Experiencing Goucher Learning Environments: The Good, the Bad, and the F***ing Awful

Mary Heinz

ES 497 – Environmental Studies Senior Capstone

2019

1) Introduction

As a full-time undergraduate student at Goucher College, a private liberal arts college, I have spent a significant amount of my college career in various learning environments across campus. During my four years here, I have been taught in each of the academic buildings, the Athenaeum (a multi-purpose library), and in outdoor spaces. Within each of these locations, specific classrooms have affected my ability to focus, while others feel disorienting. These learning experiences across campus have left me wondering: Why are certain learning spaces conducive to positive learning outcomes, while others disrupt them?

Those living in post-industrial societies spend considerable amounts of time in built environments. With specific regards to students in the United States, the average public-school student spends approximately 900 to 1,000 hours a year in a classroom setting, varying from state to state (Hull 2011). If a given student has completed twelve years of public education, that amounts to at least 10,800 hours out of that person's life. The design of these spaces, therefore, could be highly relevant to the health of the student body. School and classroom designs have undergone significant change over the years, moving away from spaces designed to maximize the number of students per room to designs focused on learning outcomes of the students (Baker 2012, p. 4). As the use of electricity became more common, or required by law in some states, fluorescent lights were installed without regard for the physical or psychological effects lighting may have. Visual discomfort caused by lighting in these classrooms may inhibit both students' and teachers' cognitive function, yet these spaces, largely, have not been updated (Baker 2012, p. 14).

A growing body of literature within the field of environmental psychology focuses on the relationship between the stimulus of light, colors, and sounds sourced from or associated with nature and human well-being. Berto's (2014) literature review on this topic suggests the existence of a consensus among those in the field on the ability of natural stimulus to restore one's attention and reduce stress. A study conducted on college students, for example, found that rooms containing windows facing natural settings were described by students as being more restorative of attention during study breaks than rooms without (Felsten 2009). Other studies have found that, while direct natural light in enclosed spaces con contribute to discomfort, inclusions or natural light in the built-design of classrooms should be encouraged due to the simulation of biological functions and improvements of psychological well-being (Constanzo and Donn 2017, p. 222)

The study described herein builds upon these findings in the literature review that follows. The review also informs the proposed study's intent: to explore how Goucher College faculty and students experience various learning environments on campus to further determine how they can be improved. The central research question is: What aspects of the various learning environments, indoor and outdoor, are regarded by faculty and students as positive or negative, and how to they experience and describe these aspects?

Guided by a mixed methodology, I am attempting to answer this question. Based on my findings, proposals for improving classrooms at Goucher are presented. These proposals could lead to an improved learning and teaching experience among students and faculty at Goucher College, and should be pursued .

My research is be further guided by the following research questions:

1. How and why do the self-reported experiences of Goucher faculty and students in indoor classrooms differ from their experiences in outdoor classrooms?
2. How can the findings of environmental psychologists be applied to the experiences of Goucher students and faculty?
3. How can indoor and outdoor learning/teaching outcomes be improved at Goucher from the perspective of those using the rooms?

2) Literature Review

Comfort In the Classroom

With regards to indoor classroom settings, researchers have found several sources of physical and mental discomfort for students. During Ricciardai and Buratti's (2018) experiments, they found that prolonged noises, like that of mechanical or electrical buzzing produced by light fixtures, disturbed student comfort and ability to focus (pp. 30). Similarly, the fluorescent lighting in classroom environments can create visual discomfort, leading to headaches and impairment of visual performance (Winterbottom and Wilkins, 2009, p. 64). An evaluation of indoor classrooms found that an overabundance of light (natural: from windows; and unnatural: from fluorescent lighting and projectors) and the imperceptible flickering of artificial lights creates environments students feel uncomfortable in (Winterbottom and Wilkins, p. 70). This is supported by findings in Ricciardai and Buratti's research. Students surveyed in their study described classrooms with the least number of light sources to be the most comfortable (2018, p. 33).

The disregard of comfort when planning educational environments can be traced back to the 1940s and 50s. Lighting standards of schools were set in terms of "foot-candles"—a unit of

illumination describing the brightness of a light source at a distance of one foot; this term is rarely used today—instead of visual comfort of those using the space (Baker, 2012, p. 14). Indifference to the topic of comfort, visual or otherwise, when planning interior layouts is a mistake, according to some research. As it will be explored further in the next section, comfort has been found to greatly influence learning capacity (Ricciardai and Burratti, 2018, p. 23).

Nature, Well-Being, and Education

Similarly, too much stress can impair cognitive function (Berto, 2014, p. 397). Impaired mental and physical well-being, which is common among college students in the form of "overwhelming anxiety" or depressive symptoms (Shellman and Hill, 2017, p. 59), affects student attainment and general life satisfaction. Some research has indicated that nature can play a role in counteracting the experience of stress or discomfort.

Many environmental psychologists hypothesize that the inclusion of green space can improve indoor environments. The presence (or view of) plentiful green space has been associated with increased life satisfaction (Houlden et al., 2018, p. 26). The complexity and intensity of built education environments, as noted by the overabundance of light and sound, can create stress. Natural environments, conversely, tend to be less "busy." This allows the executive system of human brains to relax and has restorative effects on attention and stress reduction (Berto, 2014, p. 396).

This knowledge could be applied to college campuses to improve student and faculty well-being. Felsten (2009) found that study rooms with views of real nature or dramatic images of nature were rated highly in terms of their restorativeness (pp. 165-6). Outdoor educational

programs have also been found to positively affect social and emotional well-being (Shellman and Hell, 2017, p. 64).

Lived Experiences and Faculty - Gaps in the Literature

Gaps within the existing research exist due to the consistent use of controlled, quantitative research in the studies discussed above. Quantitative studies lack the subject's own understanding of why they felt comfort or discomfort in different educational settings. Their lived experiences are removed from the analysis of the data. Quantitative studies are valid in their methods; however, additional insight can be gained through qualitative research.

