THE HUMAN-UX/UI RELATION

An Undergraduate Research Scholars Thesis

by

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ABSTRACT

The Human-UX/UI Relation

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This project takes an interdisciplinary approach, connecting the fields of phenomenology and human-computer interaction, to demonstrate how mediation theory establishes a process from which we can obtain a more comprehensive qualitative analysis of a technology's UX/UI. Such an analysis overcomes the criticism normally imposed on the notion of subjective experiences. Our perceptions of UX/UI evoke a technology experience, through which emerges an interdependent relation between user and technology, such that each has some governance over the other. Building our understanding of human-technology relationships, and UX/UI's role in them, allows us to better situate within the world a technology's influence on our perception of societal virtues, which ultimately motivate the movement of society's progress. This paper specifically analyzes Youtube and Facebook/Instagram as case studies, and their involvement in redefining the societal virtues of community and success, respectively. With these examples, I present a method to recognize UX/UI's ability to affect our achievement in developing good character, and argue that analyzing

UX/UI in such a way can make us more aware of how we should design and how we should conduct ourselves in using technology.

INTRODUCTION

What role do user experiences and user interfaces (UX/UI) play in a society dominated by technology? Currently in this Age of Information, people have become highly dependent on software to maintain tasks that previously required more involvement. Rather than walking to the bank and handing money to a teller, we can deposit checks and transfer money via an application on our mobile phones; rather than going to a bar to listen to the most recent popular hits, we can pull up our favorite music streaming application and easily see what song is trending. These tasks all share an implementation of UX/UI, and instances of it have become essential to conducting our life activities. So, how can we understand the role that UX/UI plays? Don Ihde (1990) analyzes four forms of human-technology relations, that of embodiment, hermeneutic, alteric and background. These four relations provide an understanding of how technology acts as an intermediate between us and the world. He articulates the ways in which technology becomes a part of our person, takes on a meaning of the world, takes on a life seemingly of its own, or falls into the background outside of immediate perception. While Ihde set the foundation for *mediation theory*, Peter-Paul Verbeek (2011) expands Ihde's framework by introducing the moral implications that follow from technological mediation. Verbeek contextualizes morality between technology and its users. In this paper, first I will familiarize my reader with the concepts used to support my overall argument, i.e., UX/UI and mediation theory. Once I have introduced these concepts, I will use mediation theory to discuss how UX/UI mediates our interaction with the world, and how increasingly pervasive forms of UX/UI are subtly reformulating societal virtues, particularly the virtues of success and community.

SECTION I

WHAT IS UX/UI?

In short, UX/UI is the dimension of a technology that a user directly experiences and interacts with. The more complex a technology, the greater a need for UX/UI. Simpler technologies, such as writing with a pencil, may have no benefit from including UX/UI; upon perceiving the pencil, an individual, who assumedly has been taught how to write, naturally knows how to hold the pencil in such a way as to direct its motion to produce letters and words. However, the technologies I am considering, such as application services, become necessarily dependent on the UX/UI to guide their users to successfully work through the implemented features. Without UX/UI, the technology loses its capability of interaction, and consequently becomes useless.

UX

In general, UX is the experience a user encounters as a consequence of using a technology. On the surface, this definition seems quite obvious, but going into more detail, we see that there are many characteristics that come into play. Hassenzahl and Tractinsky (2006) have identified these characteristics as (1) beyond the instrumental, (2) emotion and affect, and (3) the experiential. (1) addresses the qualities of a technology that go beyond its basic functionality, such as its aesthetic. The aesthetic features of a technology satisfy a more intrinsic human need for beauty, for "beauty is an end rather than a means" (p. 92). (2) is self-explanatory, as it concerns the user's reactions and consequences; using a technology provokes emotions. (3) involves the UX's situatedness and temporality. An individual comes upon the use of a technology with emotions, expectations, and an aim in mind, all of which occur in a finite amount of time and particular physical space.

Similarly, McCarthy and Wright (2004) identify four threads of experience that contribute to the overall UX: the sensual, the emotional, the compositional, and the spatio-temporal. The sensual thread comes from the physical use of a technology, e.g., the sitting in front of a computer, which permits a feeling of closeness to an individual, who may be miles away. The emotional thread compares to Hassenzahl and Tractinsky's "emotion and affect." It accounts for the evoked emotions of a user confronting technology. The compositional thread provides a more holistic account of UX, as it creates a narrative of how a user's initial emotions and expectations affect the use of a technology, and, in return, how such use of a technology reflects back on the user. Finally, the spatio-temporal thread resembles Hassenzahl and Tractinsky's "experiential." The UX may involve the sense of time passing quickly or slowly or the comfort or confinement of a space.

