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Technology Education: Rethinking Design Thinking

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Abstract

An integral aspect of a designer's work is to apply design thinking to the process of coming up with innovative answers to difficult problems. However, the influence of design thinking on instructional decision-making has not received much attention. Therefore, designing is often portrayed as a rational, idealistic activity in technology curricula, one that results in well considered, long-term changes in the built environment. Students learning about technology via design thinking may struggle to understand their own cognitive biases and heuristic mistakes. In this post, we have offered a general overview and explanation for why we chose to activities within the research project's educational experience. Understanding your target audience, testing hypotheses, redefining the issue, and prototyping and testing potential solutions are all part of the design thinking iterative process. The overarching objective is to brainstorm potential approaches and answers that may not be obvious at first glance. More than just a collection of instructions, design thinking is an entirely new style of thinking that comes with a toolset of practical methods for putting it into practise. Design thinking is a method of problem-solving that prioritises the needs of the end user over all other factors. It uses an iterative, hands-on approach to come up with novel solutions by watching people in their natural habitats with empathy.

Keywords: Design thinking, cognitive limitation, heuristics, technology education, humanistic errors

INTRODUCTION

Design for Science and Technology's Long Term Prospects When it comes to education, it's common to hear terms like "problem solving," "iterative process," "creativity, imagination," "critical thinking," "critical evaluation," and "critical reflection" (Technology Education is used in this study which incorporates Design and Technology). According to the revised National Curriculum in England: Framework Document (2019), which contains the overarching statement for Develop and Technology, DfE, students design and build products that answer real and relevant issues in a range of setting. In order to portray design as a force for good, one must first presume that it is seen as a rational activity capable of achieving the intended results. We're all born designers, and we're all actively involved in the creative process. 'Design' is an inherent part of who we are as humans; therefore I begin with the assumption that we are all designers as a 'process' (or, more correctly, a series of actions). It's important to remember that not everyone is born with a natural flair for design while making this case. The ability to recognize and solve problems, as well as the desire to improve our natural environment, is hardwired into our DNA, much like Chomsky's theory of language development. Our perceptions of design are distorted to a greater extent as a consequence of social and educational norms. In spite of the fact that design is innately human, it is crucial to grasp the full scope of what it means to be human, as this involves a set of values, beliefs, and ethics that may not be held by all members of the human race. It's important to consider how our "needs, aspirations, and ideals" can disturb the delicate ecological and sustainable systems we depend on if

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we attempt to modify the planet (whatever that might really mean). Modern society often portrays designers in a good light, with the implication being that their work may contribute to solving problems via the use of innovative thinking. It is for these reasons that the term "design thinking" will be examined and attempted to be reconsidered in this essay. Designers are known for their particular brand of rationalist and creative thinking. As a result, the study's primary objective is to examine how design-oriented 'Technology education' experiences challenge logical ideas of design thinking.

IDEAS FOR THE FUTURE

Technology education has evolved into a variety of ideas, each with a focus on the creative, the technical, and the aesthetic and utilitarian aspects. An approach to problem solving known as "design thinking" encompasses a wide range of methods and techniques; mind mapping, brainstorming, and iterative procedures are widely acknowledged in a larger occupational setting as methods for generating unique ideas and innovative solutions [1, 2]. Using intuition and a 'process' to solve problems is what design thinking is all about [3–10]. Design thinking is nothing more than an exaggeration, but designers have found techniques to avoid being "caught by too simplistic a solution" and that these methods may be categorized as a kind of the practice [7–9]. Design thinking isn't only about the visual aspects, but also about the semiotics and interpreters who create a design discourse [10]. Verganti rejects the prevailing dogma in the realms of style, user-centered design, and intuitive creative activity [10]. Furthermore, design thinking is increasingly being considered as a participatory co-creation activity that demands the participation of issue owners with specialized domain expertise, which requires a certain type of thinking connected to the employment and application specific process abilities.

Even though there is no universally agreed-upon definition of design thinking, the most common denominator is that it focuses on empathizing with human beings and their needs and goals. The second characteristic of design thinking is that the definitions that are used to describe it are fluid and constantly changing. If you're looking for definitions of design thinking in an educational setting, rather than a vocational or business one, consider the following: Design thinking may or may not be a component of a larger educational experience that I'm attempting to include this into, depending on where it is developed. They feel that they have a special edge in creating and fostering design thinking because of their training as technology educators If it is understood and accepted that there is no such thing as design thinking in technology education, a better-informed rationale for it may emerge.

An easy location to begin researching design thinking in an educational context is via the use of design methodologies often associated with Technology Education and seen as demonstrating design thinking in action. In this talk, the focus will be on something other than "processes" (particularly in terms of how they have been misconstrued by assessment techniques, and how creativity is typically marginalized inside constrained models of creation). My goal is to focus on a certain component of the creative process in relation to our own cognitive limits while embracing the restrictions imposed by "design procedures". In the beginning, I'd want to debunk the misconception that "design thinking" is an esoteric, logical approach to problem-solving that is, in my view, completely false. In my opinion, we all have massive 'cognitive flaws' that are being overlooked as a fantastic learning opportunity for ourselves and our children.