The only researchers to conduct interviews, Castilla et al. (2018), did so to gather the kinds of works and phrases students used to describe their environments. Using student input through the semantic differential method was important, the authors explained, because previous studies used the language of experts in their questionnaires which made the questions harder for laymen students to understand and answer (pp. 53). However, this method does not reflect the feelings and subjective understanding of the participants. It leaves the researcher asking *why?* Quantitative analysis forces the researcher to impose their own understanding of the situation upon the participants to answer that question. When the researcher's understanding is not informed by the lived experiences of the participants, then the findings may not reflect the reality, or at least the nuances, of the situation.

Castilla et al.'s research also differed from the other studies because they researched the experience of "real" environments (p. 52), meaning that, unlike Winterbottom and Wilkins (2009) and Ricciardai and Buratti (2018), their research was conducted in classrooms as they were normally used, no controlled experimentation. The use of controlled environments

exclusively, like the lack of interviewing, may produce findings that do not reflect the day-to-day lived experiences of students or teachers.

Of the students collected for this literature review, only one noted the perspective of the teacher in a given educational environment. This occurred in the literature review of Winterbottom and Wilkins' (2009) report, in which they reference two other studies: one determined that teachers preferred daylight while they taught, while the other determined that teachers preferred control over lighting levels (pp. 63). Besides Castilla et al. and Winterbottom and Wilkins, the rest do not refer to the word "teacher" in any way that is of consequence.

Finally, most of the research on outdoor experiences can be applied, but not directly compared, to the indoor classroom experience at college. Research regarding outdoor learning and the importance of outdoor activities tend to focus on the importance of hands-on learning for children (Dillon et al., 2014) or recreation at college (Shellman and Hill, 2017). There is little research regarding the experience of outdoor classrooms as they are seen and used on a college level. This study intends to address these gaps in the existing literature by using a mixed methodology to explore how students and faculty experience, describe, and are affected by various aspects of various learning environments on Goucher's campus.

3) Methodology and Data Collection

In order to conduct the study, data collection techniques from quantitative and qualitative research methodologies were utilized. The study does, however, rely more on qualitative data than quantitative. As mentioned in section two, many studies related to environment psychology and comfort in classroom environments are quantitative, which limits the body of literature's knowledge of subjective understanding, explanations, and experience of learning environments.

Qualitative research through interviews is better suited to meet this end. This study did, however, include a quantitative phase. Both the survey and interview methods will be describing this at length below.

Gathering Survey Data

A survey was distributed to Goucher students and faculty through Goucher affiliated Facebook groups, the Gopher App, and academic emails, which is a form of convenience sampling. The survey was intended to show trends (or lack thereof) among the larger student and faculty populations at Goucher regarding what indoor classrooms they liked, disliked, and what about those classrooms informed their opinion. Further still, the survey acted as a means to determine what classrooms should be used in a photo-elicitation activity during the interview. The photo-elicitation aspect of the study will be fully described later.

The survey also functioned as a means of gathering the contact information of potential informants. Upon the conclusion of the survey, participants could volunteer to be interviewed by providing their email address. Investigation of this topic requires the selection of specific types of people, therefore purposive sampling methods were used, selecting only Goucher students and faculty. For interviewing, three students and two faculty from the pool of volunteers were selected. The survey was open for three weeks, then closed for analysis through SPSS. After the completion of the survey, some respondents reached out to me through email to leave extra comments, some of which are incorporated in the findings section.

80 responses were gathered, 48 students and 32 faculty. Chart I shows the class ranking demographics of the surveyed student population and compares it to the demographic reported by the college. Due to the sampling method used and my position as an individual expecting to

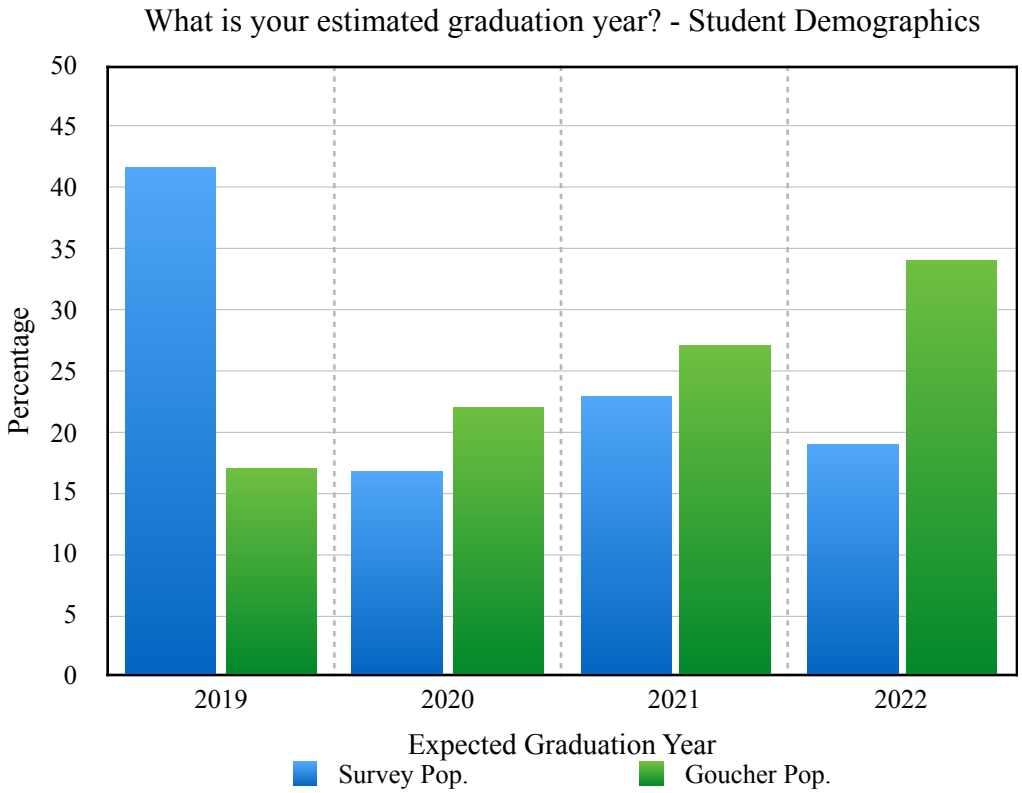

Chart I: The bar graph displays a comparison between the expected graduation of the student population surveyed and the expected graduation of the entire Goucher student body. The bars represent a percentage of the total population for the survey and Goucher College, respectively. The majority of the students that participated in the survey are from the class of 2019, which is a minority at Goucher College.

