Exploring Gender-Specific Spatial Dynamics in Philippine Higher-Education Classrooms

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Abstract: Over the past 50 years, higher education in the Philippines has seen many changes, from gender mainstreaming in policymaking to improving room setups and teaching methods. While governing bodies establish standards on school design, it mostly satisfies the physiological and safety needs of the student. Hence, despite the advancements from the changes, issues like the reversal of the gender gap and rising costs in higher education have emerged. These issues are mostly addressed separately due to the limited research intersecting gender, and architecture, specifically the basic spaces in higher education-built environment. The main objective of this exploratory study is to research the gender and space dynamics in higher education-built environments in the Philippines. Data were collected through an exploratory approach, beginning with semi-structured interviews and generalized using ANOVA and frequency on the survey result. The analysis revealed that males are much more comfortable than females in occupying space and that they have preconceived notions on how to situate themselves in a room, whereas females situate themselves based on the information they have gathered in the room. Furthermore, the study revealed that a more apparent spatial placement develops when the category expands from sex to gender-specific which affects design consideration factors such as sightlines and proxemics. For instance, males tend to sit on the edge and towards the back of the room, females tend to sit in the middle and towards the front, and gay tends to occupy the centre of the room. The findings suggest that sex, as a categorical variable, highlights biological differences in design requirements. However, gender, in the social context, disrupts stereotypes, as expressions and preferences may not align with norms. Therefore, design should consider these dimensional differences and varying expectations to develop a learning environment that supports users' psychological safety and enhances learning capacity.

Keywords: Architecture, Gender, Higher Education

1. Introduction

Gender mainstreaming, the principal approach to achieving gender equality, has been applied to different institutions of society through, but not limited to, building and upgrading educational facilities that are child, disability, and gender-sensitive, via the provision of safe, non-violent, and inclusive learning environment, is seen as a target of progress, most especially to females (Issues and Women, 2002; 'Reference Material for Gender Mainstreaming in Education Sector', 2023; *UNSDG | Gender Mainstreaming*, no date). Historically, gendered segregated education and curriculum were part of Philippine education ('Industrial Education in the Philippines', 1912). This changed when gender mainstreaming was introduced resulted in the defuncting of single-sex education in state-run institutions, and most private, combining all genders in one generic classroom with the same curriculum and minimal directives or standards on how the rooms are designed. Regulations on Philippine classroom design for higher education are mandated by the Commission on Higher Education (CHED), to which minimum standards are based on the program's memorandums. However, closer inspection of the mandates, from different programs, shows a typical minimum classroom design standard, a 9 by 7 m room, which frequently mostly satisfies the physiological and safety needs of users. Thus, foregoing the next tier of needs from Maslow's Hierarchy of Needs.

The current landscape of the Philippines' higher education shows that the gender mainstreaming approach resulted in a reversal of roles where males are now facing the gender gaps as they lag behind females (Paqueo and Orbeta, 2019). It is noted that the contrast in gender performance can be attributed to the differences in male and female cognitive and motivational functions. This has been academically observed on many occasions, as seen from the studies of different learning style theories and pedagogy, and classroom psychosocial environments that are then applied as researchers aim to improve the quality of education (Coffield *et al.*, 2004). However, gender in architecture is frequently associated with a dichotomy of characteristics. From the metaphorical association of design elements (Bondi, 1992; Lico, 2001) to Hannah Rozenberg's work building without bias, a quantification of linguistic association by gender units (GU) where gender neutrality of space can be achieved by achieving 0 net of GU based on the spatial elements and its descriptive qualities. Gender in architecture is not only in the form of gender-segregated spaces but rather it is transcendental.

The rapid changes from the 4th Industrial Revolution-Society 4.0 brought insight into the widening inequality as we live in a state of volatility, uncertainty complexity, and ambiguity, and still, there is the looming idea of Society

5.0 where technologies and developments are grounded in humanistic principles (Nakanishi, 2019; Yao, 2019). Academic institutions in the front of the VUCA World have been adapting to changes such as variations of learning modality, demands on gender equity, and increasing rapid technological advancement. In keeping abreast with the demands, CHED's additional approach to gender mainstreaming was made through the implementation of CHED Memorandum No. 01 Series of 2015 which establishes policies and guidelines on Gender and Development (GAD) in Higher Education, where colleges and universities have created their own GAD offices where changes are mainly made in social policies while physical alteration of spaces is seen in the conversion of gender-segregated toilet to gender neutral toilet.

