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## Project 3 - Bibliographic Essay

### **Introduction**

Attempting to reconcile some of the aspects that intertwine the fields of business and computer science, a research question was set out to explore the interaction between computer systems and those that use them (particularly in a business setting). This interaction was first recognized to be, at its core, one of the many interactions that humans have with external tools that are used for the purpose of facilitating and carrying out a particular function or action. In order to create a basis for the research question, historical movements and theories that explored similar connection were first examined in order to frame the focus of the research. It was found that historically, before computers, movements existed in the past that focused on the interactions between a worker and the tools and processes that they came in contact with as a study of its own. Movements which had at times led to revolutionary changes in the way that work processes and systems were designed, and in the ways in which entire markets and industries operated, such as those during the Industrial Revolution. Based on the historical movements that studied this relationship, an attempt to bridge the work that has been done to improve the interaction of a worker with the tools and machines has been used as a basis to apply the same intention to the way in which modern workers interact with computer systems as a part of a business process. The major issues and implications that arise from exploring the intersection between business and computer science rise in the different nature of the two concepts, in that given that the interaction that a human has with a computer system is remarkably much more complex, nuanced, and intricate than the interaction with a single, physical tool or analog machine. To address these implications, the study of the interaction between

human and computer such as the field of Human Computer Interaction (HCI) is used as a framework to explore the intersection which the research question seeks to explore. Ultimately, the underlying goal of the research question is how the concepts of HCI, work systematization, and efficient work systems can be intertwined, in order to create a methodology that can further the ongoing study of the interaction between workers and their tools, but that also addresses the additional complexity that is inherent to interacting with computer systems.

### **Description of Sources**

The sources used so far represent a variety of different angles in which the research question is explored. The first cluster of sources revolves around the concept of user experience and the field of human computer interaction. As a part of this cluster, *The Design of Everyday Things* is used as the foundation for the content and theory behind this aspect of the project. To support it, *The User Experience Team of One*, and *A brief history of user experience* are used to provide historical context and additional points of view. In the second cluster of sources, which focus on work systematization and mental models, are *Principles* as the foundation for work efficiency, algorithm creation, and work systematization, *Poor Charlie's Almanac* to explore mental models and for reference of how to explain complex information in simpler, and Netflix Culture slideshow, in order to present examples of robust high level materials that are used to aid in decision making across different business sectors. The third and last cluster is made up of an array of sources that are used to provide examples and research on the visualization of information through different methods. In this case, *Envisioning Information* is used as the main foundation for the methods that can be used for displaying information. From an exhibit standpoint, this source will be used to extract multiple examples of the ways in which scenarios of data utilization have been used. From a methods perspective, this source is good at showing ways in which I can physically present the findings

of my research. Additionally, inspiration for graphics and presenting information is extracted from image heavy sources such as the *sticks n' sushi menu*, *ropes at Disney*, and the *Valve Handbook for Employees*.

## **Findings**

Beginning the analysis of the several sources that were gathered, a *brief history of user experience* is the source that begins to outline the historical implications of the research question. The main focus of the source is to delineate the fact that user experience is something occurs whenever we interact with any business product or environment, showing examples from the Industrial Revolution and the early proponents of design thinking and connects them to the nature of modern computer user experience with operations management in business. Prior to the analysis, the Industrial Revolution had already come to mind as a time in which similar studies between workers and tools had been done. It was a time where not only were new technologies such as industrial machines and steam generated power introduced, but where reconceptualizations of the way that people worked, such as the proliferation of the assembly line and the development of concepts such as scientific management, reimagined and created many precedents in the way that business is still done today. On the surface, drawing parallels between the way in which laborers interacted with industrial machines and the processes they followed, and the way modern workers interact with computers now was generally not hard to conceptualize. What seemed to be an easy distinction, however, has proved to be a much more diverse inquiry of its own, given the level of complexity of computer systems. To address this complexity, *The Design of Everyday Things* is relied on heavily for creating a base to be able to talk about the interaction between humans and computers. Much of Norman's work revolves around advocating for a greater focus around user-centered design. His books all have the underlying purpose of furthering the field of design, with implementations ranging from doors to computers. Don Norman provides a holistic view of product design by showing how and why innovations

