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Leadership Principles Explored in Various Case Studies

As Engineering students, we each have different ideas about the most important thing an engineer does. Some people think it is learning different technologies. Others think it is learning how to come up with algorithms. However, to their shock, the most important thing an engineer has to learn is how to be communicate his ideas effectively, have influence, and be a leader in the community. Looking at the Global Leadership Model, the engineer has to possess specific personal characteristics, organizational skills, and global and cultural perspective, and apply them at the workplace. It is natural for an engineer to make mistakes. However what matters is how he applies those leadership principles in dealing with this problem.

First, the leader has an individual, has to build and cultivate certain foundational characteristics like integrity, effective problem solving, self-awareness and apply them in his work. A good example of the effect of this dimension demonstrates itself in the Therac-25 accidents. The Therac-25 was a medical linear accelerator used in treating tumors around the 1980s. There were several accidents of people receiving overdoses that resulted in deaths and serious injuries. The manufacturers could not figure out the reason and they kept saying it was not their fault that these accidents happened. It was because they were not self-aware that their product could have bugs, and they did not have enough integrity to take responsibility for the accidents that such many deaths occurred because of. However, a hospital physicist worked tirelessly with the operator of the machine to figure out the reason for the accident and fix it. Even though she did not have to as the company was saying it was not their fault, she knew she had to do something about it. If it was not for her integrity and problem-solving skills the problem might not have been discovered and more deaths would probably have occurred. She is what a leader and professional should be: hardworking, and caring.

Second, the leader in an organization, has to develop and practice effective interpersonal skills, understand how to function as part of a team, and articulate a vision and a plan to accomplish the organization’s goals. This dimension was severely lacking in the Therac-25 incidents. The code for the whole software was created by one person in assembly and there was no team censorship involved. Furthermore, there were no records for this person, and he left the organization and was no where to be found. This calls to question how he was even hired, let alone given the responsibility for such a great endeavor. When a single person works on something, no matter how smart he/she is, he will make mistakes. The value of teamwork is in the concept of different minds working together. Team members can help each other and catch each other’s mistakes. That is why several organizations are opting for this system in their work.

Finally, the leader in a global system, has to understand the impact of the global economy and international relations on the organization, and be prepared to address important global issues and their effect on the community. A good example of this is in high-frequency trading. This is an automated trading platform used by large investments banks and other funds where they construct algorithms to perform large transactions at extremely high speeds. Naturally in this kind of business, the effects on the economy have to be taken into consideration. While this issue has been controversial, a number of market experts believe such exchanges provide a valuable source of liquidity. So with every transaction, the trader has to consider every move he makes and the effect it has on the economy. For example, if a number of such traders withdraw from the market suddenly, it could cause a sudden crash in the market. If this dimension of leadership was neglected, the effects will be worse than usual because of the large scale that this dimension covers. Let’s take the example of voting machines. As everything is shifting towards the internet of things. People want the voting process to be made electronic so they can just vote online. However, this poses so many issues. Let’s consider the voting machines used in 1881. There were several incidents of missed ballots, and they result of the election could have been wrong for all we know. This is why if such a system is going to be adopted, the issues of efficiency, and security have to be taken into consideration. The engineers need to realize and appreciate their effect on the election and future of the country, and in turn, their effect on the global front. There are bound to be security concerns and software bugs with such a system. That is why there has to be a thorough and effective testing process for these systems. Had such a thing been implemented in 1881 then those incidents of the missing ballots would not have occurred. Since the volunteers (poll workers) could not verify correct operation of those machines, there was no way to know for sure that the results were correct.

In conclusion, Engineers have to apply leadership principles in their everyday work. Their effect has consequences and ramifications that go way beyond them, and they have to realize this. For every product an engineer works on, he has to be diligent in working on it and making sure it works as planned. Furthermore, the engineer needs to be a team player. The organization is a ship that cannot sail without everybody working together. Finally, the effects that the economy and community has on the product have to be considered and vice-versa. Failure to apply all those principles has had some negative and, in some cases, deadly results. The importance of these principles is undeniable.