

Culminating Reflection Project

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Author Note

This senior thesis is submitted as partial fulfillment of the graduation requirements of Kettering University needed to obtain a Bachelor of Science in Mechanical Engineering. The conclusions and opinions expressed in this thesis are from myself and do not necessarily represent the position of Kettering University or anyone else affiliated with this culminating undergraduate experience.

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Introduction

My name is (student name) and I am a student at Kettering University. During my time at Kettering I studied mechanical engineering, with a specialization in alternative energy. While at Kettering I did all of my co-op terms at (company name) in (city name). At (company name) I was a part of the ignition group, where our primary products were spark plugs and ignition coils. Additionally, I was a part of the ceramic group where I worked with oxygen sensors and ceramic substrates. After graduation I would like to work in either the automotive industry, or in a company involved with alternative energy products. I plan to go on and get a master's degree in engineering and potentially a master's degree in business administration. During my time at Kettering I tried to be involved on campus as much as possible. I joined a Fraternity, (fraternity name). While I was a member of the fraternity, I served as the President, Vice President, Ritual Chairman, Interfraternity Council (IFC) Representative, and Executive Committee Member. Due to my leadership positions within the fraternity I became involved more heavily with the Interfraternity Council, and went on to become the Scholarship and Awards Chairman, and the Treasurer of the council. Additionally my senior year I was a member of Kettering Student Government, serving on the Operations Council. Finally I was a member of the mechanical engineering honor society (name). Initially when I came to Kettering I had wanted to get a minor in business or pre-law. However when I was a junior I was able to begin taking my mechanical engineering elective classes. While doing so I discovered my interest in alternative energy. With this new found interest I decided to specialize in alternative energy instead. There are many projects that helped me to grow both academically and personally while I was an undergraduate student at Kettering University. These projects helped make me who I am today. The first project I intend to talk about is from my first mechanical engineering elective class in alternative energy. This project was to design a simple, inexpensive energy system. In order to provide sufficient power to a small village of 500 people in Africa. The village was located in Southeastern Ethiopia and was not near a river. The power was to be used primarily for the purpose of pumping water for

drinking, crop irrigation and raising livestock. We also designed a simple solar system to be used for lighting. The cost was to be limited to \$100,000. I chose this project because it was my first open ended project where my group and I could really do whatever we thought was necessary. This allowed me to grow as a problem solver. The second project that I will discuss is from my time as a member of (name of Fraternity). While I was the vice president, I was in charge of external affairs. This meant things like public relations and philanthropy/community service. During this time I was in charge of planning and running our chapter's large annual philanthropy event, (name of event). This event took months of planning and involved a lot of personal development from myself. This was also the first time that I was in charge of such an event. The final project that I intend to analyze is also from my time in (name of fraternity). However this time I will focus on my term as president. When I became president, our chapter had just been placed on probation. There were many things about our chapter that needed to be fixed, before we would be able to be removed from probation. Apart from the academic side of school this was by far my largest project as an undergrad. The knowledge and skills that I gained from going through this process will stick with me for a lifetime.

Conclusion and Recommendations

I would conclude that I have learned so much from my time as an undergraduate student at Kettering University. And I would definitely be a very different person today if it wasn't for the time that I spent at Kettering University. From both the academics to the extracurricular activities I was able to grow exponentially. I was able to learn things like problem solving, teamwork, delegation, leadership, event management, and achieving goals that I set out to accomplish. I experienced things that I would not have experienced if it wasn't for my time at Kettering. Things like campus involvement, and working with professionals within the community. Because of these experiences I feel that I am prepared to move forward with my career and potentially graduate school.

As far as recommendations go, I would recommend that all college students work hard during their time as undergraduate students. They should also do their very best to find topics that interest them. Far too often students attempt to use their elective classes as easy "blow off" classes and that is the wrong way to look at them. It is much more rewarding to find classes that you enjoy. Like in my case finding one class that you enjoy may lead to finding many more like it. Lastly I would recommend that all undergraduates find something outside of class at the school that interests them, and get involved in any way possible. Whether it be clubs, intramurals, Greek life, or student government, I have found it to be incredibly rewarding to be involved on campus in as many ways as possible. As far as extracurricular activities go, I believe that you get out more than you put in. So in my opinion it is worth the time and energy that is spent on extracurricular activities.

