Class Scribe: A Modern Approach to Note-taking
(Technical Report)

The User Configuration of Microsoft Kinect
(STS Research Paper)

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Socio-technical Synthesis: Class Scribe and Microsoft Kinect's Failure

My technical work and my STS research are primarily connected in that they both explore the social acceptance of a new and emerging technology that is fairly invasive yet aims to be unobtrusive. Many of the greatest technological advances in consumer electronics have come as a result of products that often push too hard in their objectives, to the detriment of their users. A notable example being the Microsoft Kinect, which incorporated many technologies that went onto transform into utilities such as Amazon's Alexa or Apple's Face ID. My STS paper focuses on Microsoft's Kinect and its user configuration, specifically in how misconfiguration resulted in its demise after the company failed to design the product for the market it sold to. My technical work focused on how modern technologies can be used to supplement handwritten note-taking in the classroom setting. So, while my STS research explores a product in a completely different market from my technical work, the task of properly configuring a user within the design of the product is consistent and to be studied across both projects.

My technical work focuses on a desk lamp that houses a small computer, camera, microphone, and ID card scanner positioned next to a student taking notes during a lecture. The motivation for this project arose when noticing the fragmented nature of note-taking that currently exists today. Students have the option of using laptops, tablets, smart pens, or paper and pencil, however, each of these options has disadvantages such as being ineffective, distractive, expensive, and limited, respectively. With Class Scribe, the title of my technical project, my project team aimed to combine the advantages that all the previously mentioned methods of note-taking have, and eliminate as many disadvantages. As a result, the product we arrived at allows a user (the student) to take notes naturally and intuitively as they have known since beginning schooling: handwriting. We supplement this behavior with a camera that captures the notes as they are being written and sends them to the cloud where the student can access them later.

This combines the benefit of paper and pencil notation with the utility and portability of laptop note-taking. A microphone onboard the desk lamp allows for lecture audio to be captured, and then transcribed into searchable and archivable text. The web service that allows students to access their notes and lecture audio also performs handwriting detection, which converts photographed notes into searchable text, adding further utility previously available on a tablet note-taking system. A secondary microphone at the base of the lamp is constantly listening for page flips, and once it hears one will trigger the computer in the lamp to denote a new page has begun. The goal behind such a feature was to create a note-taking experience that was as invisible as possible, allowing the student to focus on the notes exclusively. When a technology's interface disappears from view, it is then when a user can truly feel empowered to complete the task at hand that the technology aims to assist with. With this philosophy interspersed throughout the design of our project, my team hopes to demonstrate what we believe to be a modern approach to note-taking, one that is highly efficient, intuitive, effective, and unobtrusive.

My STS research explores the concept of user configuration proposed by Oudshoorn and Pinch's research and how it applies directly to a highly public failure of a consumer electronics device. My research focuses on the steps Microsoft, the developer of the Kinect device that is the subject of my study, took in designing the Kinect around a mistaken identity it conceived for its prospective users. The result of this improper user configuration led Microsoft to discontinue the Kinect device, while breaking up its constituent technologies into unrelated products it then announced. The goal of my research was to better understand the importance of establishing a user and designing a product specifically for that user without conflating other requirements and influences into the resulting project.

Working on these two projects in tandem gave me a new perspective on the process of product development, a field often undervalued by engineers. Without sufficient product development, the technologies that we work on as engineers fail to impact society in the way we intended. Researching the Kinect's development and its proceeding failure gave me valuable insight on how to best label, design, and eventually market my technical work to relevant parties. Learning from a unique failure that had fragments of success within it was very informative to my technical work, as it guided me to look to other

projects and technologies take influence from and build the final product my team set out to build. Meanwhile, working on Class Scribe exposed me to the thought processes that Microsoft engineers likely had when deciding on functional requirements. In summary, working on both my STS research paper and my technical project allowed me to inspect the process of product development and its various engineering-heavy aspects from the perspective of a documented failure and also a rising technology.