Prospectus

Gravitational Potential Light

(Technical Topic)

Social Construction of Technology: An Analysis on the Cocreation of the Flashlight and the Outdoors Community

(STS Topic)

By

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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

The percentage of Americans participating in outdoor recreation activities, namely hiking and backpacking, has been steadily increasing since the 1950's (Chamberlin, 2014, p.267). Many technological devices accompany hikers on their treks through nature, but one device in particular is crucial for those planning to spend a night in the wilderness. Since the flashlight's early days as a bicycle light in the late 19th century, the flashlight has become brighter, lighter weight, and more compact. These newer flashlights have enabled hikers and campers to experience the outdoors at night with ease. Since 2000, renewable energy technology such as the Luci Light has been developed for communities lacking access to electricity (Mpowerd). These technologies have gained interest from the hiking and camping community because of their portability, size, and weight. However, as many of these technologies were not originally designed with the hiker/camper in mind, their effectiveness and implementation has not been seamless. The leading solar-powered devices can be unreliable in the event of cloudy weather and the leading mechanically-powered device is more designed for household use than it is for packing and carrying on a trip (New Atlas, 2015). My group will introduce a mechanically powered camp light that is lightweight, durable, and rugged enough to be brought on a hiking/camping trip. The device will use a gear train and pulleys in order to convert the kinetic energy of a slow falling weight to a sustained source of light.

Up to this point, outdoors technology has generally been discussed as a force that drives how the outdoors community operates. This understanding, however, will not allow the design of new renewable technologies to be effectively adopted into hiking and camping culture. My group's solution addresses both the difficulties of charging solar lights and the portability concerns of existing mechanical lights. In order to design, build, and introduce this device

effectively, we must understand the influence that the hiking and camping communities have held and still hold on flashlight design.

I will discuss how Pinch and Bijker's idea of Social Construction of Technology (SCOT) helps explain the socio-technical relationship between the flashlight and the hiking and camping communities (Pinch & Bijker, 1984). An understanding of consumerism in the post World War II era (Chamberlin, 2014, p.309) will allow us to see hikers and campers as a relevant social group in determining the design of the flashlight. In the most recent decades, the interpretive flexibility of solar and mechanically powered flashlights will allow us to understand their changes in design.

This understanding is crucial in determining the design of our mechanically powered camp light and how it will be adopted into the hiking and camping communities.

Technical Project

Portable light sources have been an integral part of the hiker's gear pack since the major popularization of hiking in the post World War 2 era (Chamberlin, 2014, p.265). This increase in hikers and campers provided a larger market for flashlights intended for outdoor use. Prior to this, many flashlights had been intended for household emergency backup lighting and were not rugged enough to carry through the wilderness (Energizer). As lighter, brighter, more rugged designs have surfaced since this shift, the hiking community has recently (post-2000) adopted a desire for more renewable means of portable lighting. Since the late 2000s, solar and mechanically powered lanterns and flashlights have risen in popularity and have entered many current buyer's guides (Rosemont, 2019). Currently solar powered lanterns such as the Luci Light dominate the hiking market (Mpowerd). These lights can be strapped to a backpack or set

out on a table in direct sunlight to fully charge in preparation for night where it will last “up to 12 hours on a full charge” (Mpowerd). This introduces problems for campers in overcast/rainy weather or for hikers unable to hold the light in direct sunlight during their trek. In these situations, the solar lights will not fully charge and will often go out unexpectedly during use. The dominant stand-alone (not needing active cranking) mechanically powered light is the Gravity Light. The Gravity Light points out that, unlike the sun, “gravity doesn’t go to sleep at night” (New Atlas, 2015). The device takes advantage of the kinetic energy produced from a falling weight and, through a series of gear trains, spins a generator powering a light. This product, however, was designed with the intended user being those in countries without access to electricity. Consequently, the device is not intended for easy, compact travel. This takes the device out of consideration for hikers who require more lightweight, compact lights.