Addressing gender gap issues in architecture has been through the introduction of inclusive spaces. Yet, the approach to gender inclusivity often resulted in gender neutral approach which has been debated as the exploitation of spaces, where the perpetrators are reportedly to be from the minority group, are recorded (Barnett, Nesbit and Sorrentino, 2018). Gender-neutral space often leads to gender blindness as it frequently focuses on providing the function without considering the specific needs or priorities of a gender. Hence, the departure from gender neutrality to gender-responsive spaces is now being promoted. The concept of gender-responsive space revolves around the ability to recognize gender issues and different perceptions arising from different social locations and provide solutions that will be equitable for everyone. Studies from van Hek et al. (2018) discussed gender differences in school climate with focus on social events or activities; Ferreira et al. (2011) and King (2016) discussed the gender differences in motivational factor with focus on social relationships; and Figueroa et al. (2016) discussed geographical spatial analysis on the relationship between academic achievements and school facilities, it is notable how the social science field and spatial structure are discussed separately (Gregory and Urry, 1985). The present challenges in designing gender-responsive spaces, most especially in higher education learning environments, are due to scarcity of the studies on the area of gendered socio-spatial relationships associated with higher education performance as studies are delineated either in the social context as seen from studies of (van Hek, Kraaykamp and Pelzer, 2018) or in spatial context as seen from studies of Marshalsey (2020) and Park & Choi (2014).

Grounding the concept of gender-responsive design means understanding the different levels of needs and desires of an individual so that collected data can inform and transform approaches to designing campus facilities. Moser (1993, as cited by Lång 2010; Odbert et al. 2020) established two approaches to introspecting gender audit and analysis of planning – the practical and strategic gender needs. This allows informed auditing and analysis of space that will support not only the norms of societal behaviour with spaces but also the desired assistance and feel of an environment, giving equity to everyone. Application of Moser's approaches requires understanding human needs. Zheng, Heath, and Guo (2022) transformed Maslow's five levels of the hierarchy of needs by conceptualizing it in the context of architecture. Their work established 3 dimensions of needs with 2 subcategories each – The basic need (physiological and safety), the advanced need (socializing and esteem), and the challenging need (Historical Culture and Hybrid culture). As academic institutions are adapting to continuous social changes and fast transition of digital and technological advancements, universities are spending more to upgrade facilities which has directly influenced the increasing cost of education (Stevenson, 2006; *The Rising Cost of Higher Education. APPA Thought Leaders 2013*, 2013). Hence, it is important to examine which features/marking/attributes in the learning environment have a significant impact on students that may be updated.

2. Methodology and Procedures

The research used a mixed-method approach through an exploratory-sequential method triangulated design to investigate the relationship of gender analysis to the learning environment. The initial step of the study will be conducted through qualitative analysis, focus group discussion and individual interviews, to establish the parameters and questionnaires to be used for quantitative analysis. The quantitative analysis will be done through surveying which will allow to contextualize the general responses/findings.

The respondent of this study involves students from a higher education institution in the Philippines. Purposive sampling is done for the respondents for qualitative methods wherein the respondents must be enrolled students in a higher education institution within Philippines, must disclose biological sex and gender identity and must be of legal age. At least 12 students and 9 faculty took part through focus group discussions and individual interviews. All of them signed declaration and data privacy consent form allowing the researcher the use of collected information. Participants for the quantitative survey are derived from a sampling size of university students. The survey collection will be stratified by biological sex and gender identity to ensure

representation for a nonprobability sample selection. Target accumulated valid survey is 381 participants for a confidence level of 95% and for a margin of error of 5%.

For the qualitative, the participants will be provided with a nameplate and a flip book which they will be using during the focus group discussion. Predetermined questions for the qualitative are designed to inquire student and faculty perception and preferences of their learning environment, and to understand the features that may affect their comfort, motivation, engagement, and productivity.