graduate in 2019, I was able to access more students from the class of 2019 than the other classes. This has resulted in a drastic difference in the composition of the survey population than the total population. The survey population is composed largely of seniors, with few first years participating, making the survey data not reflective of the total Goucher population and, therefore, generalizations cannot be made from this data. A call for further research can, however, be made based on the data trends.

Since an email requesting participation in the survey was sent out to all faculty members through the faculty chair, a significant percentage of faculty took the survey. Approximately 25% of the total faculty at Goucher participated in the study. Chart II displays the amount of time the faculty participants have spent teaching at Goucher. Each color is a scale of six years due to the amount of variation in amount of time spent at Goucher.

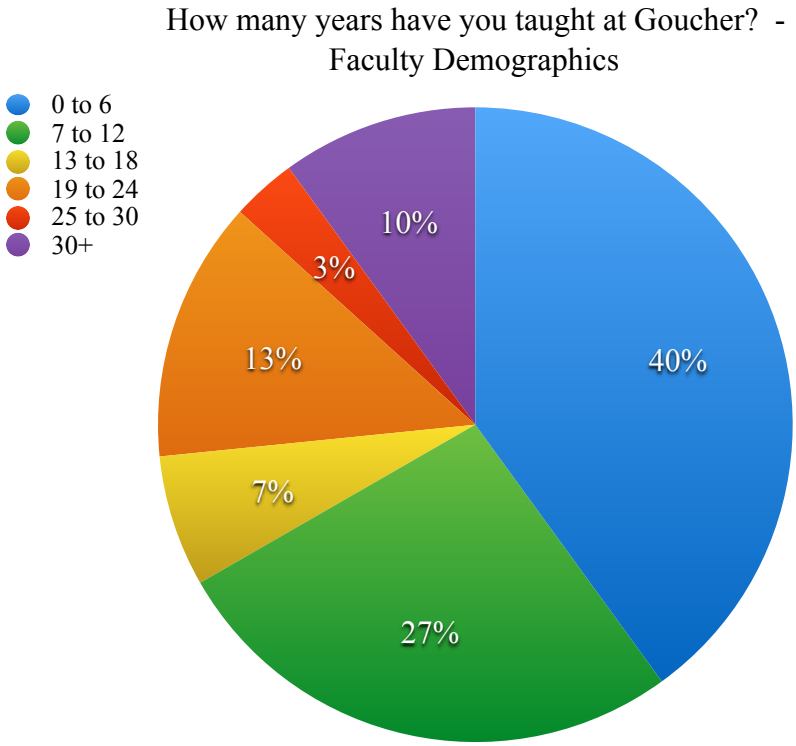

Chart II: A break down of faculty demographics by time spent at Goucher College in years. Based on how much time a respondent has spent teaching at Goucher, they were placed into a range spanning six years. The majority of respondents have taught at Goucher between 0 and 12 years.

Gathering Interview Data

A pilot study was conducted during the fall 2018 semester using a semi-structured interview. This style provides foundational questions, but allowed for greater flexibility in the order and phrasing of the questions than a structured guide. After testing the guide in 2018 on three students and a faculty member, a finalized version of the guide was created. The final version incorporates photo-elicitation, or presentation of photographs to informants during an interview to elicit memories, discussions, and reflections (Banks 2001, p. 87), at the beginning of the interview. Seven photographs of classrooms at Goucher College were presented, and informants were asked to order them from most to least comfortable or favorable. The number seven was chosen based on Lymbomirsky and Lepper's (1997) happiness scale. Across 14 sampled populations, it was found to be an effective measure of happiness. For the sake of this study, the scale is appropriated to gauge positive and negative feelings.

The photographs, which depict seven classrooms at Goucher College (see Appendix A) referenced by survey participants, remained on the table for the duration of the interview to be used as a reference and talking point, thereby improving response quality and limiting awkward silences. The photographs were numbered in the upper right-hand corner. Informants were asked to refer to the pictures by their number for reference in transcriptions of their interview. The interviews focused on their subjective experiences of their most and least favorite classrooms at Goucher, as well as their experiences with outdoor classrooms. In total, six interviews were conducted, averaging 30 minutes per interview. In the findings section, these interviewees are referred to using pseudonyms.

Data Analysis

The survey data was coded in SPSS to reveal frequencies and cross tabulations using the descriptive statistics function. Bivariate analyses were conducted to test for statistical significance between variables. Tables and charts of the data were then created using Google Sheets and can be seen in section four. Extensive inferential statistics were not conducted because fewer than 100 participants were surveyed and, therefore, the surveyed population is not highly representative of the Goucher College population.

Interview transcripts, including two interviews conducted during the pilot study (one student and one faculty member), underwent a coding and memoing process. This data is then put in conversation with the survey data and the findings of past studies in section five. Through the synthesis of these three things, proposals for additional research and changes were drafted in section six.

4) Survey Findings

Below are the charts created based on the survey data. Beside each is a detailed description and, for the sake of brevity, they will not be repeated in writing in this section. It should be noted, that survey participants were asked to pick their favorite and least favorite rooms on campus. The buildings those rooms were in are displayed in Chart III. Some participants listed more than one room for each question, others did not. The participants were then asked to describe why those classrooms were their favorite or least favorite from a list of attributes. The data from those questions is show in Chart IV and V, respectively.

