Sociotechnical Synthesis

In regards to the American school system, new standards have been designed and widely implemented, yet instead of having the intended positive effect, the most notable result is a decline in both general morale and student academic achievement. The Science, Technology, and Society (STS) portion of this thesis focuses on a literary review regarding the implementation and effects of Common Core Standards throughout the United States. This portion focuses on the Care Ethics Framework, analyzing how Common Core Standards accounts for the needs of both the care-givers and receivers in the educational relationship. On a separate note, the United States has experienced a recent growth in the number of people preferring to follow a vegetarian diet, yet many of the widely available meat alternatives like tempeh and tofu fail to replicate the taste and texture of meat. The Chemical Engineering portion of this thesis focuses on the development and production of a plant-based chicken nugget alternative, utilizing sesame as an alternative to the commonly used soy. A driving force in this research considers that the plant-based market is heavily saturated with soy based products, which is one of the top recognized allergens; sesame is also recognized as a primary allergen, yet it would still provide additional opportunity for those with a soy allergy to follow a plant-based diet. Along the course of production, the possible byproducts are explored and analyzed in order to maximize the financial feasibility of the production plant.

Common Core Standards intended to level the academic playing field and increase the college-readiness of the average American student. As part of the STS portion, the history leading up to the implementation of Common Core Standards is acknowledged, yet the after-effects are explored in greater detail, with a main focus on how the Common Core Standards ultimately failed to accomplish the goal at hand. The idea that the Standards failed is

not just based upon opinions of educators, but rather on concrete evidence like academic achievement benchmarks and the shift from a positive to negative outlook in regards to the standards by parents. The primary findings of this research indicate that students and teachers are struggling with the Standards, the Standards are lengthening the gap between high and low achieving students, parents have growing disdain for the Standards, and key topics are missing from the Standards altogether.

The Chemical Engineering portion of the thesis splits the production chain into 4 main steps: sesame oil extraction, seed cake fermentation with lactic acid recovery, yeast extract preparation, and a final mixing step where the sesame based nugget comes together. Through exploration of the material and equipment necessary for the creation of the final product and any byproducts along the way, the capital and operating costs could be estimated resulting in an analysis of the economic viability for the proposed plant. The report determined that the most financially feasible option would be to focus on sesame oil and nugget production, removing the lactic acid recovery and yeast extract preparation. The proposed location for the plant is in the Coastal Bend region of Texas, which takes advantage of the easy access to necessary resources while growing the area's job market.

In the end, the STS portion provides a thorough examination of the results of the Common Core Standards and identifies the likely issues that led to the ultimate failures of the Standards. Future research should continue to examine how replacement Standards could be developed and tested to ensure the needs of all students and educators are being met. The Chemical Engineering portion results in a theoretically successful sesame-based nugget product, although not all of the proposed steps and byproducts are part of the economically viable

production process. Future research should focus on optimizing the oil extraction process and on creating a tasty final product without development of the yeast extract in-house.

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