Both Hassenzahl and Tractinsky and McCarthy and Wright describe technological experience by compartmentalizing the experience into distinguishable facets. These facets may be used to understand how UX affects us. Because UX occurs by means of a user's interaction and perception, and users may have different experiences using the same technology, UX is not necessarily consistent or identical from use to use. What greatly contributes to the UX is the UI, whose design greatly dictates how a user experiences a technology.

UI

The UI of the technology is the front-facing component that the user directly perceives and interacts with. UI components — such as navigation to guide exploration and operation across features, buttons to perform actions, and icons to represent ideas — act as a veneer, providing the presentation necessary for the technology we are considering to be of use.

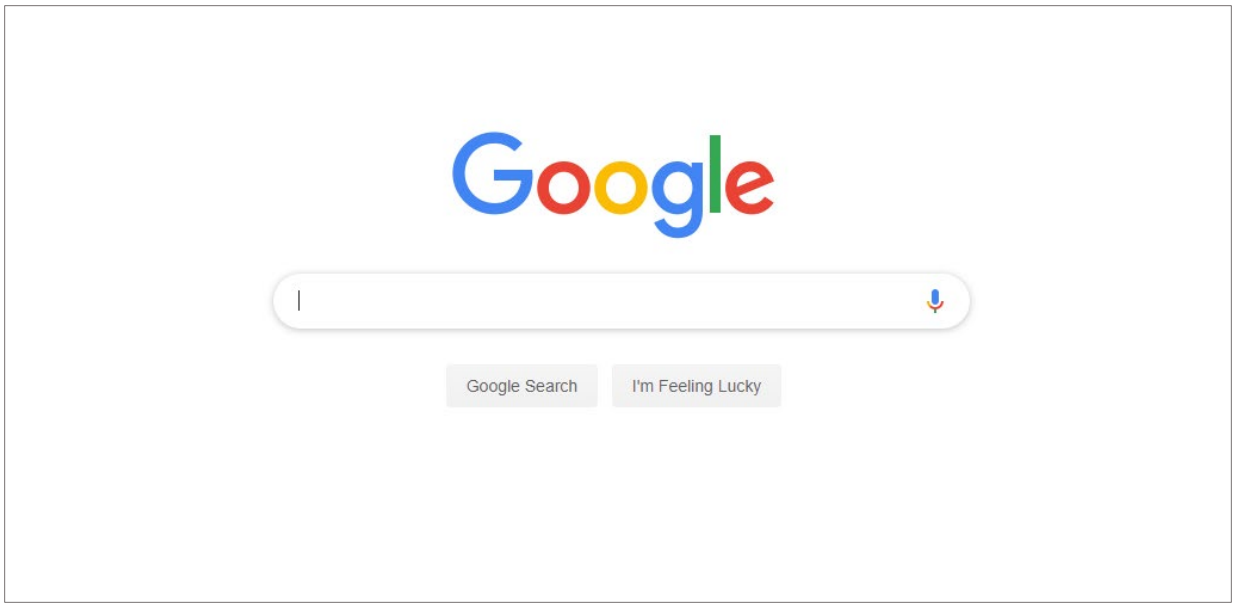

Figure 1. UI of the Google search engine.

Upon typing "google.com" into the search bar of a web browser, we come across a page with the Google logo, a textbox input, and two buttons labelled "Google Search" and "I'm Feeling Lucky," as seen in Figure 1. These four components provide the means of searching through an enormous amount of data based on a query provided by the user. In this case, the page that we first see is the UI, and the technology behind it, let us call this *technology B*, is the search functionality built upon algorithms that have been developed and refined over the years. The UX that this UI and *technology B* create is very efficient, as compared to a user skimming through thousands of books and articles to find the answer.

Generally, UI is the technology that is the user-facing side of *technology B*, and together, UI and *technology B* create a UX. Note that UX is not a technology in itself, but it can be determined by the design of a UI. This is the definition that I will move forward with to explain the human relation with UX/UI and how it takes on a moral dimension.

