

Understanding emotional design: origins, concepts, and implications

Paul Aumer-Ryan

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Emotional design, alternatively called (with slight variations in meaning) hedonic design, affective design, affective human factors design, human-centered design, and empathetic design, is in essence the inclusion of—or at least the deference towards—the role of human emotions as an influencing factor in the way we deal with and relate to objects and artifacts. Its audience is specifically those designers, programmers, engineers, inventors, and creators who occupy the role of producers of artifacts and objects, and its intent is to enhance the effectiveness and emotional content of these objects for users and consumers across the globe.

Background:

Emotional design is a multidisciplinary approach relying upon and affecting those in the areas of information science, philosophy, cognitive science, computer science, artificial intelligence, and software and game development. In a familial sense, it is the grandchild of Human Factors (Ergonomics) via Human-Computer Interaction and in opposition to classic Cognitivism (Aboulafia & Bannon, 2004). Its role as a separate

field of inquiry can be traced back to Western philosophical notions originating with Aristotle (1954/340 B.C.E.) and further developed by Descartes (1989/1694 C.E.), envisioning a distinct separation between the rational mind and the emotional mind, as well as divisions between subjective and objective experience.

Aspects of the design process are typically divided into two categories based on these distinctions: rational and emotive. While recent literature (Lewis & Haviland-Jones, 2004; Trappl, Petta, & Payr, 2003; Goleman, 1995) suggests that emotions inundate every aspect of human existence, classic treatments often focus on behavioristic or cognitivist approaches that relegate (or outright ignore) the impacts of emotions on the design process. Such approaches focus on input-output (stimulus-response) paradigms of the human mind, and tend to view emotional content as noise affecting otherwise standard data. Emotional design, on the other hand, intends to propel emotion to the forefront of design criteria.

Emotional divisions:

In order to make better sense of the varied emotional states, many authors have created categories for emotions that divide them temporally as well as cognitively. Each of the categorizations reviewed here creates a tripartite division that is substantially similar to the other categorizations. Englested (1989, as cited in Aboulafia & Bannon, 2004) creates three temporal categories of emotions, namely affect, emotion, and sentiment. Affect is a brief emotional state often in response to environmental stimuli; emotion is less situational than affect, and tends to be based more on memory and

causality; sentiment is the longest lasting emotional state, and tends to include such feelings as love and hate.

Similarly, Boorstin's (1990, as cited in Norman, 2004) emotion levels (which deal specifically with the emotional impact of motion pictures) are visceral, vicarious, and voyeur. Visceral emotions are "the gut reactions of the lizard brain"; vicarious emotions, like Engelsted's *emotion*, are memory-based, last longer, and have easily conveyed meanings; voyeuristic emotions operate on a somewhat removed level, and have a more mental than physical presence. Finally, Norman (2004) demarcates between visceral, behavioral, and reflective emotions: visceral (also called reactive) emotions are quick, evolutionary responses like fear and disgust; behavioral emotions coincide with bodily activity, and include such feelings as frustration, aggravation, and annoyance; reflective emotions, like Boorstin's *voyeur*, are removed, contemplative, and include feelings such as pride, embarrassment, and guilt.

Emotional design in the marketplace:

The impetus for these divisions relies on their ability to be mapped to different characteristics of products. Norman (2004) expounds the simplified mapping as follows: visceral design maps to the appearance of an item; behavioral design maps to its ability to be used and the pleasure (or lack thereof) from using it; and reflective design maps to the memories associated with a product and the reflection upon one's self image that it conveys.

Designing for each of these levels requires different tactics. For example, attempting to satisfy emotional design criteria at the behavioral level often entails a

thorough usability evaluation. Emotional design at the reflective level, on the other hand, may require a company to develop a corporate image that reflects upon their users (e.g., Google's anti-corporate and liberated undertones are expressed by their playful and festive logo changes during holidays such as Earth Day). Visceral design may be the most straightforward, and is clearly evinced by most automobile designs (be they sleek, cute, sporty, or domineering).

Emotional design and usability engineering:

While good emotional design has a strong impetus from marketing, enticing customers to part with their disposable income, it also has more idealistic motives, not least of which is the reduction of frustration when interacting with computerized devices. This aim of emotional design is most comparable with the goals of usability engineering, and the literature is replete with motivating factors for its pursuit, ranging from return-on-investment and enhanced productivity (Bias & Mayhew, 2005) to improved social relationships and overall well-being (Klein, Moon, & Picard, 2002) .

