# The possible effects of incorporating green spaces into indoor spaces at Thompson Rivers University

The purpose of this report is to inform the school (TRU) board of governors about the potential benefits that incorporation of green spaces can have on the school environment, its students and staff.

Submitted to

TRU Board of Governors Thompson Rivers University

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### ABSTRACT

Various research works have been carried out to investigate the potential benefits that plants provide when incorporated into indoor spaces. Quite a number of these research works have reported important findings. This research will harness those important findings to recommend indoor plants for Thompson Rivers University. It will do this while acknowledging the fact that Thompson Rivers University has installed greenery into its indoor spaces in the past, and the reasons for which that incorporation failed. This research will give recommendations on how the reasons for the past failed attempt can be tackled.

#### INTRODUCTION

Many individuals purchase potted plants to serve as motivation for them to leave their beds every morning. They claim that their having to open their window and provide the potted plants with sunlight is a compelling reason for them to rise, a reason more compelling than an early morning class, or a due assignment, or their grumpy mothers screaming that they should get busy with chores; nonetheless, more important and compelling than the motivation to leave the bed, are the significant benefits that plants (and other greenery) provide to individuals in indoor spaces— bedrooms, school receptions, library spaces at universities. Given the harsh weather conditions in Canada, it is also imperative that these green indoor spaces are created since individuals (for example, university students and staff) will naturally have difficulty enjoying fresh air, conducive space for socialization, and pure views of greenery in cold temperatures. Incorporating green spaces into indoor areas in Thompson Rivers University will not only provide benefits that supersede 'leaving the bed every morning', but also benefits that satisfy these human needs that Canada's harsh weather conditions leave unsatisfied. These benefits will also cover for the problems resultant from the burden of university work (such as stress and lack of focus); these benefits include alleviating stress and consequently increasing productivity, providing comfort indoors, and boosting focus/concentration. This research will explore these benefits and consider the potential/evidenced difficulties that may be encountered in the incorporation of green spaces into indoor areas at Thompson Rivers University. This

research will also provide recommendations that tackle these difficulties and emphasize the feasibility of installing/incorporating greenery into indoor areas.

### STRESS ALLEVIATION AND PRODUCTIVITY INCREASE

There is a grave possibility that students and staff at Thompson Rivers University can become stressed and downtrodden because of workload, academic (and non-academic). According to Brooke et al (2022), 45.6% of students in Canadian post-secondary education reported having stress levels that were above average in 2019. This statistic strikingly and conspicuously represents almost half of all students in post-secondary education. Stress can also lead to lesser productivity and cause a decline in the work turnover and excellence that Thompson Rivers University strives to attain: this follows the conclusion of Bui et al (2021) that higher stress levels at the workplace are associated with lower productivity. Significantly though, it has been found that indoor plants can solve this problem: Lohr et al (1996) reported that subjects that completed a task in the presence of interior plants (therefore, plants installed indoors) had lower systolic blood pressures than their counterparts who were tested in the absence of indoor plants. This reflects that indoor plants can alleviate stress because systolic blood pressures, as intimated by Lohr et al (1996), rise when individuals engage in stressful activities. It was given that the systolic blood pressures of all the subjects rose due to the stressful nature of the task, and importantly, that the subjects tested in the absence of indoor plants experienced a higher increase in systolic blood pressure than their counterparts who were tested in the presence of plants. This is demonstrated in the diagram below.



Figure 1.1 as given by Lohr et al (1996)



Fig 3.3 as given by lohr et al(1996)

Errors and reaction time on a computer- based productivity task in the presence or absence of plants. (P < 0.06).

Additionally, Lohr et al (1996) found that the subjects tested in the presence of plants had reaction times to the given task that were quicker than the reaction times of the subjects tested in the absence of plants (12% quicker). This indicates that indoor plants do have an impact, not only in alleviating stress, but also in increasing productivity. Having seen this, one can say it is paramount that Thompson Rivers University incorporates indoor greenery into classrooms, staff offices and the library, as these are the areas that mostly induce stress in the students and staff (because of the kind of work done in these areas). Other indoor parts of the university can benefit from this finding as well, to ensure that all non-academic stress inducers within the control of the university are accounted for and tamed.