SECTION II

MEDITATION THEORY

In order to articulate the human-UX/UI relation, mediation theory provides the framework to understand how such a relation takes place. Mediation theory concerns the co-existential influence between technology and their users. It recognizes that with technological use, human beings direct the progression in technology's advancement, and reflectively, technology dictates how human beings interact with the world around them. Technological mediation consequently takes on a co-constructivist position, a compromise between technological determinism and social constructivism; both technology and human beings play a significant role in the shaping of each other's developments. In order to understand specifically how technology affects the development of society's virtues of success and community, we will discuss Don Ihde and Peter-Paul Verbeek's contributions to mediation theory. Where Ihde provides the relational framework that accounts for how human beings associate with technology, Verbeek presents its moral implications.

Ihde and Human-Technology Relations

Embodiment

Ihde's first relation, that of *embodiment*, describes the way in which a technology becomes a part, or extension, of a user's being. When a person wears her eyeglasses, the eyeglasses become a part of her, serving to help her perceive the world around her, but falling out of her immediate perception. Through the eyeglasses she can interact with her world; without them, she may not perceive all that the world contains in front of her, let alone see the world correctly. Another example is the prosthetic, which more obviously becomes a part of its owner's person. For someone who has lost a limb, a prosthetic assists an individual to perform functions

that a missing limb may prohibit. Over time, more use acclimates the individual to the prosthetic, such that using the prosthetic becomes quite a natural feeling. It may still have its limiting factors in dexterity, but it still increases the number of tasks that an amputee could not otherwise perform.

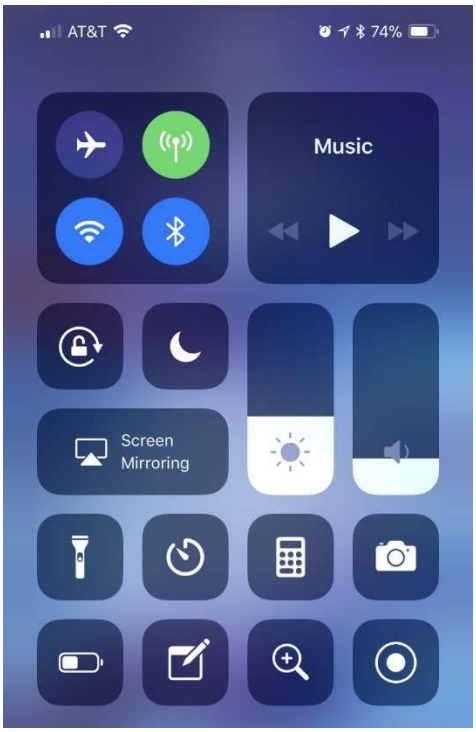

Figure 2. iOS Control Center.

For UX/UI, UX is that of our own, and we engage with UI in such a way that it becomes quite natural to use; we begin to ignore some parts of the UI, but it still allows us to interact with *technology B*, and ultimately, the world. If we consider having an embodiment relation with an iPhone, the UX/UI contributes to the relation. Owners of the iPhone can swipe up on a locked screen to access the Control Center, shown in Figure 2. Individuals may have a similar UX, or very different ones, as the Control Center is configurable. However, when the Control Center is not in use, we do not really imagine a panel hidden below the screen of the phone and sliding into our immediate perception; it quickly appears, and we move on to tapping a button to finish the

task we have in mind. We may not even wholly perceive the icon within the button that signifies the action, because repeated use has conditioned us to know where to place our finger. The UI of the Control Center, as a part of the iPhone UI, becomes a part of its user as a means to achieve some action.

Hermeneutic

Ihde's *hermeneutic relation* illustrates how technologies take on a meaning of a part of the world. He explains how language was an early form of hermeneutic relations, specifically Egyptian hieroglyphics. These hieroglyphics represent some world object or idea, all in a small space, such that when composed together, they create a greater meaning. This provides an easy translation to UX/UI's role in the hermeneutic relation, as many components of UI take on similar representations. Iconography used in UI is a straightforward example, similar to hieroglyphics. Icons symbolize something beyond themselves. On a computer desktop's taskbar, the series of icons convey the various applications in use. In the example of the iPhone Control Center, an icon of a moon signifies the capability to set the iPhone to "Do Not Disturb" mode. Buttons represent actions; fonts and their sizes may express a hierarchy; emoticons express emotion. So, UX/UI's hermeneutic relation explains how the UI becomes a representation of a feature of technology, which is a part of the world that we interact with.