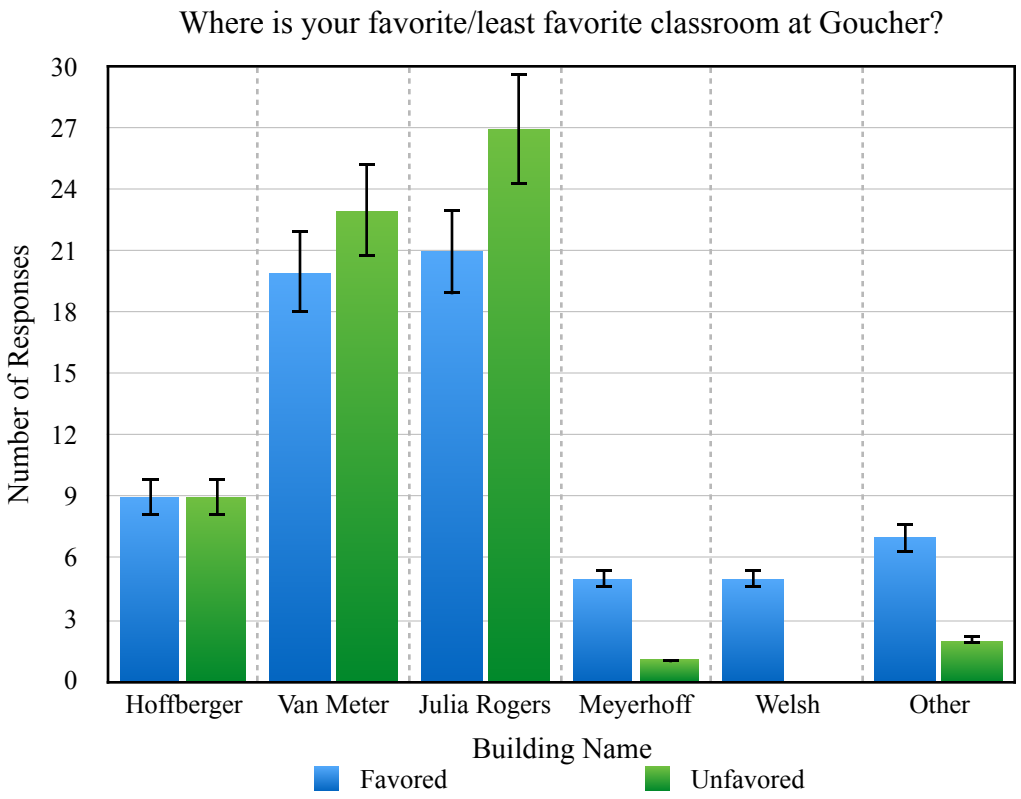

Chart III: Respondents were asked to identify their favorite and least favorite classroom. This graph breaks down the number times a classroom in each building was pinpointed as either favorable or unfavorable. Error bars show a 10 percent chance error. The data concerning Julia Rogers, Meyerhoff, Welsh, and "Other" are statistically different. Note: Some respondents listed more than one space, therefore there are more responses than there are respondents.

