ENGR 371 Research Project Proposal

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# Population

The sample will be drawn from university students aged 20-24 who own at least one electronic device (e.g., smartphones, tablets, computers).

# Hypothesis

Extended use of electronic devices before bedtime is associated with poorer sleep quality.

## Justification

Understanding the effects of the use of technology on sleep quality is crucial given the omnipresence of electronic devices in modern society. Poor sleep quality leads to daytime fatigue and decreased productivity and poses long-term health risks such as obesity, cardiovascular disease, and mental health disorders1. By investigating the relationship between the use of technology and sleep, we can develop strategies to promote healthier technology habits and improve overall sleep quality.

# Summary of Background Research

Many studies exist on the correlation between bedtime use of technology and sleep problems, namely the articles “Bedtime Use of Technology and Associated Sleep Problems in Children” 2 and “The impact of bedtime technology use on sleep quality and excessive daytime sleepiness in adults” 3 both published on the National Library of Medicine. These studies have found that there is a statistically significant association between technology use and sleep quality and quantity.

According to Joanna A. Cooper MD, the cause of this reduction in sleep quality is due to the blue light coming from electronic devices. It disrupts our sleep cycle by stimulating two parts of our brain4. The first part is the eyes’ sensitivity to light, particularly in its role in regulating wakefulness. The second part, the pineal gland, secretes melatonin, the sleep hormone, which is the cause of drowsiness, when lights begin to dim in the evening. The light emitted by technology suppresses the production of melatonin which in turn reduces the quantity of sleep an individual can get by delaying their drowsiness. This disruption of the sleep cycle is further enhanced by certain activities which can even cause a rush of adrenaline.

Technology use in the evening has been attributed to the reduction in both sleep quantity and sleep quality. In another study, “Television-viewing habits and sleep disturbance in school children,” 5 it was found that extended television-viewing in the evening was correlated with an increase in anxiety around sleep. The quality of the sleep these children had was significantly reduced by their anxiety. As for university students, they often find themselves immersed in a digital world, where electronic devices and online content are ubiquitous before bedtime. Many students engage with stimulating content6, such as social media updates, online videos, or video games, in the hours leading up to sleep. This exposure to stimulating content can lead to increased cognitive arousal and emotional engagement, making it challenging for students to relax and unwind before sleep.

# Experiment Design

## Population Selection

For population selection, a random sampling method will be employed among the student population of Concordia University. Recruitment is achieved in person and through online platforms. Participants will be invited to complete a survey online, providing convenience and flexibility in participation.

## Measurement Quantity

* **Technology use:** In terms of technology use, participants will self-report their screen time before bedtime and specify the type(s) of device(s) they typically use. This self-reported data will offer insights into participants' digital habits and the extent to which technology use may impact their sleep quality.
* **Sleep Quality:** To assess sleep quality, the [Epworth Sleepiness Scale](https://nasemso.org/wp-content/uploads/neuro-epworthsleepscale.pdf) (ESS) will be considered as a potential measure. The ESS is a validated questionnaire that evaluates daytime sleepiness and can provide valuable insights into overall sleep quality.

## Sample Size

A sample size of fifty participants will be targeted to ensure an accurate representation of the target population. This sample size allows for sufficient statistical power to detect potential associations between technology use and sleep quality while also considering the feasibility and resources available for data collection and analysis.

# Abbreviated Summary Protocol

[Link to completed abbreviated summary protocol](https://liveconcordia-my.sharepoint.com/:w:/g/personal/na_greni_live_concordia_ca/EV7IbXsxTjFCu_7hADkNuAYBaM0eITi16lVSw8fVgWKEnw?e=D1ATV0).

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