Alteric and Background

Ihde's third and fourth human-technology relations I will discuss together, as the former dovetails the latter in their application to UX/UI. The *alteric relation* describes a technology's "otherness" in which the world falls out of immediate perception behind the technology in use; the technology seems to be of its own that we interact with, as we are unaware of the world behind it. The *background relation* describes the technology falling out of immediate perception and

becoming part of the background of our experience; it becomes a part of the world that places itself in our peripheral vision. In terms of UX/UI, the alteric relation makes its appearance through the software that mandates our interaction with UI. Returning to the Google example, querying a search suggests an alterity to the search engine itself, as an individual googling something concerns herself with the list of sites that appear as a result of some algorithm, which seems to conduct itself without her interference. At the same time, the software that is actually providing the results, *technology B* that provides the search functionality, falls into the background; the user does not think about what function calls are being invoked, or how the software decides to order the results as it did. At the center of the user's attention is primarily whether or not her search was answered, and choosing the best link to find her answer.

Verbeek and Moral Mediation

By understanding how Ihde's framework applies to UX/UI, we can now move to Verbeek's contribution to mediation theory, building off of Ihde's work by identifying the moral implications of the theory. Verbeek ("Mediation Theory," n.d.) defines the idea as being that "technologies, when they are used, help to shape the relations between human beings and the world," and through these relations emerge technological morality. This is where some disagree, as the thought of technology having morality may be unintuitive or nonsensical. Does a gun have a moral claim in the act of killing, or does it simply serve as a means to conduct such an act, nothing more? Verbeek (2011) recognizes that the argument for technologies as moral agents is still upheld by some, but his argument for them having a moral dimension is compelling. Considering technologies indeed having some kind of relation between us and the world, indicating technological contribution to our interaction with the world, it is difficult to deny that technologies also contribute to the ethics which emerge through such an interaction. With a gun, the act of shooting and killing another

becomes possible. The gun *and* the individual who pulls the trigger perform this act. Take the gun out of the equation, and the potential murderer is at a loss. Either some other technology is needed, or the task becomes much more difficult. If the gun is necessary for killing another in this way, then surely it takes on a moral dimension as well. When we view technology this way, we can consider UX/UI as having its own moral qualities which affect our perceptions of societal virtues. Once we establish the kinds of relations that we have with UX/UI, it necessarily follows that UX/UI has a moral component, which, in this case, emerges as influencing societal virtues. To better articulate how this occurs in UX/UI by applying mediation theory, we will turn to the virtues in question — success and community — and simultaneously look at popular applications that lend themselves to this exchange.

SECTION III

CASE STUDIES: APPLYING MEDIATION THEORY TO YOUTUBE AND FACEBOOK/INSTAGRAM

With the foundation set on mediation theory, we can move to how it arises in an ethical analysis of UX/UI. Although UX/UI as a whole is unique to an application, there is a standard set of design components found in nearly all applications, such as navigation, iconography, and notifications. How they are specifically implemented in an application is motivated by its purpose. This section specifically looks at Youtube and Facebook/Instagram and identifies the types of human-technology relations that users encounter through the applications' UX/UI. Establishing these relations sets the groundwork for articulating the effect on a user's ideas of particular virtues. The theory of virtue ethics (Aristotle, 1998) illustrates how we possess virtues, and the degree to which we own these virtues dictates our behavior and actions, which should be ultimately directed toward *eudaimonia*, i.e., some ideal happiness. For Youtube and Facebook/Instagram, applying this type of ethical framework will reveal their UX/UI's contributions to our notions of success and community, and whether these notions align with the notions we should have to achieve *eudaimonia*.

Youtube and Success

Since its creation in 2005, Youtube has obtained nearly 2 billion users. Not only do videos uploaded by content producers provide a wide range of entertainment, but they also come with information attributed to popularity, and ultimately success. Youtube's monetization allows Youtubers to use the platform as a source of income. According to Youtube (2019), there are several ways that Youtuber's can earn money: advertising revenue; channel memberships;

