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How to Build a Digital-Physical System

Final Report

In order to successfully create a digital-physical system, one must understand the key elements of design, and how to apply them to an issue or problem at hand. As was stated multiple times throughout the course of our lecture class, design is key.

The best way to truly explain the process of building a digital-physical system is to elaborate on how one was created. As such I feel that it makes sense to outline how, in the waning days of this class, my group went about creating our final project.

The initial part of the design process started merely with understanding what existed already within the automobile industry. We reviewed the various issues of Ownership and Pride, Preparedness, Safety, Freedom, Adventure, and Discovery, Control and Comfort, as well as Entertainment. All of these were issues that we found existed by simply discussing what we as consumers noticed about our cars as artifacts, as well as investigating the artifacts within our cars. By understanding the context and the stories behind the objects within automobiles, we were able to understand how some consumers view their automobiles, as well as discover some issues that the consumers may run into on a day to day basis. While this is a rapid way of investigation, throughout the course of the class we did discuss some other methods, such as surveys, observations in the field, conducting interviews, and even having people record their thoughts via journals and photos. Depending on the product and the amount of

time given to develop it, any or all of these methods may be valid ways to investigate the target audience of a product. The bottom line is that in order to create a product tailored for success, one must understand the various consumers of the world that might partake of or purchase one's product.

Once the consumers have been investigated, the designers have a better understanding of what they want or can use. In our group project, we figured out a problem that plagues virtually everyone residing in the hot and dry Arizona climate and that is cooling off. I talked to people I know, and for some of them, the heat is such an issue they will actually refuse to buy certain cars that they might normally enjoy because they are afraid of the environmental consequences. For example, it is rare to encounter a black vehicle that belongs to an Arizona resident, as the color heats up the vehicle must faster than others. I also learned that many people refuse to purchase automobiles with leather interior due to the generally hotter temperatures the material reaches when compared to standard carpet-like interior. A glance at a local parking lot will enlighten oneself to even more coping mechanisms, such as sunshades, steering wheel covers, and seat covers, all of which are there to protect against the sun's heat. Some people even crack their windows, which in other states is a large attraction for criminals, but ironically enough, here it is just too hot to justify trying to steal a car in midday. Upon driving along our highways you will often encounter vehicles "abandoned" on the side of the road. These are left by their owners when car trouble arises, with them being fairly confident that it will still be there the next day.

These good people have an issue, and as a group we set out to solve it. After a suggestion by Daniel Grabowski, we decided that perhaps a good way to solve this problem would be via a solar powered air-conditioning system. Good design involves tailoring to the extremes, and to some extent we sought to do so with questions like: What about people who don't want to waste extra solar power? What about those who cannot afford a new car? Can this also generate heat in the short winter? As we further developed our design, it became apparent that while it would be more efficient on the engineering side to integrate our air-conditioning system directly into the automobile's air-conditioning, consumers can't always afford to redo their car or buy a new one. As such we felt it prudent to create a dash-mounted system as well. If we were to fully design out and build the system, I foresee the dash mounted system as our initial and primary product, with clever copywriting in place to allow us to make money off of the integrated systems when large car companies decide to capitalize on our idea. This would allow us to maintain our own, cheaper, and more flexible product, while letting the larger companies handle the larger, and more difficult to construct, products. To me, this experience of designing is what really helps one to learn about the process. It is always good to review what multiple others have done throughout the years and their various design principles, but when it comes down to it, to truly learn about how to build a digital-physical system, or design anything for that matter, one must actually go out and design!