in design come about, often making the crucial distinction between incremental and radical innovation (279). He states that most radical innovations fail, and even when they do succeed, they can take multiple years or decades to be accepted (268). His most important takeaway is that with the passage of time, the tools and objects in the world that people use will change, however, the psychology of people will remain the same (298). So far, the interaction that a worker had with a specific tool, and analyzing the way in which a worker followed a list of steps in order to achieve a task that will accomplish a business purpose (a business process), had only been mentioned as a unit. The next step in addressing the question was understanding how these two related to each other. Again, a broad distinction was made that both the tool and the business process were designed. Meaning that both of these were deliberately created with a set purpose in mind. Before diving into the challenges that emerge from comparing a physical object and a concept under the same scope, it was still possible to hold on to the previous distinction while also going a step further in saying that the interaction, or experience that an individual had with both a tool and a process could still be observed under the same light. The field of design, therefore, provided an opportunity to talk about both a tool and a process at the same level, given that emotionally and cognitively, using a tool or following a business process both generate a quality of interaction between the user and the thing, whether this is subconscious or conscious for the user.

In the field of computer science, User Experience (UX) is sometimes used to narrowly define the overall experience that a person has while using a product (within a computer system) such as a website or computer application, especially in terms of how easy or pleasing it is to use. The definition is sometimes taken a step further, used to describe a person's perceptions of a computer system as it relates to the function, value, ease of use, efficiency, and appearance of a product or software more generally. In this realm, the concept is well known, almost always talked about in conjunction with User Interface (UI). The user interface is the space and the points of contact that the user has to the computer system. It is the

interaction between the user with a program's User Interface that produces a user experience of that program. Yet, aside from its considerations on just the field of computer science, the design of a User Experience was not, and is not limited to only the interactions between a human and a computer. Going back to analyzing a user's experience as it relates to a tool and a process. A broader definition of User Experience is established. One that comes to mean "a person's perceptions and responses that result from the use or anticipated use of a product, system or service". In this way, the connection between a business process and the use of a computer system could both be reconciled by a unifying factor: **Focusing on the end user, and their *experience* as a main driver of how something is to be created and designed.** In this way, a Human Centered Design (HCD) approach could be followed, one that "puts human needs, capabilities, and behavior first, then designs to accommodate those needs, capabilities, and ways of behaving."(DoET, 8) There are various areas in which connections could be preemptively seen in which the combination between the fields of computer science and business could benefit mutually to create significant synergy. The use of design as the intersection between the fields of business and computer science addresses the initial question of how workers interact with computer systems, and the way in which these systems are used to promote a business mission, in a way that presents the opportunity to think of a work process not as a concept, but as a *designed product*.

Earlier it was mentioned that there are certain limitations for drawing parallels between a concept and a product under the same scope, given that it limits its comparability. Therefore, it helps to try to conceptualize a business process away from just a concept, and reimagine it as a product that is deliberately created and designed. Much of the way in which business processes was conceptualized as an object early on can be directly traced to the influence that Ray Dalio's *Principles* had on thinking about the relationship that workers have with work process as a physical interaction with a tangible system of operating and decision making. By writing down decision making and past mental models of the way

things are carried out in step by step lists, algorithms are essentially followed that are directly appendable and improved upon. Through the use of his principles to structure the culture and business model of Bridgewater Associates, Bridgewater has delivered the biggest net profit of any hedge fund firm ever, since billionaire Dalio founded it in 1975 through the end of 2018. Bridgewater, which has over \$150 billion in assets under management, led the list of performing hedge funds with a net \$8.1 billion gain in 2018 for its Pure Alpha, Pure Alpha Major Markets and Optimal Portfolio strategies, following a gain of \$300 million in 2017. The firm overall has delivered a gain of \$57.8 billion for these strategies since its founding. Unlike other academic works, most of Ray Dalio's Principles are based on his biographical experiences at Bridgewater associates. Formed by decades of research across many different resources, such as Bloomberg and news outlets that provide market information. The primary value for the source is that it provides evidence for how a structured list of principles can be compiled and used as a reference for decision making. Unlike a big business plan, the principles are structured like a decision making framework to reference when situations requiring these skills arise. This source provides substantive evidence on how a product can be created that is used like a direct reference guide to decision making. It provides a very succinct example of how algorithms (a set of detailed and methodical instructions) can be created for humans to reference. The materialization from concept to a written principle takes away a layer of abstraction, allowing for a process to be more easily seen as an object whose user experience can be *designed*. The materialization of a business process also adds another dimension of design into consideration, in that when it stands as a tangible object, it presents the opportunity for the designer to design a User Interface with the process. As opposed to thinking of a concept abstractly, the creation of it as a product also gives creative opportunity in creating a way of interacting with these processes in a way that impacts the experience of carrying out these list of steps. Designing an interface of a list of instructions considers the design aspects of aesthetic, placement, and artistic considerations of a physical,