Without a more reliable backcountry light source, hikers and campers will be unable to fully adopt renewable technology. Campsites can be difficult to maneuver in the dark; injury becomes more likely with the presence of many sharp objects and no bright lighting. With such dangers and inconveniences, the growing community of outdoor venturers are at risk of decreasing due to poor experiences in the outdoors. With more reliable technology, however, hikers and campers will be able to successfully incorporate such technology into their camping experiences.

The goal of my group’s technical project is to design and build a reliable, rugged, lightweight, mechanically powered light suitable for backpacking and camping. The device will be designed to attach to a tree and use the weight of a backpack or other camping supplies as the source of energy for the light. Similar to the Gravity Light, the device will use a gear train to spin the generator faster than the rate at which the weight falls. Through 3D modeling, acquisition of

existing parts, and 3D printing, we will design and build the device. This device will aim to solve the problem of finding a reliable renewable energy source for hikers and campers that can be easily adopted into their camping essentials.

STS Project

Technology has been a fundamental component of hiking and camping since the 1930s. At this time, the "parks movement" was in full force as American government prioritized outdoor recreation projects and hiking clubs began to increase membership exponentially (Nye). At this time, military supplies were the widely adopted tools and equipments for outdoor recreation (Chamberlin, 2014, p.258) and were provided to hikers as members of a hiking club. It was not until the 1950s that individual consumerism began to define the hiking industry and stores such as REI began to flourish (REI). At the same time, participation in backpacking skyrocketed and the overwhelming adoption of the flashlight into hiking expeditions finally began (U.S. Dept. of Agriculture, Forest Service, 1969, p.19).

Though not studied in depth, the technology-society relationship in the hiking industry has largely been discussed in terms of technological determinism, where technology determines the function of society (Pinch & Bijker, 1984). While this may have been true leading up to World War II, such an approach to this socio-technical relationship at the onset of widespread consumerism does not hold. If researchers were to apply such a framework to the understanding of flashlight designs post-1950, they would overlook the influence the hiking and camping communities have had in the artifact's design. The growing prevalence of renewable technologies and growth in outdoor recreation since 2000 (Cordell, p.5) forces a technological deterministic view to fall short of understanding how these technologies function and succeed

within the outdoor community. By considering the ways in which the hiking community has influenced the design of the flashlight, we gain a better understanding of how we arrived at the current design and how new designs will be influenced and accepted.

In the following paper, I will discuss how Pinch and Bijker's ideas of relevant social groups and interpretive flexibility in the context of SCOT applies to the design of the flashlight. In particular, I will discuss how the hiking and camping community has influenced this design in the post World War II era. As this analysis enters the 21st century, renewable technologies have been designed for communities without access to electricity. Pinch and Bijker's idea of interpretive flexibility provides us a framework with which we can view renewable technologies from Luci Lighting (Mpowerd), Goal Zero (Goal Zero), and LuminAID (LuminAID) as products with different uses for different social groups. While these technologies are still on their way to stabilization, hikers as a relevant social group interact with these technologies differently from social groups in India (LuminAID). I will explore how the hiking community has recently influenced the design of these technologies in order to adopt them into its culture.

Conclusion

The technical project will introduce a mechanically powered, rugged, portable camp light. This device will address flaws in current renewable technology that has been adopted by the hiking and camping communities. Current solar lights prove difficult to achieve a full charge during a day of hiking or inclement weather. Current mechanically powered light systems are not portable enough to bring on a hiking or camping trip. In order to overcome these flaws in current technology, we must consider society's role in constructing the design of the flashlight. In order to gain a better understanding of how hiking and camping communities interact with current

renewable technologies, we must compare them as a relevant social group to the intended user (those without access to electricity). This socio-technical relationship and the interpretive flexibility of current renewable technologies provides us the understanding necessary to introduce a camp light to the hiking and camping community.

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