

Bright Students, Bright Campus?

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Received Date: 18 August 2022 | **Accepted Date:** 05 September 2022 | **Published Date:** 10 October 2022

Citation: Kathy Sexton-Radek (2020) Bright Students, Bright Campus? *J. Brain and Neurological Disorders*, 5(5): DOI: [10.31579/2692-9422/040](https://doi.org/10.31579/2692-9422/040)

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Abstract

Give light, and the darkness will disappear of itself.” Desiderius Erasmus

While the above quote by Erasmus applies to the University setting implies light as knowledge and darkness as ignorance, this report highlights the issue of an overprovision, literally, of light that poses an imposition to students’ sleep quality. Bright students at the University as a group, have poor sleep quality Sleep disturbance of fragmented sleep, difficulty of falling asleep, wake-ups and difficulty falling back to sleep and excessive daytime sleepiness are commonly reported by students (Sexton-Radek and Graci, 2022). The significance of these sleep disturbances accentuates the very need of the University student for good quality sleep – to insure cognitive functioning. Reduced grade point averages, impaired performance on academic tasks such as presentation are a few of the empirically substantial reduction in attention, concentration, initiative, and essential to academic performance (Sexton-Radek and Graci, 2022).

Keywords: sleep quality; light; natural light

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In the provision of an academic environment, universities provide safe, brightly lit classroom, study rooms, laboratories and library space. While the typical amount of light illuminated in these settings is necessary for

academic tasks, extended exposure and continued exposure in university student study spaces may be excessive, Haber and Ghosh (2021) reported that smart phone touch screen use was continuous in their university sample of participants. Further, deficit performance on cognitive was worse one hour before bedtime and the hour following wake-up time. Haber and Ghosh (2021) commented that cognitive rhythms are influenced by artificial schedules of society rather than intrinsic variations characterized in sleep-wake, menstrual and rest-active cycles. Cognitive performance is reduced under high sleep propensity (Haber and Ghosh, 2021; Sexton-Radek and Grace, 2022) as measured by tapping speed and extent – the metric of tappigraph is depicted in Figure 1. Further, tapping actions were found to be distinctly increased at night and on the weekend (Huber and Ghosh, 2021). An implication of these findings is the self-imposed light exposure of university students in evening and weekend time reflects and extension of excessive light exposure. Siraji, et al. (2022) reported that high light exposure (i.e., ≥ 500 lux) induced a beneficial effect on the performance of simple tasks not complex performance.

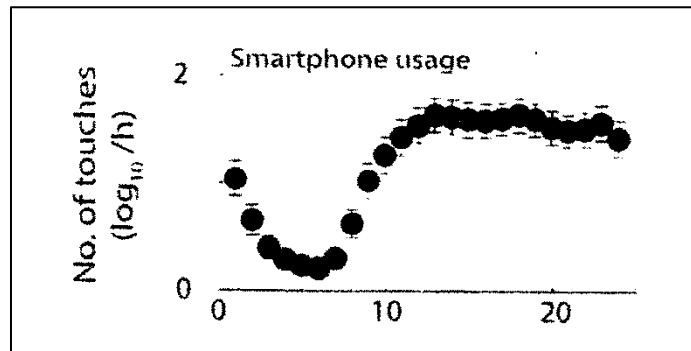


Figure 1. Time of Day and Physical Activity (Tapprography)

