Analysis of Urban Electric Scooter and Bike Integration and the Impacts on Accessibility for the Disabled Community

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On my honor as a university student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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Introduction

Disability refers to a condition or function judged to be impaired relative to the standard of an individual or a group. The concept of disability is shaped by societal constructs and perceptions. Societies, both historically and presently, have been inherently designed for those that are considered able-bodied. This has created a world where disabled people are given unequal opportunities and more hardships. These unequal opportunities include the opportunity to be able to navigate spaces freely and unhindered.

Those who create the technology can shape it to fit their agenda, in the case of ableism, the creators are able to shape it to be best fit for those who fit societies standards for ability.(Winner, 1980) Ableism is so engrained in society that it is even more than just discrimination based on ability, but it also overlooks the other qualities in disabled people based on their ability. This idea is used in society by different social groups to "justify their elevated level of rights and status." (Wolbring, 2008, p.253)

Disability is far from just being a condition of limitation, instead it embodies a diverse spectrum of experiences and perspectives to enrich our understanding of the world. Celebrating disability means that we as people should recognize and value the diversity that they bring to the world and the contributions that they give to our communities. In celebrating disability and creating equal opportunities for all, regardless of ability, we are creating a world with inclusivity at the forefront. (Garland-Thomson, 2017)

The environment surrounding people is a contributor to their disability. (Gray, Gould, & Bickenbach, 2003) The environment in which a disabled individual navigates can either mitigate

or magnify the challenges which they face. When a building is not built with inclusivity in mind, it amplifies the challenges faced and effectively makes a person more disabled within the environment. This highlights that disability is not necessarily a characteristic of a person, but it can be the interaction between the abilities of a person and the abilities of the environment.

As big cities in the world have become more populated over time, there is always a growing need for efficient modes of transportation. The first mass-produced electric scooter came out in 1996. Much more recently, in the late 2010's scooters have become very popular in urban areas, especially for their environmental initiatives and means of efficient transportation in crowded cities. For people that do not have a car in big cities that are not easily walkable and lack public transportation, renting a scooter is the best option to traverse the built environment. With no end in sight to the growing popularity of these electric vehicles, it is important to look at not only the positives that they may bring to society, but also the negatives that it introduces to society in urban areas.

Electric scooters and bikes are celebrated for their eco-friendly abilities and convenience for many. Often the vehicles are carelessly left on sidewalks, in front of walkways, or even in the street, in a way that they can hinder the size of the path of navigation. For individuals who have a more limited range of movement, this can cause them to have to turn around and take another route. A technology in this case that is widely thought of as an improvement to society an innovation, like the electric scooters and bikes, can be a regression for the navigation of mobility disabled persons. I want to analyze the extent that this technology hinders movement for those that have mobility disabilities. Even in a situation where the benefits outweigh the shortcomings for the majority, we still must look at how the technology can discriminate against minority groups.

For my STS research project, I will be analyzing the integration of electric vehicles, bikes, and scooters specifically, in urban areas. I am researching the ways that these vehicles impact disabled persons ability to move around in urban areas, which already present a plethora of challenges due to the close-knit environment and the density of people within. This is a problem that I observe when walking around the grounds at the University of Virginia, it must be a much larger problem in close-knit urban cities.

Methods

The primary question this research will search to answer is how has the increasing prevalence of electric bikes and scooters in urban areas impacts the mobility and accessibility experiences of those with physical disabilities? To answer this question, I will be employing a classic science, technology, and society (STS) framework and applying that framework to recent studies done in this field. To conduct my research, I am using the Social Construction of Technology framework, also known as SCOT. The Social Construction of Technology is in complete opposition to technological determinism: the idea that technology shapes the way that society thinks and acts. The SCOT framework highlights the importance of societal impacts on technology instead of the other way around. We must look at the way that many different social groups interact with technology and the impacts that the technology creates. (Pinch & Bjiker, 1984) “The notion of ‘relevant social group,’ as it is employed in SCOT, may, as we have indicated, provide a fruitful approach.” (Pinch & Bjiker, p.431 ,1984) The different social groups that interact with these electrical vehicles are the consumers using the electric scooters, the electric scooter companies, local government through regulatory policies, and the mobility disabled patrons. The SCOT framework was chosen instead of Actor-Network Theory (ANT). The ANT framework is helpful for exploring the complex interaction between actors in society.

Many argue that ANT is done without considering the ethics of the situation, which is why I decided to use the SCOT framework throughout my research. I will also engage in a literature review of studies done in urban areas to evaluate the climate of the current situation. The case studies will be able to shine a light specifically on the types of questions that people researching electric scooters have already been asking. This review will also help us understand how the different social groups interact with each other and the impact that has on the hinderance of mobility disabled patrons.

