

Introduction to Engineering Design with Professional Development I (ENGR 2050) Classroom Lab Activity

19-4	Professional and Societal Considerations Assignment
Textbook Reference:	N/A
Purpose / Goal:	To clarify student thinking beyond the technical aspects required to develop their project to include
Materials / Resources Required:	Project design process materials
Time Allocated:	Take Home Assignment

Introduction & Instructions

As part of your design process, your team must make informed judgments that consider the impact of engineering solutions in global, economic, environmental, and societal contexts. In the following sections, describe how you **individually / personally** considered this and provide your evaluation.

Each student is to *individually* complete this form for their **overall team project**, *not* their individual sub-systems. Note that the impacts in each area may be positive or negative.

After each section, indicate your evaluation of the impact for each topic. Indicate a strong **positive** impact as a 5, no impact as a 3 and a strong **negative** impact as a 1.

ALL SECTIONS ARE REQUIRED!

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**Introduction to Engineering Design with Professional Development I
(ENGR 2050) Classroom Lab Activity**

Public Health and Safety	
Impact Description	<p>The device aims to increase customer comfort during their travels. They no longer have to carry lots of luggage or heavy baggage for long distances or long stretches of time in the airport. According to a table compiled by ebags.com, the weight of a carryon item can be upwards of 22 lbs, even up to 30 lbs in some cases.</p> <p>We anticipate that in the future, the technology we develop can be used for helping workers at airports or factories to carry around heavy cargo. The transportation process would be accomplished by the software meaning that workers would not need to consistently operate it. This can increase efficiency as they can multitask even better with the automated software delivering the cargo or luggage.</p> <p>There exists the concern of the automatic luggage follower running into people and potentially causing some injuries. The speed of the device is set to a restricted 3 – 4 mph. This falls in line with the average walking speed of 3 – 4 mph as stated by Emily Cronkleton (healthline). Therefore, the concern level is the same as people bumping into each other.</p>
Impact Evaluation Strong <i>positive</i> impact=5 No impact = 3 Strong <i>negative</i> impact =1	4

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Global	
Impact Description	<p>Travel laws and restrictions vary from country to country. The same holds true for airports rules and regulations as these change from location to location. Our product may not be able to be featured in airports whose guidelines prevent our product from operating. This adds an effect to our design principles and process. We must consider how we can modulate the design or functionality to have them featured in those airports.</p> <p>The design that is currently developed features a spot for advertisements on the side of the device. For international airports especially, it critical to consider how advertisements are chosen for the devices featured at these locations. This can be a substantial way to make profit for airports that choose to feature our device.</p> <p>Airports across the world have varying levels of passenger traffic. According to CNN in 2018 Airports in China and the US had 20% – 30% more passenger traffic that other Asian or European airports (Hetter). Our device would have to be able to operate within this high traffic environment. It also should not inhibit the normal flow of these airports.</p> <p>Because our device is intended to be rented we must consider how our device will affect those in poorer countries. Prices may need to adjust for these countries and airports so that people can use the product.</p>
Impact Evaluation Strong positive impact=5 No impact = 3 Strong negative impact =1	2

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Cultural	
Impact Description	<p>In certain cultures there is an expectation that free services should exist in public places, and airports are no exception. It may be seen as disrespectful to the public if airports in those locations are offering our product for sale. Airports will not be able to earn any profit in those locations as no one would want to use our product.</p> <p>Furthermore another cultural aspect that our device can inhibit upon is that certain cultures will desire to carry their own luggage by default. It could be a matter of protection of personal items, or it could be that people of that culture value personal comfort lower than financial stability. Whatever the case may be it exists and is something we must consider.</p>
Impact Evaluation Strong <i>positive</i> impact=5 No impact = 3 Strong <i>negative</i> impact =1	2

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Societal	
Impact Description	<p>Similar to the introduction of Hoverboards in common society, our device will create more traffic in airports. According to The Guardian, in the UK Hoverboards became an increasing public issue to the point where it required a legal definition (Hern). The ALA device should take this issue into account.</p> <p>As mentioned before there is a global factor of high population density affecting the performance of our device. This plays back to a societal impact. Depending on how the device is developed to address those concerns we can potentially cause problems within gates and security checkpoints of the airports.</p> <p>The device may also break TSA guidelines and restrictions meaning the device would need additional design iterations to fully comply. Furthermore the device, without any precautions, leaves the personal belongings of the customer open to theft. Our device should not decrease safety in airports.</p> <p>The ALA device is meant to increase comfort for those with physical challenges, those traveling with small children, and frequent flyers who want to better their travel experience. Should the device address all the concerns effectively, there is a real positive effect that the device can have for people.</p>
Impact Evaluation Strong positive impact=5 No impact = 3 Strong negative impact =1	4

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Environmental	
Impact Description	<p>Our device is made up of a steel frame with circuits, and a battery to power the circuit and motors. There is a real effect our device can have on the environment should the batteries we choose fail. According to Forbes, certain battery types can have the effect of environmental contamination if not recycled properly (Rapier).</p> <p>This means that the device must have the design specification of what battery type is to be used, and how to replace and recycle them if they fail. Furthermore the batteries themselves should be rechargeable to cut down on costs and potential environmental waste.</p> <p>The steel frame itself should be recyclable for when the unit exceeds its lifecycle. And the material used to create the device like the aforementioned steel frame and battery must last as long as possible.</p>
Impact Evaluation Strong positive impact=5 No impact = 3 Strong negative impact =1	2

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Economic	
Impact Description	<p>An economic factor we must consider is the rapid growth of technology. Our circuits, batteries, and sensors are technologies that are rapidly advancing. At a point, the design we chose will become obsolete and airports would lose money on renting out our product. If the design isn't made to be updated, it will decrease the life cycle of our product.</p> <p>Furthermore, because our circuits are heavily dependent on microcontrollers. As semiconductor and silicon prices go up, even slightly, the cost per 1000 units is greatly increased.</p> <p>The design must be able to either support updates, or if the unit is replaced it must be recycled properly. This is to minimize environmental effects as mentioned before.</p>
Impact Evaluation Strong positive impact=5 No impact = 3 Strong negative impact =1	3

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2050) Classroom Lab Activity**

References

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