merchandise; Super Chat, where dedicated viewers can get their messages recognized in chat streams; and, Youtube Premium Revenue, where the Youtuber receives a part of a subscriber's Youtube Premium subscription fee. All of these avenues of earning money depend on the number of viewers. More viewers increase the chances of ad engagement; more viewers increase the chances of a viewer joining a Youtuber's channel membership; and so forth. Youtube's UX/UI contributes to the number of viewers and conveys to viewers information that deem a Youtuber's success. There are several data types that lend themselves to this phenomenon: the number of views, likes and dislikes, and the number of subscriptions. With these figures, we encounter a *hermeneutic relation*, as the way that both viewer and Youtuber interpret this data carries significant weight in the public perception of a Youtuber's success. Often, the end of Youtube videos sign off with a message to click the subscribe button, like the video, and/or comment below, an expression of a Youtuber's recognition in the importance of growing the audience. On the other side of the screen, as viewers watch series of videos, subscription count and likes convey potentially good quality, popularity, and draw viewers to the videos associated with this data, snowballing until the most popular videos are "trending." However, there are even subtler *alteric and background relations* emerging. As viewers play through videos, the software behind Youtube collects data on the types of watched videos, resulting in a list of recommended videos, which immediately appears in the center of a user's Youtube homepage. The recommendation feature is a common UX/UI component across applications, providing users new content based off of previously consumed content, easing the browsing process. Youtube's use of recommendation leads viewers to videos of such a category, keeping viewers in a biased realm of videos, which other than that may never be seen. It creates a sort of echo chamber for viewers, returning to their previously watched producers or entertainment of the like, circulating them from video to video,

giving Youtubers, who have already attracted a viewer, a greater chance of attracting them again. Youtube becomes this entity that manipulates the UX (alteric), the process of which is out of the user's perception (background), in such a way that Youtubers succeed because the algorithm that produces a set of recommended videos brings viewers back.

If these UX/UI components and the relations that take place center around a number of viewers, these viewers become a means to maximize a number, which ultimately reflects the success of a Youtuber. In this sense, the relationship between viewer and Youtuber becomes one of utility. Aristotle labels this an imperfect friendship, where the relationship, which is not really a friendship at all, depends on each individual involved participating in the relationship solely to benefit off of the other. This is not to say that a viewer and Youtuber cannot have a genuinely virtuous relationship, what Aristotle calls a "friendship for its own sake," a true friendship. There is recognizable value in Youtube videos, whether it is providing desired comedic entertainment or presenting educational content. The concern arises when users perceive high numbers as relating to success. A Youtuber may easily fixate on the information itself, reducing the viewers to a number. A viewer may incorrectly deem the quality of a video based on its likes and dislikes, or never be exposed to videos with alternative ideas, as we saw with the recommendation feature. Whatever the case may be, a successful Youtuber should result from her virtuous relationships with subscribers and viewers. If parts of Youtube's UX/UI, like the displayed information and recommendation feature explained above, contribute to our notion of success in this way, then it seems that these kinds of design components should be reconsidered and possibly reconstructed to promote virtuous use.

Facebook/Instagram[1] and Community

The first relation that we encounter with social media is the *embodiment relation*, as the persona on such applications is by definition an extension of its users. The embodiment relation captures a holistic sense of a user's experience with social media. Their portrayal of their social media selves relies a curated set of posts, created with intention. From the couple of billions of users on Facebook/Instagram and their online presences, a socially online community emerges, and UX/UI features certainly have their role in enabling unique features of online communication, distinct from its physical counterpart.

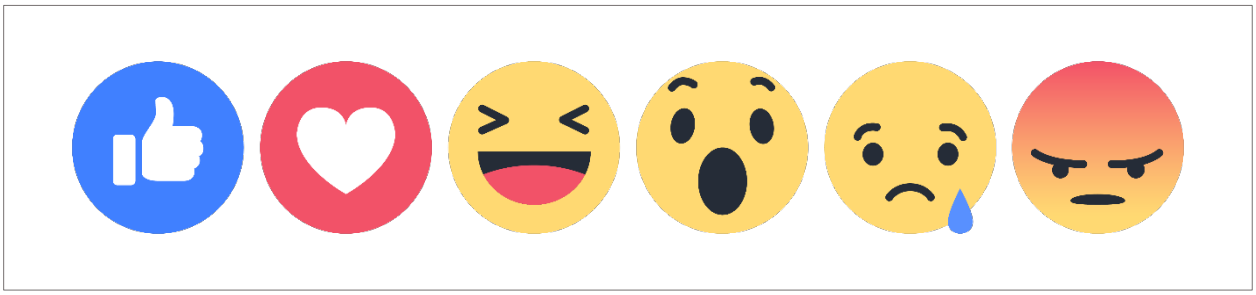

Figure 2. Facebook reactions. From left to right: "Like," "Love," "Haha," "Wow," "Sad," "Angry."