Project Description and Learning Outcomes

The first project that had a large effect on my academic journey came from my first mechanical engineering elective class in alternative energy. This project was to design a simple, inexpensive energy system to provide sufficient power to a small village of 500 people in Africa. The village was located in Southeastern Ethiopia and was not near a river. The power was to be used primarily for the purpose of pumping water for drinking, crop irrigation and raising livestock. Additionally a simple solar system was needed for lighting purposes. The cost was to be limited to \$100,000. Additionally this class was online so that added some amount of complications. The groups were assigned at the beginning of the class and we were, for the most part allowed to go about solving the problems with very little intervention. Our group began the project by setting up a weekly meeting time. So that we would all be able to discuss the project as a whole, and further divide up the work. The first meeting was mainly focused on the requirements and planning our research. From there we would meet at our assigned meeting time to discuss the research that each of us had done over the previous week. At this point we would be able to help each other as well as make suggestions about things that others should research going forward. We did this for a few weeks, at which point we began creating the midterm presentation. We again did this by dividing up the sections of the presentation. Each person was in charge of making the section that correlated with their research. Then we met one last time prior to turning in the midterm presentation to insure that the project looked like one cohesive unit. From that point we took the suggestions of our professor and to fix our presentation and finish adding the needed information. Lastly about a week before the end of the term we began collectively working on the final paper. We did this using our knowledge that came from making the presentation. This allowed us to write the paper in a relatively short period of time. Again we met one last time before we submitted the final paper and presentation to ensure that everything came together nicely. There were a few issues that arose while doing

the project. One issue was understanding how things will work together in a system. This was important when designing something for a town of 500 people. Due to the fact that all of the equipment needed to work together in order to adequately solve the problems of the people. A problem that I ran into was overthinking some aspects of the project. This caused me to waste some of the group's time. An example of this came when working on the lighting of the houses. Originally I believed that we would need a separate solar panel set up that would connect to a battery. Then each house would draw electricity from the battery using wiring that was run to every house. However I figured that in this situation we could use a significantly more simple system. Instead of the large system we instead decided on a simple, all in one, solar panel powered light. Every house would need only one, and the light had enough battery life to last all night if needed. This option was much simpler and significantly cheaper.

The reason that I chose this project to reflect on was for a few reasons. The first was because this was the first of the classes I took toward the alternative energy specialization. This class helped decide to pursue the specialization in the first place. Additionally this was the first class I took that had this style. Where we as students were left to solve a more open ended problem. From that I was able to learn a lot about how to work through that type of problem. Something that I did not realize at the time, but came to understand, is how this project seemed to mirror the process in which many projects are completed in the workplace. Often when doing projects in school you can talk with your group twice a week while in class. However in this case we were left to work on the project separately. We would then meet weekly to discuss progress. This is similar to how things would work at my co-op. So I believe that this project helped to prepare me for that in many ways. I believe this project was able to show my problem solving ability. Both with small issues that need to be dealt with and on a larger scale by working through a problem from start to finish. Additionally I think this project shows my ability to work well in teams. I definitely believe that I work very well with others and I believe that will help me going forward in my career because it is important to be able to work with others.