Electric Scooter Companies

Consumers can rent an electric scooter from a company like VeoRide or they can purchase their own scooter. VeoRide has parking zones in every city and university where a driver is unable to stop their ride unless they park it in a designated zone. They also require a picture of where you parked the ride to ensure it is in a permissible zone. This method has a couple of clear shortcomings, with the first one being that these scooters and bikes can easily be hit and fall over. This is a large problem for someone in a wheelchair and would hinder their ability to navigate the route if there was a scooter on the ground blocking the way. Another issue with these parking requirements is that once parked the bike is not secure any patron walking by the electric scooter would be able to walk it five feet out of the zone into a sidewalk. A possible solution that the scooter rental companies could implement is to have their own parking racks within the zone. These parking racks could use a locking mechanism with a passcode that provides a new passcode to the next user. This technology would solve these issues with rental scooters, but there are still personal scooters. In 2018 there were five million electric scooters sold and this number has only increased with the growing popularity of these devices. Personal scooters do not have parking zones or places where a driver is not able to take the scooter. This is

extremely dangerous because there is no built-in functionality within these personal scooters to stop them from going wherever the driver desires. I do not believe that the creators of electronic scooters had bad intentions when developing their devices. When a user of a scooter leaves the scooter in the middle of a sidewalk, blocking a person in a wheelchair from moving by, that is not what these companies had intended for their user. The company goal was to provide a form of quick and easy transportation for those who do not have a bike or a car and need to get somewhere. However, the company can still play a part in the way that its technology is used in society when it does not have proper guidelines for the user to follow. The company is responsible in a sense for the way that technology is used in society. There is also government regulation involved in this. If a government sets guidelines for the users of this technology and enforces them, then it could help to mitigate the problem of negligence. On top of just setting the guidelines for the individual rider, there can be regulations imposed on the specific companies to implore them to educate consumers of their products.

Oregon Case Study

A key stakeholder in this entire ordeal is local governments and the regulations that they have put in place to ensure scooter drivers are not causing safety concerns within their communities. In an assessment of the compliance of scooter parking in Portland, Oregon, the findings showed that many users failed to comply with parking regulations. (Hemphill et al., 2022) The implementation of parking regulations and penalties saw an increase in compliance, but there are still many users that are not compliant with the new implementation. Specifically, of the 576 electric scooters that were observed in this study, only 28% of the vehicles were parked in accordance with city codes. For navigation to not be disrupted and for electric scooters to exist together in urban areas, such as Portland, the regulatory systems in place must be created

in such a way that free navigation is at the forefront of policy. Engaging with the community to gather feedback on the regulations and the concerns they have could help contribute to better adherence to the regulations. Expanding the data set to see what other big cities have done to help mitigate the concerns with these scooters and evaluating what has worked and what has not will lead to a better solution. A large-scale problem that is exhibited in this situation is that the government has regulations in place, but either the patrons riding the scooters do not know about them or they just do not care to follow them. There needs to be an improvement of the system put in place to enforce these regulations. If governments continue to turn their back towards the problem, it will grow exponentially over the coming years along with the growth in electric vehicle riders. Another problem that this case study presents is the different rules via the government and the e-scooter companies. In Portland, "parking e-scooters within five feet of a bike rack is a common violation." (Hemphill et al., p. 489,2022). This certainly collides with Veorides statement on their website, "Make sure to park in areas designated for bike or scooter parking, such as public bike racks or other parking zones." In this case, a Veoride consumer who is following the company parking rules can also be violating the rules of the local government. A hope for the future is that the city representatives, electric scooter companies, and the public at large can come to a consensus that respects mobility freedoms and parking regulations. In this consensus we would also ideally have all stakeholders on the same page about any form of regulations or standards regarding the technology. "In addition to technological solutions, policymakers should to focus on common sense regulations, education, and strategic deployment of dedicated parking." (Hemphill et al., p. 492,2022) The idea of not just creating more regulations but also educating the public on the regulations is a great idea that was introduced in this paper. I enjoy how the authors of this study are considering that technological solutions are

not the only answer to problems like this one, but working to educate society can help shape technology in a different way. This is another example of how the government can help to implement social changes for the current situation.

Hungarian Case Study

A Hungarian study focused on the integration of electric vehicles into the transportation systems of urban areas. They started off the paper by talking about the positives of electric scooters, including last minute transportation and positive environmental impacts. The authors then moved into evaluating the regulatory legislation that has come with these electric scooters and they had this to say: "E-scooter legislation varies greatly among jurisdictions, affecting the scope and type of safety concerns. Clogged streets from littered e-scooters, parking confusion, speeding infractions, and drunk driving offenses put pressure on European municipalities to develop new legislation to keep up with the spread of these vehicles." (Szemere, Iv*á*nyi, Surman, 2023) This problem statement includes all of the negative ways that these scooters are being used within European cities. There is no centralized legislation among these newly implemented technologies which makes their impact differ across societies. It is of the utmost importance that all governments can look at this technology and how it interacts with the society over which they govern. While the positive impact that vehicles can have on society is very clear, there must be regulations that make it so that electric vehicles are able to benefit the users without harming those around them. It is also necessary that these regulations are enforced and do not act as suggestions. "The integration of advanced technology has paved the way for a greener, more sustainable future in transportation. Emphasizing the importance of responsible road behavior and adherence to regulations will encourage a safe and harmonious coexistence among all road users." (Szemere et al., 2023) This conclusion highlights the importance of the users of the

technology being responsible in their operation of vehicles. The shortcoming of this argument is that it does not include the irresponsible off-road operation of the electric scooters, as well as the irresponsible spots that the vehicles are left. However, following the rules of the road would be a step in the right direction for users to start being responsible in their endeavors with the new technology. The inexpensive, ecofriendly technology can coexist in society with mobility disabled persons. It will create a positive impact on society if the government and users of the technology are on the same page about the initiative of being mindful about the way that it is used.