Similar to Youtube, Facebook's UI incorporates reactions, as seen in Figure 3, and comments; Instagram's UI includes "likes,"[2] represented by the heart icon, and comments. Also similar to Youtube's "likes/dislikes," Facebook/Instagram reactions bring forth a *hermeneutic relation*. When a user reacts to a post, a hermeneutic relation forms from reacting with the UI, with a reaction communicating a particular response to the post's creator. At the very least, a reaction serves as confirmation to the post's creator that her post was seen; she receives recognition. This exchange of reaction and recognition establishes a dialogue that differs from normal, face-to-face

[1] Although Facebook has suffered a significant amount of disapproval because of recent data scandals and unfavored news publicity, I include it in my discussion because of its once, and possibly still, position as *the* social network.
[2] Although Instagram does not refer to their "likes" as "reactions," I will use "reactions" (and its various forms) to mean *both* Facebook's reactions and Instagram's likes from this point forward, unless otherwise stated, for simplicity's sake, as they resemble each other in functionality and explanation.

conversation, perpetuating what mimics an emotional response. Comments as asynchronous communication take this even further, though interpreting comments is less involved than interpreting icons. Regardless, both reactions and comments, being part of Facebook/Instagram's UI, create another means for interacting with other individuals in one's community.

Notifications provide an awareness mechanism for updating users, making them standard UX/UI features. Our experience with notifications results in a *background relation*, as they pull our attention to an update after the fact. We do not perceive the event of a new like or comment signaling a notification to appear; it is only after a notification alerts us that we become immediately aware what has just occurred. Similar to reactions and comments, notifications contribute to maintaining a conversation of sorts. When a user's Instagram account notifies her that a follower has commented on her most recent post, she can immediately respond. Thus, notifications enable a continuation of correspondence, minimizing time between each individual's participation.

Reactions and notifications enable further means to participate in a relationship. Although these kinds of UX/UI components can lend themselves to friendships of utility, like considering the case of users who focus on the number of reactions and notifications, they can also promote friendships in which an individual genuinely cares for another. Put simply, if the motivation for a reaction originates from good character, then the reaction serves a virtuous purpose.

While reactions and notifications support participation, I now return to Facebook/Instagram's embodiment relation, as this is what describes how an online persona extends from a user's being. The combination of posts and other application activities form an online counterpart of ourselves, not totally inseparable from our person in the world. Here, the UX/UI acts as a whole, where online communication and its effect on our online presence go

beyond the screen. Consequently, a user's online presence should align with her actual character, rather than what she believes to be an online community's expectation, as there can be misleading notions of virtue in this belief and/or expectation. If a user manipulates her Facebook/Instagram activities, such that they reflect an ingenuine character, she falls victim to contributing to the cycle of misled users.

DISCUSSION

Current UX/UI analyses, such as A/B testing, expose potential user difficulties in actually using a technology, specifically focusing on a technology's ease of use. Although these kinds of analyses are useful in ensuring that a user can successfully interact with a technology, there lacks an analytical method that uncovers how a technology affects our person. This should be better incorporated in technological design, otherwise, we will blindly continue technological developments without considering a more in-depth influence and effect on society as a whole. Here, I have presented a method to conduct a qualitative analysis of UX/UI, with the examples of Youtube and Facebook/Instagram, and shown how the design of these applications influence our virtuous activity. Mediation theory as formulated by Ihde and Verbeek has provided the insightful analysis necessary to recognize the underlying virtues that a technology promotes in its use. From the user's perspective, having this kind of awareness allows a user to interact with the technology without letting it direct her away from a virtuous life. From the designer's perspective, the designer can find motivation in virtue to dictate a creation's evolution. Generally, technological mediation articulates how we relate to technology's UX/UI. In this relationship, we can uncover how UX/UI encourages, or deters, its users to a eudaimonic life.

REFERENCES

Aristotle. (1998). *Nicomachean Ethics*. Oxford: Clarendon Press.

Hassenzahl, M., & Tractinsky, N. (2006). User experience – a research agenda. *Behavior & Information Technology, 25*(2), 91-97. https://doi.org/10.1080/01449290500330331.

Ihde, D. (1990). *Technology and the Lifeworld: From Garden to Earth*. Bloomington: Indiana University Press.

McCarthy, J., & Wright, P. (2004). Technology as experience. *Interactions – Funology, 11*(5), 42-43. doi: 10.1145/1015530.1015549.

Verbeek, P. (2011). *Moralizing Technology: Understanding and Designing the Morality of Things*. Chicago: The University of Chicago Press.

Verbeek, P. (n.d.). *Mediation Theory*. Retrieved from https://ppverbeek.wordpress.com/mediation-theory/.

Youtube. (2019). "How to earn money on Youtube." Retrieved from https://support.google.com/youtube/answer/72857?hl=en.