The next project that aided my growth both personally and professionally is from my time as a member of (name of Fraternity). At the time I was the vice president, in charge of external affairs. This meant things like public relations and philanthropy/community service. During this time I was in charge of planning and running our chapter's large annual philanthropy event, (name of event). This event took months of planning and involved a lot of personal development from myself. As this was the first time that I was in charge of such an event. (Name of event) serves as the fraternity's mandatory large philanthropy event. It must be held at least once a year. It always takes place in the summer and starts on a (dates of event). It begins with (name & explanation of event). It is followed by (explanation of event). Teams pay to enter and there are additional money raising events such as a 50-50 raffle. Additionally money is donated from local businesses in Flint as well as some teachers and parents. All of the money raised goes to support Feeding America more specifically the Foodbank of Eastern Michigan. They help more than 300,000 people in more than 22 counties in Michigan who suffer from lack of food. The planning that goes into the event is quite extensive. It starts in the months leading up to the beginning of the summer semester. The first steps are working with companies to try and get donations. Additionally I had to work with members of the fraternity to leverage their connections to receive further donations. Closer to the beginning of the summer semester the planning involved working with the school and the student life office in order to plan and reserve the appropriate items. This involved getting a spot in the great court to hand out sign-up sheets and spread the word on campus about the event. Reserving a spot (event specific information) to further spread the word. As well as to reserve (specific details). The week of the event was when a lot of the planning came together. The (location & specific prep necessary) had to be prepared.

Schedules had to be created for all of the brothers so that they knew what they were assigned to do throughout the event. Food had to be ordered and I had to ensure that it was getting cooked during the event. Additionally I had to take in all team sign-up sheets and their payment in order to create the bracket for the (event). Lastly I had to actually run the (event) itself. In the end the event went well and we raised more than \$2000. That was double what we had raised the previous year. The Food Bank of Eastern Michigan claims that for every \$1 they can pay for 6 meals, so we were able to donate 12000 meals to those in need.

The reason that I wanted to reflect on this project is because it helped me grow so much both personally and professionally. The position of vice president helped me grow overall. However this project contributed a lot to that growth. This project took place at the end of my term as vice president. This meant that it basically served as a final project. It took all of the things I had learned while in the position and put them into one large project. During my time in the position I worked with a lot of professionals outside of the fraternity. The first was the director of marketing and communications at McLaren Health Center. I also worked with Kettering's director of external relations. Lastly for this event, I worked with the vice president of development and communications at the Food Bank of Easter Michigan in order to plan parts of the event. Going into this position I was not very experienced working with people in a professional setting. Getting the opportunity to work with some very knowledgeable people within our community really helped me to learn how to work in that kind of environment. This includes things as simple as sending a professional email, all the way to things like participating in meetings with high ranking employees of a company in order to plan large scale events. As far as professional skills that this project is able to show, I believe there are a few. The first is delegation, this project involved far too many things for one person to do alone especially when it came to actually running the (event). So in order to do this I had to learn how to assign

jobs or roles to other people. This was difficult for many reasons. The first difficulty was trusting people to do the job that you assigned to them. Second you have to understand people's strengths and weaknesses and be able to find a role for them that takes advantage of their strengths. Another issue is managing the tasks that need to get done. There is often a fine line between managing appropriately and micromanaging. And it is important to make sure you are not crossing that line when managing others. However in the end you must understand that if you are running an event all of the individual tasks that need to get done are your responsibility. Additionally this project showed my event planning ability. It was important to understand how the event was going to go, and think through every part of the event. This way I could plan each part. It was also important to understand that this was too large of a project, to plan in a short period of time. Especially while going to school, so I had to spread out the planning of the event and plan things well in advance. So I believe that this project taught me many things that will stick with me for a long time. As well as exemplify my delegation, event planning, and leadership skills.

The final project that I wanted to reflect on also came from my time as a member of (group name). This time it was while I served as the president of the fraternity. When I became president our chapter had just been placed on probation. There were many things about our chapter that needed to be fixed, in order to be removed from probation. Apart from the academic side of school this was by far my largest project as an undergrad. The probation was to last one year, so long as we completed a comprehensive list of requirements. Which included things like community service, fraternity education and risk management education. Completing this list of items was a very involved task. At the same time, the membership had a lot to work on as well. When I ran for president I knew that there were things that we would need to fix. At the time we had the worst grades on campus, and were shaping up to lose a large number a guys who were graduating. Unfortunately we were only bringing in a few new members so our total membership was much lower than the chapter was used to. On top of that, our relationship

with the school and our general fraternity had soured. So going into this I understood that there was a lot to do, but adding the probation on top of all of that made things very difficult. To start planning for the probation I had to meet with the director of risk management at our general fraternity. This was to discuss all of the terms and make our preliminary plans the mandatory events. Then I had to meet with the Greek Life advisor at Kettering to again go over the terms of probation. I was able to get a few of the terms amended to better suit our chapters needs as well as clarify some of the more confusing terms. The main events that we had to plan for probation were...

