Sustainability and Commercialization of Capstone Projects

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The USF Capstone Design Course and the Center for Rehabilitation and Technology have collaborated to provide USF students with an outstanding Capstone Design Experience.[1, 2] The content of the course has also been discussed,[3] and the fact that two instructors are necessary to handle the workload has also been addressed.[4] Many of the prototypes that the students have developed are wonderful innovations. The USF Office of Patents and Licensing evaluates the projects and has received patents on several of the designs. The next step is to commercialize the most promising designs. A new approach, forming a development company, has been taken by USF and will be discussed here.

A new company, Rehab-IDEAS (Institute for the Development of Engineering and Assistive Solutions), was formed in 2006 in conjunction with the Center for Rehabilitation Engineering and Technology. Rehab-IDEAS was incorporated and developed by one of the instructors of the USF Capstone course. The goal of Rehab-IDEAS is to further develop the Capstone designs and bring the resulting products to the marketplace. One of the ways that this can be done is to develop the idea to the point that a company easily sees the commercial potential of the product. This other company would then obtain the license to manufacture and market the device. Another way is to team up with a manufacturing company to manufacture the product. Rehab-IDEAS would then market the product. Rehab-IDEAS also needs manpower to develop and redesign the products, so some members of the student teams may be employed, or other students may be employed to develop the products.

After evaluating many of the Capstone Design devices developed by the students, five designs stood out. It was decided to try to develop these five prototypes into commercially viable products. These five products are: (1) Wheelchair Backpack Retriever, (2) Wheelchair Folding Tray, (3) Beach and Rough Terrain Wheelchair Platform, (4) Folding Crutch, and (5) Sideways Wheelchair Kit. Rehab-EDEAS and the USF Patent office have signed the necessary agreements to license these five products.

Wheelchair Backpack Retriever: This is a mechanism that takes a backpack or briefcase from the side of a power wheelchair to the back of the chair. This is helpful, because with the backpack on the side of the chair, the wheelchair can't fit through doors. This design is unique, because the backpack hugs the side of the chair and doesn't swing out and endanger other people. The commercial version has the mechanism covered so that things can't get caught in the mechanism.

Figure 1. Backpack or Briefcase Mechanism (Original Prototype)

Figure 2. Backpack or Briefcase Mechanism on Powered Wheelchair (Commercial Version)

Folding Tray: This is a table for wheelchairs. The table folds into the arm of the wheelchair for storage and unfolds to provide a surface for taking notes or eating. This device makes it much easier for students to take notes, read, write, or to eat a meal.

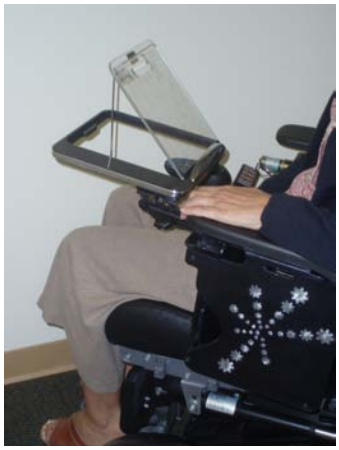

Figure 3. Folding Tray(Commercial Version)

Beach and Rough Terrain Wheelchair Platform: This is a platform that allows a person in a power wheelchair to explore rough terrain. The power wheelchair drives up a ramp onto the platform and puts the drive wheels of the wheelchair on two rollers. These rollers then operate the flotation tires that then drive the platform, with the wheelchair and operator aboard, on a ride on the beach.

Figure 4. Beach and Rough Terrain Wheelchair Platform (Original Prototype)

The Mobility-Rover, as this is now called, has been developed further and shown to be a commercially viable product. See Figure 5. In the last few months, the license to manufacture and sell units has been signed with Dixie-Chopper, and they plan to manufacture 500 units during the summer. This collaboration worked because Dixie-Chopper makes a similar product, the zero turning radius lawn mower, and they want to expand their product line.

Figure 5. Beach and Rough Terrain Wheelchair Platform (Commercial Version)

Folding Crutch: The Folding Crutch just makes it easier to have a full size crutch in a small package for transporting it.

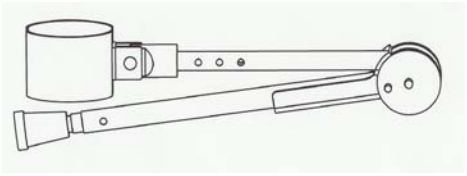

Figure 6. Folding Crutch

Sideways Wheelchair Kit: This device fits on the back of the wheelchair and lifts up the drive wheels of the power wheelchair, so that the swivel casters on the front and the sideways wheels are the only wheels on the floor. The sideways wheels then move the wheelchair sideways at 90 degrees to the direction that the wheelchair drive wheels move the chair.

Figure 7. Sideways Wheelchair Kit (Prototype)

For one of these products, the company was successful in obtaining a Small Business Innovation Research grant from the US Department of Education's National Institute for Disability Rehabilitation and Research. An advantage of forming a company is that you can apply for grants that are not usually open to university proposals.

Although there were several other prototypes that were commercially feasible, these five were selected because it was predicted that they would have the best possibilities of achieving success. Developing five different products is a challenging, but it seems to be working. Success, for Rehab IDEAS is achieved when the device has been developed and shown to be commercially viable, and then a company licenses the intellectual property to produce the device. Rehab IDEAS will then begin developing other devices.

The support of the USF Office of Patents and Licensing is essential to the success of this venture. Students submit their final reports along with a disclosure form to the Office. For those projects that have merit, a provisional patent application is filed. The students and the USF Office of Patents and Licensing develop a formal agreement and the device is offered to companies so that they can commercialize the product. The financial split is roughly 50% for the University and 50% for the student team. Recently the university has also encouraged students to undertake entrepreneurship opportunities by creating a business plan competition.

Students have also been able to continue their work on these projects as graduate students and one student has also been permanently employed by the USF Center for Rehabilitation Engineering. Some of the student teams have received royalty checks. This is a great "postscript" to an exciting Capstone Design experience.

References:

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