Norwegian Case Study

For mobility disabled patrons, it is clear the impact that the electrical vehicles have on their mobility in urban areas. In a study published in Norway, there was a survey conducted for members of the Norwegian Association of Disabled (NAD) about their experience with electric scooters in urban areas. A significant portion of the survey respondents said that electric scooters are an obstacle to them in day-to-day navigation. “Of the NAD sample, 66% have been forced into the road, and 45% have been forced to turn around, due to a parked e-scooter blocking their path.” (Karlsen, Weyde, Nielsen, & Dale, 2023) The idea that two in every three participants of this survey have been forced into the road where cars are driving displays that these scooters are constantly putting mobility disabled people in danger during their trips through urban environments. In response to questions about where they experience electric scooters as obstacles, 65% of respondents had been blocked from accessible parking locations and wheelchair ramps. The action of blocking off these features that have made society more accessible is a step in the completely wrong direction for accessibility initiatives. If a car parks in a handicapped parking spot they are faced with a hefty fine, but when a scooter parks in one how

is that dealt with? As a vehicle that is also operated in urban areas, they should have to face the same punishments when rules this egregious are broken. The respondents also said that when interacting with electric scooter riders or parked electric scooters they were more likely to avoid an area or drop a trip altogether. (Karlsen et al., 2023) This study in Norway further bolsters the argument that electric scooters are a variable that disables people in the urban environment. The users of the technology are shaping the electric vehicles to endanger the safety of mobility disabled persons when they are trying to navigate the area. It is a social inequality in society when mobility disabled patrons are not able to have access to navigate through urban cities the same way that others are. Even in the case where they are still able to navigate the area, but it takes more time, they are not being allowed the same opportunities to navigate the area without being disrupted. No member of society should feel uncomfortable or scared on their way to work or drop their trip to the grocery store due to the negligence of others. I am sure this also contribute to emotional burdens for mobility disabled people when they feel frustrated by the lack of consideration by their peers.

Future Works

There are suggestions for all the stakeholders to try to improve this problem that has become more prevalent with the increasing usage of electric scooters. For the scooter companies, both personal and rental, they need to implore drivers to be safe in their activities while they are operating or parking the scooters. For the drivers of the scooters, they should be well informed of the rules and regulations needed to drive these scooters, just as they should be when operating any motor vehicle. Mobility disabled patrons should be advocating for themselves to local governments to let them know that this is a problem, and it hinders their navigation in the physical world. As the number of people that aware of the problem grows, the more likely it is

that there will be large scale changes. Finally, governments need to be cognizant of the social inequalities that are going on in their city, especially through technologies that are being operated within their jurisdiction. If the governments can make their constituents aware of the problem, then they can work to change their own behavior when operating and parking these electric vehicles. Improved awareness is the first step in the right direction for governments when trying to mitigate this problem in cities. The studies that they do can help to create regulations that are helpful for everyone in this situation. It is imperative that future studies assess the way that regulations are improving mobility in urban areas. Even though all the stakeholders have different motivations for this problem to be improved, there are ways that everyone can come out happier.

Conclusion

While the introduction of electric bikes and scooters has been highly commended for its environmental impacts, the technology proves to be a significant challenge for mobility disabled people. These vehicles become obstacles when left unattended or improperly parked in tight urban areas. They also cultivate a feeling of fear among the disabled community, so much so that many members of the community just avoid areas with scooters altogether. When the technology interacts with mobility disabled persons in this way, it creates an environment that contributes to their disability. My research conveys a multifaceted approach to the problem in which regulatory bodies, electric scooter companies, and the public work to shape this technology in a way that benefits everyone. This includes keeping in mind the social inequity that the technology poses for mobility disabled citizens. Fostering a more inclusive urban environment will create a life where everyone is able to enjoy the endless opportunities that large cities provide. The most important part of this entire evaluation is that there are multiple different stakeholders that need

to work together to socially construct the technology into a different direction. It is imperative that when working together, the stakeholders can all obtain the same information, so as not to confuse people in the direction that the technology is headed. There is certainly a possible future where electric scooter and bike users are cognizant of the disabled community when they use the technology, and the vehicles can be a positive edition to urban environments as opposed to a vessel that creates inequality. This future is most easily attained when the stakeholders work together towards the common goal of making life in the built environment as accessible as possible for members of society with mobility disabilities. I hope that people can read my research project and realize that actions that you choose can have a large effect on those around you. Specifically for the stakeholders, I hope that they can see this problem of social inequality and act on it to make the world a better place. This project addresses a step in making this world around us a more accessible and inclusive place for everyone regardless of ability. “Working toward an accessible future is everyone’s responsibility.” (The World Bank, 2019)

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