- A probation progress committee had to be created and we had to meet once a month.
 - That committee also had to meet with the Greek life advisor twice per term
- A FIPG party planning presentation had to be created and given to all Greek life.
- A culture week had to be created with presentations on a number of different topics, this had to be done each school semester during probation.
- As president had to attend our fraternity's conference for chapter presidents and present what I learned to the Greek life advisor.
- Had to have a sober monitor training session for the whole chapter.
- All members had to attend a TIPs training session, and receive certification.
- A presentation from a health and public safety official had to be planned and all members had to attend.
- We had to have 70% of our chapter at every IFC community service event.
- We had to conduct a community service event once per term that 100% of our membership attended.

There were many more terms but the rest were mostly paperwork intensive or heavily fraternity related and did not require as much planning. Because of the amount of events that had to be

included into our already busy schedule, many of these events had to be planned months in advance. On top of all of this a couple of goals I had made for my term as president were to raise our house GPA and to grow our membership back to what it had been prior to losing a large number of guys. So I had to make a plan to achieve each of these goals. For the events related to the probation, I handled a number of them mostly by myself, using my free time during work term to plan the events. But a number of the events were delegated to other members of the house. Often the members that I delegated to were members of the probation progress committee. One of the most difficult parts of the probation was trying to get the membership of the house to “buy in” as opposed to giving up. At the time with such a small membership, and having to complete all of these terms in addition to school work became tough task. This led many people to take on an attitude that the school was against us, and that we shouldn't do any of this extra work because it wouldn't help. This really required me to become a good leader in a fundamental sense, and learn how to lead others so that we could accomplish our goals.

The reason that I decided to reflect on this project is because it was the largest project that I had to work on while I was an undergrad at Kettering. Not only was this a huge project but it forced me to grow in many ways. First it helped me grow as a leader, just in a general sense. Things like my attitude and decision making process improved greatly. I had to understand how decisions I made would go on to affect many people. This position also had a big impact on me and I don't think I would be the same person today if it wasn't for the time I spent as president. It provided me an opportunity to become a leader. Which is something that many people do not have an opportunity to do until later in life. This position allowed me to participate in some experiences that I would not have been able to do, if not for being president. Two main examples were getting to go to our fraternities (name of conference) which was a leadership conference that the presidents of our fraternity's chapters would attend. In addition to that, I was able to attend president meetings with other leaders on campus, and with the president of the university. From all of this I had learned that I was interested in being more involved on campus

and because of this I decided to run for positions on the Intern-Fraternity Council. I went on to serve as both the Scholarship and Awards Chairman, and the Treasurer. In addition to that I ended up applying for Kettering Student Government and served on the Operations Council. Without my time as president I would not have made the decision to be as involved on campus.

I believe that this project is a good representation of the skills that I have gained while an undergraduate student at Kettering University. This project mostly shows my skill as a leader, which will be important going forward. During my time as president I was able to complete all of the terms of our chapters probation on time with zero issues. This meant that we could be removed from probation on time. From my conversations with representatives at the national fraternity office, this is something that many chapters have a hard time doing. This often causes their yearlong probations to be much longer. Additionally by the end of my term as president our chapter was able to complete all of the goals that I had set out to accomplish, from the beginning of my term. Our house GPA had risen to be above 3.0 and we were no longer the lowest GPA on campus. In addition to that, our class of incoming members was larger than it had been in multiple years, and we were able to grow the house back to an appropriate size. Finally our chapter was able to repair our relationship with both the school and the national fraternity. Because of all of these accomplishments I believe that the chapter is in a much better place than it was when I began my term as president.