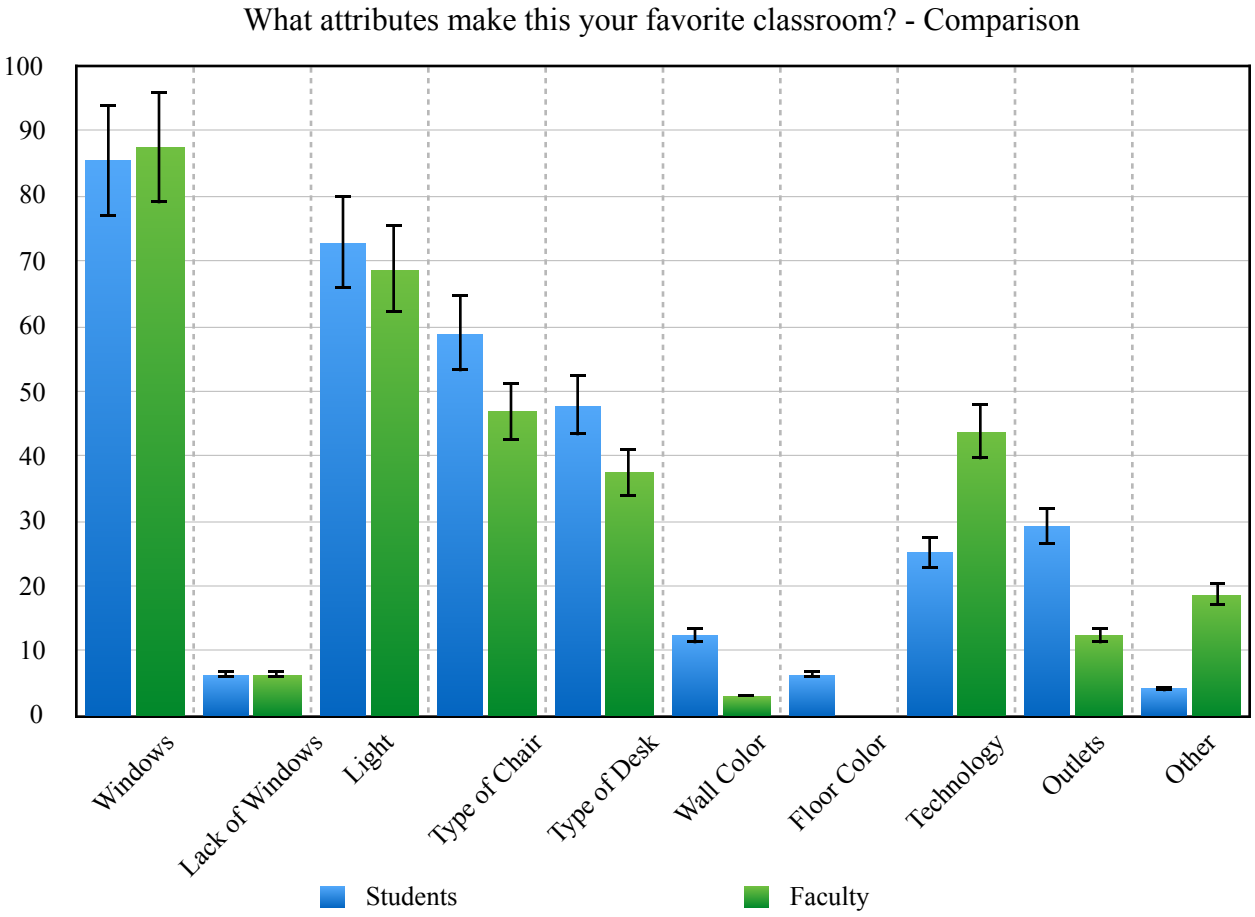

Chart IV: A comparison of what students and faculty deem favorable in a classroom environment. Due to the large difference in population surveyed between students (48) and faculty (32), the bars shown here are the number of responses given by each group if their total population was 100. By making the two populations equal and displaying a percentage, instead of the true numbers, the comparison of the two groups' responses is validated. Error bars indicate a 10 percent chance of error. Light, type of chair, type of desk, wall color, floor color, available technology, available outlets, and "other" are statistically different.

Status	Pearson Correlation	1	0.024
	Sig. (2-tailed)		0.502
	N	800	800
Favorable	Pearson Correlation	0.024	1
	Sig. (2-tailed)	0.502	
	N	800	800

Table I: A bivariate analysis of the relationship between status (faculty or student) and what aspects of a room are deemed favorable. None of the relationships were found to be statistically significant.

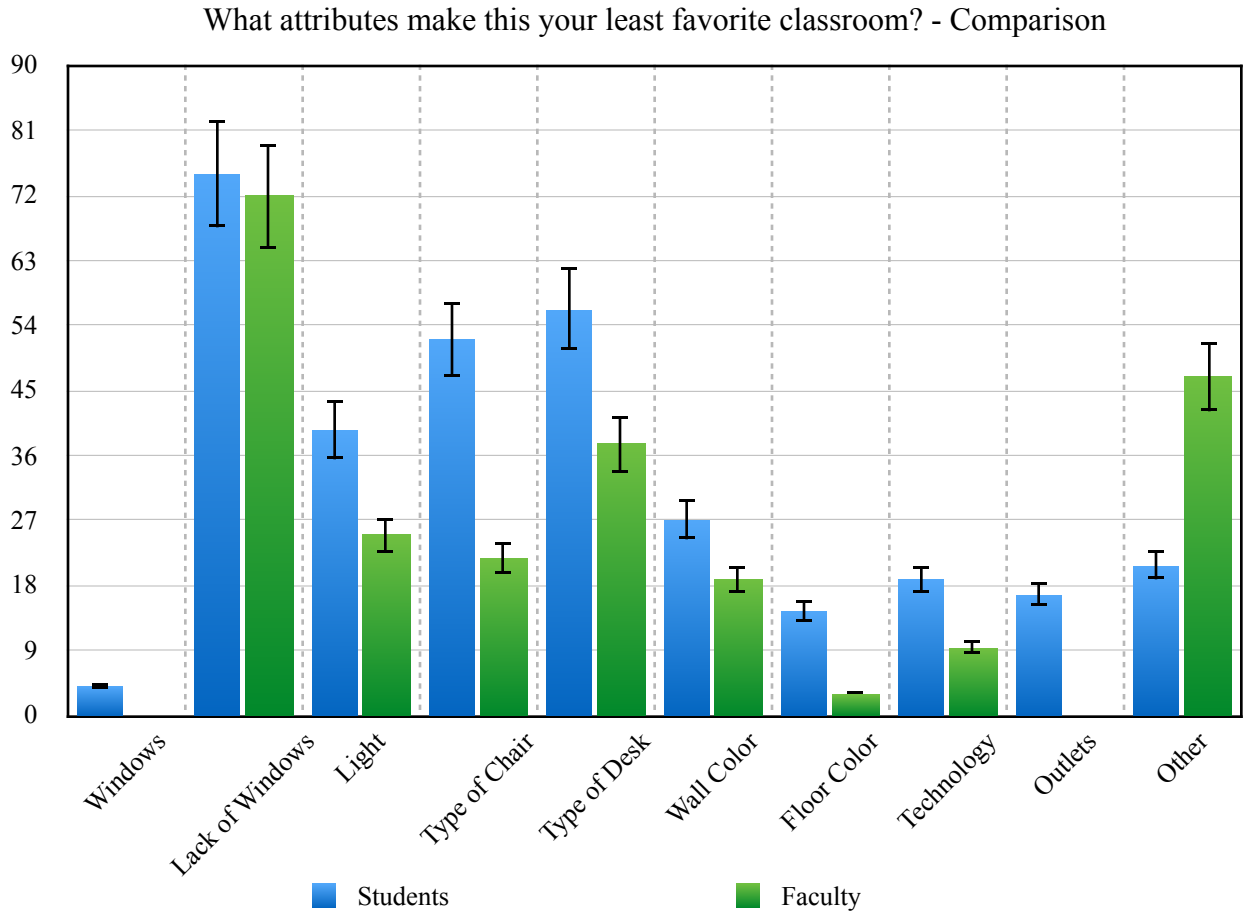

Chart V: A comparison of what students and faculty deem unfavorable in a classroom environment. Due to the large difference in population surveyed between students (48) and faculty (32), the bars shown here are the number of responses given by each group if their total population was 100. By making the two populations equal and displaying a percentage, instead of the true numbers, the comparison of the two groups' responses is validated. Error bars indicate a 10 percent chance of error. Type of chair, type of desk, wall color, floor color, available technology, available outlets, and "other" are statistically different.

