as would the ability for one to flow easily from one music genre spatially embedded experience to the next. This team addressed the identification of these emergent desires and effortlessly transformed them into a consumer experience. Most importantly to the LIFECYCLE directive, their solution would not generate the sales and distribution of materially based products.

Seminal to the studio critics, faculty, and IDEO collaborators was the fluidity of our approach. The blurring of boundaries fostered by the edicts of cross-disciplinarity reinforced this organizing principle. Each group of 5 students gained a diverse and inter-related knowledge and set of proficiencies. They were encouraged to not limit their individuated design solutions based upon discipline, but to invite collective consensus and brainstorming to propel them to the cornerstones of collaboration. They were encouraged to situate themselves outside their comfort zone.

Suffice it to say, it was one colossal mash-up and remix pulsating with alternating currents of exhilaration and high anxiety.

Having recognized the vital prescience of this course, the [Thoreau Center for Sustainability](#) Gallery, offered our students a public exhibition for the installation of their projects.

Due to the added emphasis of research and user experience, in conjunction with the identification of a complex lifecycle process, the faculty's focus fell upon evaluating group dynamics of collaboration and conceptual development. The skillful, aestheticized manipulation of a finished product was of secondary concern. Negotiating complex processes may help designers re-imagine the end of a design process from its inception. LIFECYCLE offered the recognition and identification of a nascent design process with an emphasis on trans-disciplinary from its inception to its EOL. To initiate the design process with the end of a products usefulness - not its prescribed starting point, not as planned obsolescence - but rather by embedding a symbiotic and generative looping relationship in the design of our products, we have contributed to a significant shift necessary to advancement of design pedagogy in relation to consumer and environmental ethos in the 21st c.

2. REFERENCES

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