#### INDOOR COMFORT

As is known in axiom and was equally affirmed by the Government of Canada (2015), plants absorb carbon dioxide from the air through photosynthesis. This portends great prospects for the enterprise of installing plants in indoor spaces in Thompson Rivers University because it would cover for some of the problem created by Canada's harsh weather conditions as mentioned earlier— 'difficulty enjoying fresh air' and 'conducive space for socialization'. Plants improve the state and quality of the air breathed in the environment. This is the reason why the Government of Canada has started a program to plant two billion trees over the course of ten years, as stated by Government of Canada (2023). If greeneries (not necessarily of the size and mass of trees) are incorporated into indoor spaces at Thompson River University, students and staff will breathe fresher air indoors. This would be most profitable during the cold winters in Canada when people can hardly breathe outside without suffering feats of cold and flu afterwards. Students and staff of Thompson Rivers University will also have a more conducive space indoors to socialize and engage with each other in card games and several other activities, whether it is hailing sleet and snow outdoors or raining cat and dog. Additionally (and resultantly), indoor plants can improve the overall comfort of individuals, as highlighted by Moya et al (2018). If the air quality of an environment is improved— therefore, enriched with oxygen— the environment generally becomes more comfortable for individuals because air is a human necessity. This comfort provided by indoor plants however goes beyond simply catering for the respiratory needs of individuals, but also serves aesthetics demands, which according to Moya et al (2018), are important as well. Given this, one of the problems created by Canada's harsh weather conditions will be solved— the problem of lack of 'pure views of greenery'. Even though interior plants cannot provide the panoramic view that natural outdoor trees would, they still appear aesthetically pleasing and are better than plain walls and constantly pale faces of students and staff burdened with work.

#### **BOOSTING FOCUS/CONCENTRATION**

Another noteworthy benefit that indoor plants provide is boosting focus/enhancing concentration. This was confirmed by Jung and Awad (2021), who found in a research that learning concentration improved by 120% when indoor plants were present. This finding highlights the gross impact that indoor plants have on the learning experiences of students, and shows the prospects that indoor plants pose for the betterment of Thompson Rivers University. According to Neiterman and Zara (2019) 68% of instructors are worried that students' cellphones serve as a distraction, and many of the students surveyed also agreed that there was a certain level of inescapability from the distractions that the devices brought about. These results emphasize the importance of the impact that indoor plants have on students' focus: by the

incorporation of green spaces into indoor spaces at Thompson Rivers University, students will hardly be distracted by their cellphones, but will focus and learn well.

## POTENTIAL DIFFICULTY

According to Bass (2016) Thompson Rivers University's attempt at installing green spaces failed due to the costs of maintenance that the indoor plants accrued. This could be a potential difficulty if this project is undertaken again. Nonetheless, I propose that Thompson Rivers University continues with the project still because of the paramount benefits that indoor plants provide. I also suggest that to avoid falling into the ditch of accruing excessive costs and having that idiomatic expression play out in real time— 'once beaten, twice shy'— Thompson Rivers University should undertake this project with acknowledgement of this possible difficulty. Recommendations will be given that will highlight subtle but efficient steps that Thompson Rivers University can take to deal with this problem of excessive costs while installing indoor plants across various spaces of the university.

#### CONCLUSION

In conclusion, Thompson Rivers University should incorporate greenery into indoor spaces in its premises because of the benefits given above, thus, alleviating stress and consequently increasing productivity, providing comfort indoors, and boosting focus/enhancing concentration. The potential difficulty of the indoor plants accruing great costs for maintenance, which— as evidenced above— has been experienced before, should be acknowledged in this incorporation process without stalling the enterprise all together. The enterprise should not be stalled all together because of these important benefits that indoor plants could provide for students and staff, and consequently, the whole of Thompson Rivers University. These recommendations given below should also be taken into consideration to ensure the success of this incorporation, and the tackling of the problem of maintenance costs as experienced during the first attempt at this project.