Status	Pearson Correlation	1	**0.098**
	Sig. (2-tailed)		0.006
	N	800	800
Favorable	Pearson Correlation	**0.098**	1
	Sig. (2-tailed)	0.006	
	N	800	800

Table II: A bivariate analysis of the relationship between status (faculty or student) and what aspects of a room are deemed unfavorable. The relationship was found to be statistically significant based on the Pearson Correlation, which approaches 0.01.

5) The Value of Windows and Natural Light

One key finding of this study, across the survey and interview data, is the apparent value of windows and natural light. There appears to be a shared value of these two aspects within built design, as they generally create favorable environments for learning and teaching. Or, at least, environments that do not cause discomfort, given that some participants focused on the negative feelings experienced in windowless spaces without access to natural light. In such spaces, participants recount feeling trapped or artificial, in addition to experiencing migraines and drained energy levels.

Survey Analysis

Two of the survey questions asked respondents to list their favorite and least favorite classrooms, including the building code. Chart III compares the data derived from these questions and reveals an interesting tend. Accommodating for ten percent chance of error, Van Meter and Hoffberger equally favored and unfavored by the survey population. Meyerhoff, Welsh, and Other have statistical differences, yet few people selected those buildings, potentially because the majority of students and faculty experience Van Meter, Hoffberger, and Julia Rogers first hand. It is of note, however, the Welsh classroom, in which three of the four walls contain large windows, was never listed as a least favorite classroom.

Julia Rogers, unlike the two other major academic buildings, is the more frequently disliked than favored and is the most disliked building at Goucher College. This is caused by the large number of survey respondents that listed the Julia Rogers ground floor classrooms (GR 46-50) as their least favorite classroom at Goucher. All of these classrooms are windowless with grey carpet and white walls. Windows are considered an important aspect of their favorite

classroom by 85% of the total survey population. 73% of the survey population also selected light as a positive influence on their choice (see Chart IV). 73.8% listed lack of windows as a reason why they dislike their least favorite classroom (see Chart V). When comparing what students and faculty consider important when considering a classroom their favorite or least favorite, the consideration of windows as favorable and lack thereof as unfavorable are statistically the same (see Chart IV and V).

Interview Findings - Negativity

During interviews, windows and light were the most common topics of discussion when interviewees were asked to order the photographs of classroom spaces from best to worst. Focus, which is discussed often by researchers in the field of environmental psychology, was not normally on their minds while speaking on their personal experiences in Goucher classrooms. When asked directly if windowed or outdoor spaces improve their ability to focus on a lesson, the respondent was either unsure or, with regards to the Van Meter outdoor classroom, said no due to the proximity to passerby on Van Meter Highway. Instead, respondents recount strong affective descriptions of bodily or emotional discomfort in windowless spaces that diminish learning and teaching outcomes, which reflects the strong dislike of windowless rooms (see Chart V) by the greater Goucher population.

The most extreme physical reaction to windowless rooms comes from the most passionate person interviewed for this study. Sandy, a faculty participant in the pilot study, suffers from chronic migraines. For her, access to natural light through windows is a must in order to teach properly. When in a space that relies completely on artificial, and often fluorescent, lighting, Sandy's migraines are triggered, and she cannot function properly in the

space. Even without a migraine, she says, “I always feel light is oppressive in a classroom with no access to natural light,” making the experience uncomfortable at best.

Jen, another faculty member, feels similarly. While describing her teaching experiences in a classroom on ground floor of Julia Rogers, she says, “The lack of windows feels artificial, you know? With the weird lighting, too, I feel like, ‘Am I in a classroom or is this a weird science lab? A place where we’re all under experimentation.’” Lily, a student participant, finds that her classmates feel trapped in these same rooms, “like they are deep in the basement and they’re never going to get out.” This feeling of entrapment heightens Jen’s claustrophobia, which is usually eased by the presence of the window. No matter how small a space, the window provides a sense of depth to Jen that she feels is important. It is also a reminder to her and her students that there is a world outside the classroom, which she feels is conducive to learning and discussion. Sandy seconds this opinion, noting the importance of windows to student awareness of the outside world. It enables to students to comprehend is the passage of time and changes in the weather, which contextualizes the discussion within a greater sense of the world. Lily finds windows to the outside reassuring for this reason.

All the participants, in one way or another, recognized a want or need for natural light in their educational spaces because of the visual or emotional discomfort caused by artificial lighting. When they can, some avoid using artificial lights, relying entirely on light from windows. However, getting that resource into every classroom is not always possible due to the lack of windows or the timing of a class. In such instances, people get creative. Another Goucher faculty member, as reported to me by an anonymous student through commentary on the survey,

would bring his own lamps to his night class from home so he would not have to use the provided fluorescents.

When not overtly uncomfortable, the lack of windows and natural light still has effects on the energy of a learning space. For Jen, student participation suffers in windowless spaces as if the space drains energy from those in it. Grant experiences similar troubles. He describes he experiences teaching in a dim, windowless theater like teaching in a fog that creates, “a kind of lethargy, psychological and physical.” By comparison, windowed spaces, especially on sunnier days, can raise the energy of a class or, as Grant puts it, “make people cheerier,” and thereby improving discussion and student engagement with the class.

Interview Findings - Positivity

The presence of windows and natural light may also improve learning outcomes in other ways. According to the participants, exposure to outdoor spaces, through windows or directly while in outdoor educational environments, helps people cope with harsh topics. Grant likes to take his students outside when working with the theater of the absurd, a dark theater style, and finds that doing so, “balances the darkness of the content.” I also received two anonymous comments from faculty members through the survey that supports the notion that windows create balance. One received a course evaluation for a feminism class held in Welsh 128, which is flanked on three sides by tall windows and received a 100% favored rank in the survey (see Chart III). The student evaluating the course commented that the windows, “allowed for her to remain present and focused on the difficult topics at hand.” The second faculty member reflected on their experience with a student who frequently experienced panic attacks in their windowless classroom. Removal from the classroom was necessary for them to calm down. For this

particular response, it is ambiguous whether the subject matter of the class or the classroom itself was the trigger for these attacks. Either way, windowed rooms have the potential to relieve the stress and feelings of darkness presented to students and faculty members by darker content.