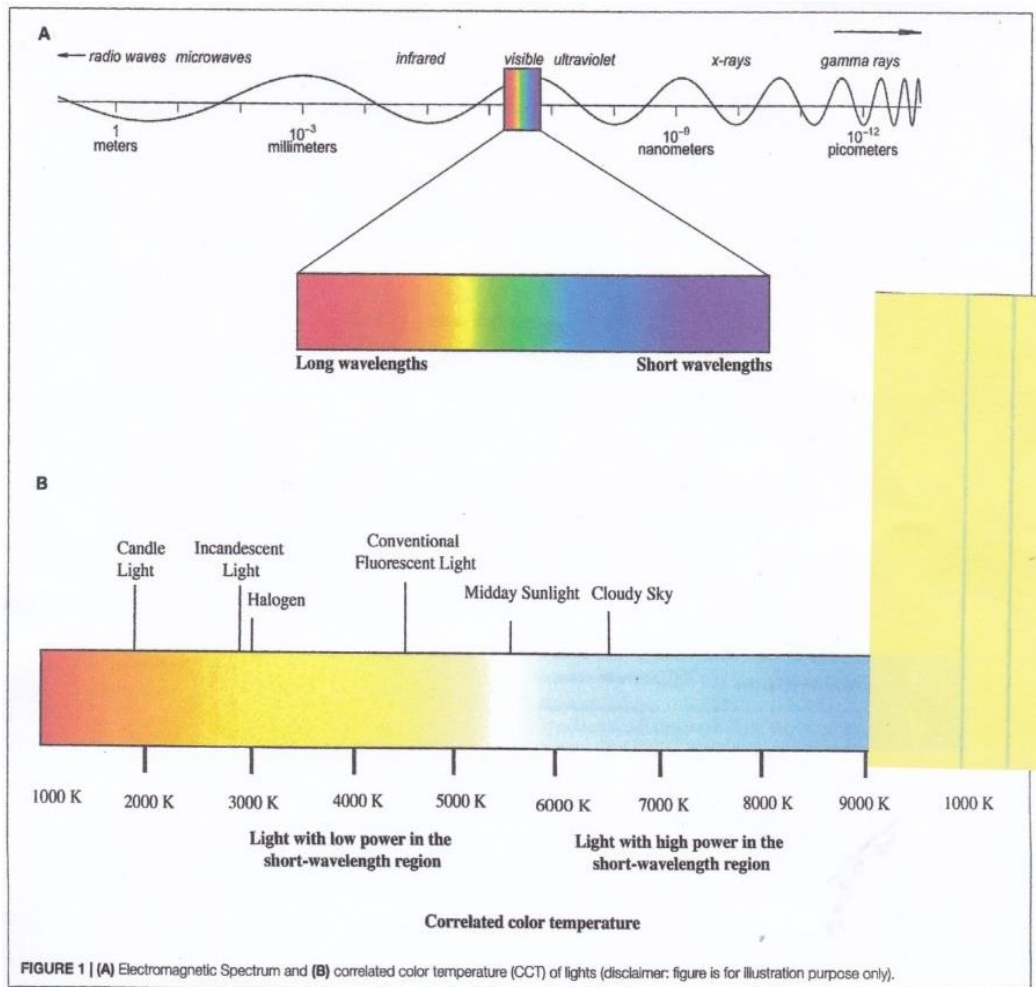


Figure 2. Correlated Color Temperature

Exposure to light will signal the brain to wake mode. It is possible that extended and intermittent light exposure of the university students' experiences from class/lab room to sels schedule, collectively, result in an overexposure. This effect, if consistent has detrimental effects in the necessary rhythmicity of the sleep cycle. In the natural exposure to light in a university setting, the student typically finds it to be bright. Table 2 depicts a representative sampling of light exposure from a Midwestern university. Finding such as those in Table 2, are then? with students? schedules of light, bright light or otherwise. The bright lighting of university academic settings is leveraged to produce/be conducive to

academic outcomes (St. John, Clark and Jemtrud, 2022). Dong and Zhang, (2020) investigated optimal lighting for residential rooms in university settings. In calculation of natural daylight exposure at eye level upon awakening, values showed positive correlations and sleep quality. Thus, the "daylight design" of a residence hall room is added to the configuration of light exposure to the university student. The natural light exposure, class/lab room light exposure and university student light exposure imply and excessive amount. Investigation by Chellapp, Gordijn and Cajochen (2011) provided evidence to the attenuation of cognitive ehaviors with poor sleep quality and intermittent light exposure.

Time/Day	Location	Light Level*
8 am Wednesday		575 lux
8 pm Monday	Classroom	525 lux
1 pm Tuesday	Biology laboratory	625 lux
3 pm Monday	Student Center – Main Floor	600 lux
8 am Thursday	Residence Hall Room	550 lux
10 pm Tuesday	Residence Hall Room	775 lux
2 am Friday	Residence Hall Room	825 lux
9 pm Wednesday	Library	575 lux
Noon Tuesday	Cafeteria	675 lux

Table: 1. Representative Light Levels by Location – Midwest University Campus

Light meter value

Further study of the natural pattern of university student light exposure, sleep quality and cognitive performance are necessary to determine the implied disruptive results of excessive light (bright light).

In light of these findings, it is suggested that the university student consider the following

Recommendations:

- Regular wake-up time, optimally with exposure? to natural bright light.
- Rest intervals from excessive light exposure (bright light) when beyond a few hours. A walk outside in natural light after the class lecture or laboratory is suggested.
- Adjust settings on all devices to reduce bright light intensity exposure (i.e., use blue light screens) to moderate levels such as indirect light exposure – a desk lamp or floor lamp.
- Reduce excessive light exposure after bedtime by placing smartphones/tablets/computer screen off or blocked from exposure one hour before bedtime.
- Until investigation of light exposure amount/duration in relation to cognitive performance and sleep quality are completed (Sexton-Radek – two studies currently), limits to light exposure are recommended.

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DOI: [10.31579/2692-9422/040](https://doi.org/10.31579/2692-9422/040)

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