With the current state of computers, we can adequately assume that most users (beginner, intermediate, and advanced) will experience some level of frustration in their dealings with them. Mitigation of this frustration using emotional techniques is an area ripe with opportunity as well as its share of failures (obligatory reference to Microsoft's Clippy office assistant). Klein, Moon, & Picard (2002) focus on the sources of this frustration and possible techniques that can be used to ameliorate its effects. The novel notion they present is that, in addition to avoiding sources of frustration by utilizing

usability techniques and sound program design, computers can act to address user frustration that has already occurred.

Frustration is described in this sense as doubly troublesome to computer users, as they must both deal with the source of frustration (the misbehaving computer) and the emotional response itself. Klein, Moon, & Picard hypothesize the following: “When a computer system creates frustration on the part of the user, it can relieve that frustration quickly and effectively by means of active emotion support” (p. 124). In other words, by making the computer act as a sincerely interested party to the frustration it has caused, users can vent their emotions and hopefully rely on an empathetic and sympathetic response that validates their feelings. Using a contrived computer game, the authors created frustrating situations for participants (such as unresponsive input devices while the game world continued forward) and provided a questionnaire at the end where the computer recognized the user frustration and allowed the participant to respond to it. Simply allowing the user to vent in freeform fashion showed a reduction in the effects of frustration, but the most effective method occurred when the computer addressed the feelings of the participant in the questionnaire (e.g., “It sounds like you felt fairly frustrated playing this game. Is that about right?” [p. 128]).

Based on this and similar research it can be summarized that, in addition to the standard usability practices that reduce sources of error and frustration, including support agents in software applications that actively address a user’s frustration can create a much more harmonious relationship between the user and computer.

Human-computer etiquette and computers as social actors:

In order to further realize this harmonious relationship, several researcher groups have focused on the Computers As Social Actors (CASA) paradigm, which has as a main tenet the following: “All interfaces, however badly developed, have personality” (Topffer’s law, from Mishra, Nicholson, & Wojcikiewicz 2001-2003). The primary set of experiments that exemplified this concept were conducted by Reeves & Nass (1996) and dubbed “the media equation.” In one of them, users interacted with a training program on a computer and were asked to evaluate the computer afterwards (one group of users filled out the evaluation using the same computer, and the other group used a different computer). The users who used the same computer exhibited signs of politeness—their responses were significantly more positive—implying that, at least subconsciously, we treat computers much like we treat human beings.

By casting computers in the role of a human (or at least a human-like collaborator), we gain certain insights into expectations that users may already have for the interaction. This act of personification is yet another tool on the designer’s tool belt that allows him/her to create appropriate exchanges between users and the computer.

The emotional interplay of tools and goals:

By definition, the act of design is oriented towards a specific goal or purpose, and the design itself cannot radically change that end (there are rare cases of invention where new designs can create entirely new purposes, but this is often only noticeable in retrospect). What is being designed is an artifact or “tool” that furthers the purpose in mind and, in the case of emotional design, has the added effect of eliciting an emotional response (e.g., Philippe Starck’s “Juicy Salif” citrus juicer—as cited in Norman (2004)—

fulfils the goal of producing orange juice while at the same time evoking a reaction to its alien contours). The important thing to note is that the tool and the purpose are separate entities, and hence the emotional impact of using the tool is dependent on both it and the activity being performed.

This has broad implications in the realm of computer software design, where the products of design (applications) are quite clearly tools in furtherance of some goal (e.g., a web browser allows users to browse the web, and a word processor allows users to compose literature). A mindful designer has a strong element of control over the emotions elicited by the application s/he is creating, but little, if any, control over the emotions caused by the actual task. More flippantly, I can design a more comfortable and relaxing dentist's chair, but it doesn't change the fact that I'm in the office because I have a cavity.

This may be seen as a severely limiting factor in emotional design, but such a view is needlessly restrictive. In fact, one may classify the entire field of usability engineering as a subclass of emotional design—for its purpose is to increase user productivity by addressing those elements that cause frustration (a strongly negative emotion). This is often the best way to recognize inefficient design—by observing a user's emotional responses to interacting with it.