#### RECOMMENDATIONS

• The university should consider employing the exact species of plant used in the research of Lohr et al (1996) to ensure alleviation of stress and increased productivity. This is because these plants have been tested and proven to be capable of alleviating stress. The species of plant include Aglaonema sp., Chamaedorea Sefrizii, Dracaena marginata, Dracaena deremensis 'Janet Craig', Epipremnum aureum, Homalomena siesmeyeriana, Hoya sp., Philodendron scandens, Sansevieria trifasciata, Sansevieria trifasciata, Scindapsus pictus 'Argyraeus', Syngonium podophyllum.

• Thompson Rivers University should consider using smaller indoor plants. This will reduce the costs of maintenance that the plants will require.

• Thompson Rivers University should consider placing the indoor plants in strategic positions, so as to cover many areas efficiently as well as allow plants discriminately emit the carbon dioxide trapped, which according to the Government of Canada (2015) are let out during plant respiration.

• Thompson Rivers University should consider working with an efficient maintenance plan that will allow for regular and cheaper maintenance. This maintenance plan may involve weekly, monthly or quarterly supervision over the plants to ensure they are performing at the best of their capacity and are in healthy condition.

### WORK CITED

- 2 billion Tree Commitment. (2023). *Government of Canada*. Retrieved April 1<sup>st</sup>, 2023 from https://www.canada.ca/en/campaign/2-billion-trees.html
- Bass, dale. (2016, January 22). TRU'S living wall takes its final breath. Kamloops this week. https://www.kamloopsthisweek.com/local-news/trus-living-wall-takes-its-final-breath-4364752
- Bui, tina, et al. (2021). Workplace stress and productivity: A cross- sectional study. *Kansas journal of medicine*, vol.11(1), 33654542.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7889069/

- Jung, C., & Awad, J. (2021). Improving the IAQ for Learning Efficiency with Indoor Plants in University Classrooms in Ajman, United Arab Emirates. *Buildings*, 11(7), 289. MDPI AG. Retrieved from http://dx.doi.org/10.3390/buildings11070289
- Linden, brooke, et al. (2022). Trends in post- secondary student stress: A pan- Canadian study. *The Canadian journal of psychiatry,*

https://journals.sagepub.com/doi/full/10.1177/07067437221111365#:~:text=Data%20coll

ected%20from%20Canadian%20post,%E2%80%9Ctremendous%E2%80%9D%20(15.3 %25)

- Lohr, virginia, et al. (1996). Interior plants may improve workers productivity and reduce stress in a windowless environment. *Horticultural research institute*. Vol.14. https://www.researchgate.net/publication/237441131\_Interior\_Plants\_May\_Improve\_Wo rker\_Productivity\_and\_Reduce\_Stress\_in\_a\_Windowless\_Environment#:~:text=Interacti on%20with%20plants%2C%20both%20passive%20and%20active%2C%20can,importan tin%20improving%20satisfaction%20with%20indoor%20space%20%287%2C%2013%2 9
- Moya, Tatiana, et al. (2018). A review of green system within the indoor environment. *Indoor and Built environment*, vol.28(3),
  298309.https://journals.sagepub.com/doi/pdf/10.1177/1420326X18783042
- Neiterman, E., & Zaza, C. (2019). A Mixed Blessing? Students' and Instructors' Perspectives about Off-Task Technology Use in the Academic Classroom. *The Canadian Journal for the Scholarship of Teaching and Learning*, *10*(1). https://doi.org/10.5206/cjsotlrcacea.2019.1.8002
- Toxic substances list: carbon dioxide. (2015). *Government of Canada*. Retrieved April 1<sup>st</sup>. 2023 from https://www.canada.ca/en/environment-climate-change/services/management-toxicsubstances/list-canadian-environmental-protection-act/carbon-dioxide.html

# GLOSSARY

Greenery: growing plant or vegetation Panoramic: A clear wide view of a surrounding environment Aesthetically pleasing: impressive beauty Incorporate: To include in a wider set Install: To fix something in a position, where it will be ready for use Indoor: Areas inside a building or structure Photosynthesis: the process by which green plants and some other organisms use sunlight to synthesize nutrients from carbon dioxide and water Respiration: the action of berating