Even though I previously indicated that design thinking should not be regarded the domain of Technology education, I feel that technology education offers a unique chance to examine cognitive constraints in order to better comprehend design thinking in a number of scenarios. It's possible to gain an advantage by metacognitive intervention, such as cognitive debasing, which identifies cognitive boundaries and errors in heuristics.

Failures in Cognition and Humanistic Errors

Emotions and subconscious processing may influence our decision-making in a variety of ways, including narcissism and altruism. When it comes to making decisions, I've come to recognize that we

all have preconceptions and biases that impact the decisions we make. Because of 3 billion years of trial-and-error, humans have sluggish mental states, which have resulted in poor memory, unstable judgment and an inherent belief in the impossible.

As a result, we also have a language that is neither properly structured nor easy to comprehend. Conjunction fallacy highlights our difficulty in grasping probability, which needs automatic and unconscious cuing while making what seem to be obvious judgments. At least 85 percent of the time, our conscious minds "prime" our analytical judgments, while we are also seeking for patterns that may or may not exist. This condition is known as "extreme apophenia," or the propensity to perceive connections and significance in apparently unrelated occurrences [11]. Our irrational thinking is exacerbated by our inability to cope effectively with a broad variety of cognitive constraints when faced with a large range of uncertainty, as is the case when we are inventing something new.

Some of the consequences include a propensity for avoiding dealing directly with cognitive boundaries by relying on intuition, gut feelings, or fundamental rules of thumb. In fact, we are often guided by our emotions, but this is not always the case [12]. For example, in deliberate practice, we work "quasi-automatically and with fair competence" and have an innate sense that something is correct, a shortcut, but this can lead to mistakes when making decisions while under a cognitive load [13]. To overcome these limitations, we might adopt an optimistic outlook. Looking forward and identifying our future needs with an optimistic attitude is a crucial survival technique. The "superiority illusion," in which individuals feel they are better than they actually are, is a problem that we all face. By Sharot's estimate, 93% of drivers who participated in a survey believed they were better drivers than the average person, which is scientifically impossible [14].

Our ability to store and recover information that goes far beyond what we could ever hope to understand via traditional means has been repeatedly shown in image recall experiments. Image-based sub processing questions how designers retain and modify images in their thoughts, as well as the degree to which this is a purposeful process, and the validity of design ideas. It's like the Müller-Lyer illusion, where we know two lines are the same length, but our brains perceive them differently. Our judgments of what we see and what we recall are both erroneous. Emotional and cognitive processes might lead us to make decisions that don't always lead us to the "ideal" outcome. In fact, this is just one of many examples.

It is possible for designers to take use of people's cognitive processing restrictions to make design decisions in their own self-interest, while admitting that there are several limitations. Definition of a "focusing illusion," we overestimate the relevance of individual occurrences. Customers are used by designers and marketing professionals by using an optimistic bias, as well as manipulating consumers' emotions and exploiting the cognitive limits described above, via the use of visual illusions [15].

Because of this, it seems that educational programmes that promise to promote "design thinking" and "design capability" should also examine the underlying cognitive restrictions and heuristic traps that designers fall into while reasoning. It is necessary, however, to add an ethical and long-term component to prevent taking advantage of cognitive limitations and controlling others. In the midst of serving others, design experts are guilty of exploiting others via their ideals of a future society that may never come to reality. An interesting contradiction occurs, pointing out that some of the most creative individuals have a significant negative impact on the environment. "Agency" may be described as a person's ability to recognize cognitive flaws and take control of their own ideas and actions. Self-reflection and regulation are necessary for designers in any design process [16, 17]. I would agree that these abilities are essential in any design process. Rethinking design thinking is necessary in light of the discovery of cognitive limits and the misuse of heuristics as a crucial component of agency and design thinking in the context of technology education. This paper is the initial step in a wider research endeavor to investigate whether or not design thinking involves cognitive limits and heuristic deficiencies.

CONCLUSION

Design thinking as part of technology education provides a unique chance to both reveal and learn from cognitive constraints that I believe provide a metacognitive way of debasing to better future decision making. These are only a few of the numerous cognitive restrictions that have been reported in a broad range of sources, and I am aware of this. Selecting the areas that are particularly relevant to technology education while dealing with uncertainty was done via an extensive adductive reasoning process and a description of each is presented as an inventory of design thinking cognitive faults. An acknowledgement of cognitive defects is made in this procedure. Many cognitive biases may distort design thinking, and this study intends to provide a set of debasing and reflective tools for metacognitive degradation as part of a reevaluated approach to design thinking. This study intends to demonstrate the need to re-examine the limitations of design thinking approaches via the application of pre-existing research to the area of technology education. During the second phase of this research, we propose to use an inventory of design thinking cognitive flaws to help students participate in a metacognitive process by applying a set of debasing and reflective tools. Because of this, students should be able to use a more rigorous design process in and beyond their Technology education classrooms as a result.

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