Against a hedonistic conception of emotional design:

In observing user responses, the tendency is to clearly classify emotions into positive and negative frames, and assume that the product is succeeding when positive emotions are displayed and failing when negative emotions are displayed. However, this

mechanically hedonistic framework of emotion is resisted by both Aboulaflia & Bannon (2004) and Leontjev (1978). Strictly speaking, hedonism seeks to define human activity in dichotomous positive and negative categories, and then define the driving principle of that activity as a simple optimization problem: maximize the positive, minimize the negative. Resisting this approach decries the rote design practice of assembling an emotionally evocative product from a list of “emotional attributes” that belong to certain design actions. In essence, the reason the hedonistic approach fails in most cases is because of the previously mentioned division between the emotional effect of the design (the tool, application, or artifact) and the emotional effect of the situation (the goal or purpose of the tool). Most designs (with the notable exception of games) aren’t geared towards the primary goal of hedonism—having a “good time.”

Aboulaflia & Bannon describe an auxiliary form of happiness that is more within the reach of non-hedonic emotional design: “In order to be happy, one must have some kind of goal; then striving toward it, one will experience happiness without directly focusing on it” (p. 13). In essence, this conception of emotional content subverts the issue created by the tool vs. goal dichotomy. In related literature, this state of enjoyment is called the “flow” state (Csikszentmihalyi, 1992, 1981), wherein the division between a person and his/her task disappears and a euphoric sense of engagement occurs. Typically, it is the fault of the tool (or a person’s inexperience) that prevents the flow state from occurring (e.g., an artist cannot become engaged because his/her pencil tip keeps breaking). The flow state can lead to an increase in concentration, and is additionally motivating and addictive (Norman 2004). Good emotional design (via

standard usability practices) can help experienced users accomplish this eudemonia, leading to an increased amount of well-being and productivity.

Cultural issues in emotional design:

As we have seen, emotional design can do little to change the positive emotional impact of the goal that the design is aimed towards (other than providing an efficient and usable route to its accomplishment). Practitioners run into further difficulty in broadening emotional design across cultural boundaries. Besides (and in addition to) the traditional problems of internationalization, there is evidence that many emotions are experienced differently (such as how often experienced and how strongly experienced) across cultures (Uchida, Norasakkunkit, & Kitayama, 2004; Ou, Luo, Woodcock, & Wright, 2003; Kitayama, Markus, & Kurokawa, 2000; Markus, & Kitayama, 1991).

In a follow-up study to the “media equation” studies conducted by Reeves & Nass (1996), Katagiri, Nass, & Takeuchi (2001, as cited in Miller, 2004) performed a cross-cultural study evaluating differences between strongly collectivist (Japan) and strongly individualist (United States) cultures, and found that the latter group tend to offer politeness only to the computer involved in the test, while the former collectivist group will also reciprocate politeness to other computers of the same *brand*.

In furthering the field, proponents must be aware of certain adherences that may influence the treatment of emotions. Western philosophical tradition dating back to Descartes has placed a substantial emphasis on the divisions between mind and body, the psychological and the physical, and the rational and the emotional (Descartes, 1989). In fact, it is for this reason that “emotional” design exists as a separate field (i.e., traditional

software design is focused solely on solving the cognitive issues with no acknowledgement of emotional impact). While important for Western audiences, the implications of this separation may become hindrances when attempting to design for a more international audience.

Conclusions:

Although somewhat beyond the scope of this paper, it is important to note that idyllic designs (i.e., those that are effective for all users) do not exist because of the influences of cultural context. For this reason, “knowing one’s audience” (i.e., who the design is for and will be used by) is of primary importance in emotional design. Internationalization and localization issues are just as important when designing with an eye towards emotion. In a sense, where emotional design seeks to build upon classic design frameworks by adding in a more human context, so to do cultural studies need to build upon the study of emotional design by uncovering the interrelations between emotional experiences and human sociality. Since the current literature has been successful in creating appropriate categories for emotions (by time and cognitive structure), future studies can aim to build on this quantification by adding in the cultural dimension. In this way, emotional design will further solidify its foundations and allow the design process to become more closely aligned with the human experience.

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