Product, Design, and Innovation at Rensselaer
A Student Perspective

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P roduct Design and Innovation, better known as PDI, is one of the many exceptional programs offered by the Rensselaer Polytechnic Institute. Recognized as a dual major it combines elements of mechanical engineering with industrial design and social science. It is a unique set up that acknowledges the interaction and integration of these fields. The students involved work closely with professors and teammates in a studio setting to learn the processes of design, contemporary design principles, and the mindset that it takes to solve problems throughout society. Projects during the semester offer challenging opportunities for students to learn through experience, and exercise their own innovative skills. Developing leadership, teamwork, communication, and presentation skills is incorporated into the work being done as well. Through an outstanding and unique approach, PDI encourages socially responsible, innovative, and feasible design and engineering. There is no doubt that the concepts incorporated into PDI will be a part of the driving forces of the future of design and society.

As an intriguing blend of the humanities and engineering departments at RPI, the Product Design and Innovation curriculum is about teaching how to design appropriate and sustainable solutions. The best way to learn such a thing is to learn it firsthand through experience. Hence, each semester we have a studio where we work on both group and individual projects, listen to lectures, and have open discussions about design principles and philosophies. Everything that we learn is based around a design process that we use to help identify and then solve problems.

The first step for any project is to identify and clarify both the problem and goals of that project. Sometimes, we are given limitations and various situations to work around, while other times we are free to choose our own challenges. In either situation, it is important to look in depth at the larger context that always surrounds even the most seemingly simple problem. I will use one of my favorite projects as an example. Other than a time limit and budget, our only two constraints for this project were we had to design a gift for RPI to give away, and then actually produce a finished version of the product. It seems like a simple task, but to us, as freshman at the time, it had many subtle challenges that combined many aspects of design including aesthetics, social values, manufacturing, and innovation.

So as I was saying, when a project is first introduced, as the first step in the design process we are encouraged to study a product's history in order to develop a clearer idea of the basis of and context surrounding a problem. Our research often includes such things as past designs as well as market and consumer trends, which help us to evaluate or even anticipate the needs and social values associated with a product. For designing a

gift, this step meant trying to define what it is that people want – not exactly an easy thing to do. We tried to ask questions like, "What makes a good gift?" and then, "What does it mean not only to the people who get it, but also the people who give it?" If there were answers to these questions, because people rarely know what they really want, we decided that it depended highly upon to who the gift was being given, and as in almost every step of design process, there were many possibilities for this as well. Our group, rather than design a gift for RPI to give to say alumni or campus visitors, decided to play to our strengths and draw from our experiences, leading us to focus on incoming and accepted students.

Actually we really decided this after we had already generated some ideas, which normally would take place later on, but I mention this to highlight the fact that the design process is always fluid. In fact, it is sometimes very useful to think ahead or reevaluate what has been done to make sure you're headed in the direction that you want to go, and that you haven't excluded some of your initial ambitions. Anyway, once we had decided who we were designing for, we then could use some of the information we had gathered about that group to evaluate our ideas and create new ones based upon anything that incoming students might have wanted or needed.

Out of probably over a hundred ideas that we created the main idea that we went with was to design a board game, and here's why:
1.) We wanted a good alternative to video and computer games, something to get students to interact socially and physically. For new students in particular, it is a good way to meet new people and make friends.
2.) A board game is not something most people would have already brought, or even thought to bring to school with them, making it a functional gift – not one to be left sitting in a closet or on a desk.
3.) It is also something that's usually suitable for everyone and applicable outside of school when students go home to their families and friends.

Some of the other reasons we chose a board game were based on the fact that depending on how the game play was designed it could also achieve some of the needs of our client, RPI. Hopefully, the game would provide a good experience making students feel welcome and interested in the school. It could also be used as a medium to educate students about some of the things RPI has to offer, such as the various activities that are on campus or in the surrounding area, or some information about of each of the academic departments. Finally, we also developed some of our own guidelines as to what we wanted our gift to accomplish. Primarily, we wanted to make sure it was fun, and not a game that everyone knows how to play. It also needed to be a challenging strategic game that stimulated thinking, especially because of the typical profile and level of intelligence that one would normally find amongst the students at RPI.

After designing and redesigning many versions of the game, our final product was what we called "The Designer's of the World". It was based on the internationally renowned game "The Settlers of Catan" which had a basic format that met every guideline of what we wanted our game to be. We then redesigned every aspect of the game to make it our own, including its pieces, cards, appearance, box, and even the rules so that it was all about RPI and the field of design. We realized that this would probably be a very appealing theme to most of the students at RPI because the large majority of us are either engineers or entrepreneurs. In addition to all of this, we were also able to develop the processes necessary to actually manufacture the game, which we then used ourselves to make a finished product ready to be given away. In the end, we presented the final product along with a power point and posters about the game to our fellow classmates and professors as well as representative of the RPI administration and visitors from outside of the school. We were very pleased with how it went, and the game was even considered as actually be given as gift to students in the future.

There is so much to think about in any design process, that subsequently it is another challenge entirely to describe to someone all that goes into a project. This applied to not only when we were presenting our final product, but also applies to what I have tried to do here, so let me try and summarize a few key points about what I've learned about design and PDI at Rensselaer. Design is an integral part of society, and as such design is just as complex and diverse as society from nearly any perspective. Hence, following a structured methodology is very helpful to come up with a successful design. Looking at a product's history, identifying user needs and social values, generating new concepts, modeling and prototyping, reevaluating ideas to make sure they are really suitable solutions, while taking as many influences into consideration as is possible, and finally, in the midst of that ensuring that the design is feasible for both manufacturing and suitable a product on the market are all important aspects and elements of the design process. In most projects, we also usually take into consideration during our design process sustainability, environmental impacts, and social responsibility. Ultimately, however, no matter how much time you spend on evaluating every aspect of a design, the design process is still something that never really ends. It involves infinite iterations of continual improvements, the purpose of which is to make our society a better place to live. I believe that the values and principles incorporated into the Product Design and Innovation Program at Rensselaer are a part of the next step in that direction. Besides, PDI, and all of the projects that we do, is something that I really enjoy, and I know I will be able to take what I learn, and apply it as I continue to explore the rest of the world.