Leigh, a student interviewee, identified windows as highly important aspect of classroom-built design, just as many of her peers did in the survey. For her, windowed spaces provide a cozy feeling the helps her be present in her classes. The other student participants, Lily and Emily, felt differently. Lily recognizes that windows are important to her classmates but finds the flexibility and usability of a classroom space to be the most important aspect of an educational space. This will be further explored in section eight. On the other hand, Emily genuinely finds windowless rooms to be cozy, "like the passage of time doesn't mean anything," something Jen finds distressing. Emily also has ADHD, making the presence of windows a distraction. She does admit, however, that her positive experiences in a classroom are much more reliant on the class that is taught there.

6) Potential Value of Color

The aesthetics of classrooms were generally ignored by the survey respondents. Wall color and floor color were two of the least significant aspects of favorable classrooms, selected by only 8.8 and 2.5% of the total survey population, respectively. They were more frequently selected as unfavored aspects (23.8 and 10%, respectively), yet ranked sixth in terms of importance. Yet, it was an aspect that the interviewees discussed as an important part of their classroom experience. As discussed above, windows and natural light affect the comfort and learning outcomes of the interview participants. They also matter significantly to the greater

Goucher population, as shown in the survey. But there is a way to resolve the problem caused by the lack of windows without power tools: color, such as using a splash of paint here and there.

When asked how she felt about color in a classroom setting, Leigh notes how boring she finds the gray tones and most classrooms on campus. She generally desires something more interesting to look at in her classrooms. She explains, "it doesn't have to be a preschool classroom, but if there's a pop of color it's nice!" Lily notes that the blues and grey of Julia Rogers make the classrooms feel calm, but understand that others feel it's bland. In describing her ideal classroom space, if given the opportunity to build one herself, she plans to create a space that relieves the sense of entrapment in windowless spaces by using pastel wall paint to add brightness to space. Jen, who enjoys windows for the depth they give a space, notes that a single wall painted a contrasting color, like the stark blue found in Hoffberger 148 (see Appendix A), has the same effect. She also seems interested in the idea of dramatic murals to lighten the mood of a space. In rooms with all white walls and no windows to balance the intensity of the light, artificial light can become harsh. By adding color, the intensity of the light decreases, making the space more comfortable.

When asked how he felt about the potential intervention, Grant began discussing a coworker who had done something similar to her office. Upset because she did not have windows, she photographed and printed pictures of the outdoors and hung them all over her office to the space feel more like home. In his own experience, however, he (like Emily and Sandy) did not regularly note the color of classrooms. He did speak about a room in Meyerhoff that, at one point during his 30 years of teaching, was teal. It has since been repainted white, which he says brothers him.

7) Other Findings - Finding Fault in Crowding, Immobility, and the Outdoor Classroom

Herein are a few minor findings of the study that could be further investigated by future studies. Within the existing literature, the experience of teachers was considered once. The general finding of that study was that teachers wanted direct control over the aspects of their classroom environments, particularly lighting levels (Winterbottom and Wilkins, 2009). The faculty members interviewed for this study did not appear to have similar feelings regarding their teaching spaces. Inability to control the classroom environment or a desire to control the lighting of the space was not discussed by most interviewees. Sandy did approach the idea of having control of the classroom environment by including adjustable lighting in her ideal classroom space, which would enable her to change the brightness of a space in accordance to her own and her students' visual comfort.

Both Jen and Grant were more fixated on the crowding of a space. Jen, when asked about any feels of emotional or physical discomfort in Goucher classrooms, reflects on her experiences with claustrophobia, which she feels limits her ability to engage with students. She says, "If there's too many students in a room, and there's 50 extra chairs, and I literally can't get around to students the way I like to, you know what I mean? That bothers me." Grant feels similarly. As a theater teacher, he utilizes space and movement in his classes, even his lectures. Like Jen, he feels unable to properly teach in a space where he cannot easily move around to check on students or encourage students to move around. Lily, the only student participant to address crowding and flexibility, notes that mobile desks and chairs are a must for her. It gives a room the potential to be useful to any style of teaching, discussion, or in-class activities. She found

Hoffberger to be the most frustrating academic building on campus due to the age, size, and immobility to chairs and tables in the building. In the survey, type and desk and chair were selected only by 50% or fewer of the total survey population as favorable or unfavorable.

For Grant, flexibility is the benefit of outdoor spaces, but not the outdoor classroom.The intent of the interviews was to compare the positive experiences students had in outdoor classrooms and windowed classrooms with their negative experiences in windowless classrooms. Through the comparison, I would present proposals based on environmental psychology for bringing the "outside in." What I was not expecting was the generally negative reception of the Van Meter outdoor classroom. Of the participants, Jen was the only neutral party, finding the space functional. Grant detests the area because of how immovable and rigid it is. The student participants note how easy it is to become distracted in that space because of passerby chatting and staring at them. They also find the rocks uncomfortable, at best. For all participants except Leigh and Emily, the outdoors was better utilized in other spaces. Grant and Jen enjoy using the grassy academic quad for discussions and writing workshops because of how easy it is to move around.

8) What to Do? - Concluding on Student and Faculty Experiences

At any given point in time, 20-25% of the global student population feels stressed (Haidar et al. 2017, p. 261). Exposure to stress for significant periods of time can cause a variety of health problems, including cardiovascular diseases and depression (Cohen et al. 2007, p. 1685), and can inhibit learning. Goucher College, as an institution responsible for the education and well-being of more than a thousand students who spend significant amounts of time in classroom environments, needs to consider how the built design of those spaces effects student

and faculty health and learning outcomes. For the participants in this study, the negative effects of windowless, colorless spaces on well-being can be steep, ranging from lethargy to migraines and panic attacks. Interventions that prevent these effects and improve learning and teaching outcomes.

