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## Student1(4)

My constructionist learning mindset began *building* itself early on through my Legoland microworld – a 6' x 8' plank of plywood in my parent's living room covered from edge to edge with gray and green Lego plates – where I worked on building my own metropolis every day from pre-school through the third grade. I never grew tired of this and constantly integrated non-Lego craft materials and personal objects (other toy figures, stuffed animals) to make my Legoland an even more special, purposeful, physically and emotionally meaningful environment. Eventually I was pushed to pursue sports and music lessons, forcing me to leave my Legos behind and then (sadly) to the good fortune of the Salvation Army. Even though 20 years have passed since my Legos and I parted, I still hold onto such rich, fond, and powerful memories of my experiences and time spent with these physical objects that encouraged me "to fall in love with life" in a way as Eisenberg mentions in *Mindstuff*.

Aspects of my elementary and middle school education mirrored the foundations of the Beyond Black Boxes project in many ways. Through these experiences I was able to interact with physical and computational objects through many home science activities. Ranging from an array of science fair inventions that tackled environmental issues, building my own functioning camera, devising special containers made of household materials that could protect a raw egg and withstand falls from 25' in distance, and working with computers to drive Lego cars through Logo commands, I had to build tools for creation and measurement of the results, evaluate the efficacy of my inventions, and develop the mental bearings for constantly redesigning and testing my mini-hypotheses like Alexandria and her marble machine. Throughout these personally-involving experiences, I always placed great import on the aesthetics of my creations. The design aspect served as a huge source of fun, control over the assignment (instead of the reverse and being a slave to the constraints of the project), and a tangible visual execution to share with others and save for posterity. I always pushed myself just as hard in the design aspect of the project, approaching the process with an eye towards appealing details, precision in presentation, humor, color, and a stylish and unique execution. Due to my own sense of artistic pride and connection to each project as an extension of my personal image, I could never rest until my masterpiece was beautiful and functional both inside and out.

Unfortunately, my interest in scientific questioning, dissecting inner workings, and testing diminished as I moved into high school. Looking back, I suspect this was due to the reduced leeway for creativity and exploration in my high school math and science courses. Instead, our activities were focused on the answers and test prep, thereby causing disconnect from the *why* and the *how* behind the tools and processes we were using. The thrill of investigation was gone, and I found no comfort, no emotional ties, and no deeper understanding of the tools I used in science. Both metaphorically and physically, black boxes were stacking up to my right and left in the classroom, leaving me feeling lost in science and math, and deterred by these subjects that used to be "fun". Clearly, my experiences with computational objects were not only meaningless, but also terribly unpleasant without the demystification and underlying understanding behind each tool and process.

Looking back with the lens of this week's readings, it comes as no surprise that I turned my energies towards non-science based arenas (like journalism, photography, student government, and sports) yet still applied my scientific problem-solving perspective in these social science areas, illustrating the transfer of engineering-to-social context problem-solving concepts mentioned by Berg and Turbak. Instead of building mechanical devices that resolved technical problems, I was more interested working on social machines that resolved issues surrounding accurate presentation of facts through words and images, creating effective human interactions, and strategizing on different answers for relational and environmental problems. However, I could not understand why the appeal of interacting with computational objects no longer held a gleam for me in the classroom, despite my clear interest and understanding of software, computers, and tools I used for my social experiments.

After this week's readings, I feel especially fortunate that creation and personalization of my own scientific instruments was instrumental in my childhood educational experiences. Stories like Jenny and her bird feeder struck a chord during my readings because it took me back to memories which seemed like a long-lost distant memory of a comforting old friend. Furthermore, it is through this

reflection that I am able to recognize where and why my interest in science dropped off, and how my immediate environment impacted my experiences with computational objects. Stripping the physical objects and elements of personalization from my high school experiences turned my interactions with computational objects into a paralyzing freeze. Although it prevented me from allowing my natural curiosity and problem-solving to marry itself in the classroom, it enabled me to apply this marriage outside of the classroom.