graphical product that were not there before. To provide an example, there is a different interaction to be had from material that promotes readability and usability, while considering aesthetics and presentation. Rolf Tufte's book, *Envisioning Information*, provides an opportunity to explore how “enhancing the dimensionality and density of portrayal of information” can be explored. The work conducted by Tufte seeks to delineate the general principles that have specific visual consequences on the interpretation, analysis, and creation of data representations. The display of complex data is analyzed through the media that have been historically successful for interpreting data, such as “techniques exemplified in maps, the manuscripts of Galileo, timetables, notation describing dance movements, aerial photographs, the Vietnam Veterans Memorial, electrocardiograms, drawings of Calder and Klee, computer visualizations, and a textbook of Euclid's geometry”(9). By doing so, it allows the reader to see why some displays of complex data are objectively better than others. The culmination of these concepts into one could be culminated in a manual that creates a tangible representation of one or many business process, resulting in the transference from business process as a concept into the physical product of our aim. The representation of complex data in visually striking and intellectually engaging forms is one of the aspects that on a foundational level drive my research. This book is great for presenting the ways in which different scenarios of complex data visualization take abstract approaches for these to cope with the restrictions of showing a three-dimensional subject through a one-dimensional medium. This source will be a combination of exhibit and method source. From an exhibit standpoint, this source can be used to extract multiple examples of the ways in which scenarios of data utilization have been used. From a methods perspective, this source is good at showing ways in which I can physically present the findings of my research. To support the structure of *Envisioning Information*, additional sources, such as the *Sticks n' sushi* menu, the *Valve Handbook*, and the *Ropes at Disney* are all used as exhibit sources to show more ways of presenting information. The *Valve Handbook* is of particular importance among these information

visualization sources, in that it presents an intersection between process oriented documents and documents that are visually appealing. The main focus of the guidebook is to establish the working structure of the company, which values creativity and individuality. It serves as a pseudo manifesto on how they differ from a normal company. Among their distinctions they claim that “hierarchy is great for maintaining predictability and repeatability. It simplifies planning and makes it easier to control a large group of people from the top down, which is why military organizations rely on it so heavily. But when you’re an entertainment company that’s spent the last decade going out of its way to recruit the most intelligent, innovative, talented people on Earth, telling them to sit at a desk and do what they’re told obliterates 99 percent of their value.”(4)The reason that Valve cites for their unique approach is that they “want innovators, and that means maintaining an environment where they’ll flourish. That’s why Valve is flat. It’s our shorthand way of saying that we don’t have any management, and nobody “reports to” anybody else. We do have a founder/president, but even he isn’t your manager. This company is yours to steer—toward opportunities and away from risks.” As a company, Valve tries to work like a conglomeration of creative forces as opposed to a company with rigid structure, giving the employees complete freedom to produce their products. The most important takeaway from this source it provides an example of a modern, friendly, and innovative handbook that employees can use in order to navigate the business environment. Its use of imagery and design concepts make it much easier to understand and interact with than a standard black and white text manual. These concepts highlight the value of design and graphics when integrated with a part of the business process.

## **Conclusion**

Exploring the intersections between the concepts and resources that are used to frame the research question, the main focus that the research question and the thesis that is to be developed seek to augment how the concepts of design and human computer interaction can be applied to areas such as work



optimization and process creation in order to create better business performance. Combining the concepts of User Experience design and work process systematization, the main goal is that this will provide opportunities for a self serving synergy in the projects and products where the considerations of these fields are applied. The implications of the research are to explore if a cyclical and iterative framework can be developed that creates increasingly greater output and iterations as the business process is improved upon, and as processes are applied to create increasingly better and more sophisticated products. There is great benefit that can be drawn from the application of User Experience and other concepts which are typically reserved for computer science into the field of business if this crossover can be achieved. It is predicted that in a situation where these two are intertwined, such as when the business is focused on making software or computer systems, even greater synergy can be theoretically achieved and garnered, given its increased cyclical and self referential nature of developing better development processes.