Through exploration of the gathered data, there are ways to intervene, ways to make teaching and learning better in the classroom and, perhaps, improve well-being some across campus. In future construction projects, like the new Hoffberger Science building, great care should be taken in considering the purpose of a space. It is understandable that theater-style rooms do not have windows, however access to natural light through windows appears to be a key player in the functioning of students and faculty, especially when the alternative to natural like is fluorescent light. Fluorescents cause a significant amount of visual discomfort, triggering migraines or simply physical discomfort. Additionally, access to natural light has enabled students to cope with dark concepts and, potentially, focus better.

In situations where windows are not feasible—a room is intended to be a theater, it is older, and installation is costly, etc—attention should be paid to the type and severity of lighting in that space. Weaker lightbulbs or adjustable light fixtures—which use a slider instead of an on/off switch—should be considered for those spaces to maximize the learning and teaching outcomes of those who will use the space. As discussed in the findings section and in studies referenced in the literature review, the glare produced by such lighting and the imperceptible flickering of the lights can impair tasks and cause discomfort (Winterbottom and Wilkins, 2009).

An additional intervention for such cases, but could also be implemented across campus, is the inclusion of bolder, or at least non-white or grey, colors in classroom spaces. Felsten

(2009) found that dramatic images of nature in study rooms had positive effects of restorativeness. In this study, there appears to be an interest in applying the concept in college classrooms. Painting a single wall a contrasting color, or utilizing pale shades of blue, pink, green, etc, has the potential to change the experience of a Goucher classroom. Julia Rogers ground floor rooms, for example, could be painted in a way that increases the sense of depth and comfort in that space. Further research should, however, be conducted before applying these interventions, as the effectiveness of them is generally understudied. The suggested interventions should be applied to existing rooms and the experiences of students and teachers therein should be studied. If future studies confirm the findings and assumptions of this study, they can also gauge the most effective methods of intervention application.

It should also be noted that there are gaps in the data due to the scope of the study. Considering the interview data in a vacuum, it could be concluded that faculty care more about the presence of windows than the students. This is not, however, reflected in the survey data. As shown in Chart IV and V, there is no statistical difference between the number of surveyed faculty and students that selected windows as their favorite aspect and lack of windows as their least favorite aspect. Within their respective charts, windows or lack thereof were the most commonly selected out of the ten aspects a respondent could choose. Therefore, additional students should be interviewed to gauge whether or not Lily and Emily's responses are outliers. Yet, it is still clear that Goucher students and faculty find windows to be an important part of their academic pursuits.

Works Cited

Baker, Lindsay. (2012). "A History of School Design and its Indoor Environmental Standards, 1900 to Today." PhD Dissertation, Department of Architecture, UC Berkley, California.

Berto, Rita. (2014). "The Role of Nature in Coping with Psycho-Physiological Stress: A Literature Review on Restorativeness." *Behavioral Sciences* 4:394-409.

Castilla, Nuria, Carmen Llinares, Fabio Bisegna, and Vicente Blanca-Gimenez. (2018). "Affective Evaluation of the Luminous Environment in University Classrooms." *Journal of Environmental Psychology* 58:52-62.

Cohen, Sheldon, Denise Janicki-Deverts, and Gregory E. Miller. (2007). "Psychological Stress and Disease." *JAMA* 298(14), p. 1685-1687.

Costanzo, L., and M. Donn. (2017). "Thermal and Visual Comfort Assessment of Natural Ventilated Buildings in Europe and North America." *Energy and Buildings* 140: 210-223.

Dillon, Justin, Mark Rickinson, Kelly Teamey, Marian Morris, Mee Young Choi, Dawn Sanders, and Pauline Benefield. (2006). "The Value of Outdoor Learning: Evidence in the UK and Elsewhere." *School Science Review* 87(320):107-111.

Felsten, Gary. (2009). "Where to Take A Study Break On the College Campus: An Attention Restoration Theory Perspective." Journal of Environmental Psychology 29:160-167.

Haidar, Suzan A. MS, N.K. de Vries PhD, Mirey Karavetian PhD, Rola El Rassi MS. (2018). "Stress, Anxiety, and Weight Gain Among University and College Students: A Systematic Review." *Journal of the Academy of Nutrition and Dietetics* 118(2), p. 261-274.

Houlden, Victoria, Scott Welch, Joao Porto de Albuquerque, Stephen Jarvis, and Karen Rees. (2018). "The Relationship Between Greenspace and the Mental Wellbeing of Adults: A Systematic Review." *PLoS ONE* 13(9):1-35.

Hull, Jim. (2011, December). Time In School: How Does the U.S. Compare? Retrieved from http://www.centerforpubliceducation.org/research/time-school-how-does-us-compare Lofland, John, David A. Snow, Leon Anderson, and Lyn Lofland. 2005. "Starting Where You Are" from *Analyzing Social Settings: A Guide to Qualitative Observation and Analysis*. Thomson Wadsworth: Australia.

Ricciardai, Paola, and Cinzia Buratti. (2018). "Environmental Quality of University Classrooms: Subjective and Objective Evaluation of the Thermal Acoustic, and Lighting Comfort Conditions." *Building and Environment* 127:23-36.

Shellman, Amy and Eddie Hill. (2017). "Flourishing through Resilience: The Impact of a College Outdoor Education Program." *Journal of Park & Recreation and Administration* 35(4):59-68.

Winterbottom, Mark and Arnold Wilkins. (2009). "Lighting and Discomfort in the Classroom." *Journal of Environmental Psychology* 29(1):63-75.

Appendix A

Picture 1: Van Meter G02

Picture 2: Hoffberger 1

Picture 3: Hoffberger 149

Picture 4: Van Meter 209

Picture 5: Van Meter G07

Picture 6: Julia Rogers Computer Lab

Picture 7: Julia Rogers G48