Instrument for quantitative analysis was crafted after the result of qualitative revealed common denominator for genders is that their behaviour is based on their level of comfortableness in a space. This section of qualitative analysis discusses the results and analysis of this research. The survey question uses a photo-elicitation method allowing the participants to gauge their level of comfortableness through images and closed questions to find preferences on seating location and common difficulties met. The survey form consists of 38 questions including the acceptance of usage of data and general information such as their age, biological gender, and gender identity. The survey itself is divided into 4 sections: General Information, The Classroom Environment, Computer Laboratory Environment, Hallway, Mini Library, and Canteen Set-up. 400 valid survey forms are accounted for from 420 answered forms. The questions were primarily distributed via scanning of QR code inside university premises, where 360 successfully answered the link, and via survey printed handouts, where only 40 out of 60 forms are valid due to errors in answering.

3. Result and Analysis

3.1 Qualitative Data Result

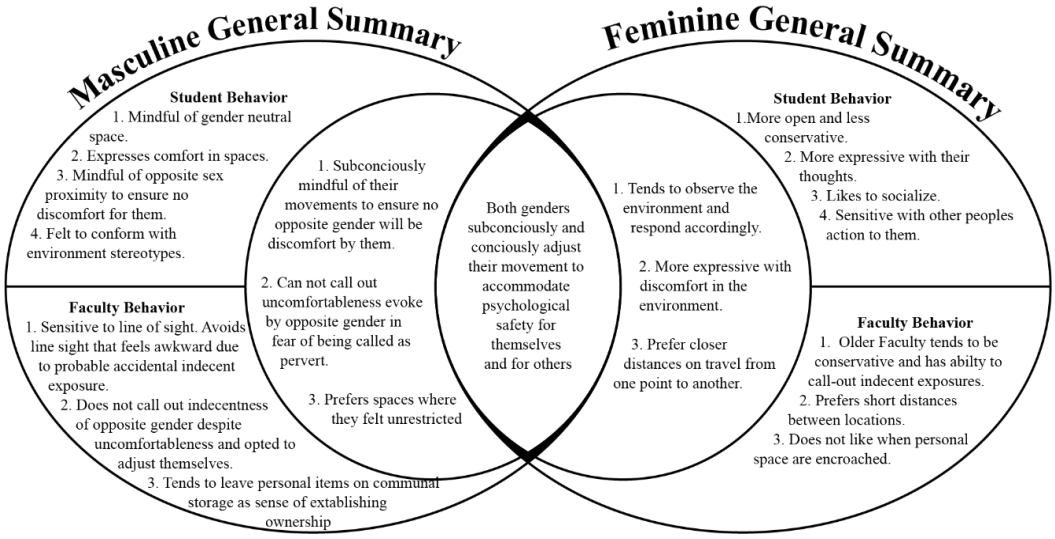


Figure 1: Masculine and Feminine General Summary

Coded, categorized and themed information shows that faculty and students ensure that their comfort is not compromised especially their personal space. The main difference between biological sex is that males have established expected behaviour over the space while female tends to observe and react to what they experience in the environment. In summary, as seen in, Figure-1, both student and faculty are attuned to their environments wherein they act accordingly. The main difference is that males have preconceived actions based on the stereotypes of the space. An example that can be highlighted is the manner they move in tight spaces as they avoid accidental contact/s or accidental view/s with the opposite sex that may lead to being accused. This action is similar to Pain's (2001) finding where men are mostly subjected to exclusion due to being perceived as a threat based on the stereotypical perception of gender.

3.2 Qualitative Data Result

Of 400 valid respondents, the sex distribution is 256 (64%) female and 144 (36%) males. On the other hand, when the basis is gender identity, the respondents are as follows: 201 (50.25%) female, 113 (28.25%) male, and 86 (21.50%) non-binaries. Among the non-binary, 52 (13%) are bisexual, 17 (4.25%) are gay, 4 (1%) are lesbian, 4 (1%) are pansexual, 7 (1.75%) are queer, and 2 (0.50%) are transgender. The unpredictability surrounding the

disclosure of gender identity led to a significant margin of error. As a result, comparative results between gender identity and biological sex are used in statistical information and frequency patterns.

The first section, general information, provides the categorical groupings and overall ambiance preference. In Figure-2, participants answered a 10-point scale determining the degree of professional (0-point) or casual (10-point) ambiance. The graph shows that male participants opt to have a casual ambiance as compared to females.

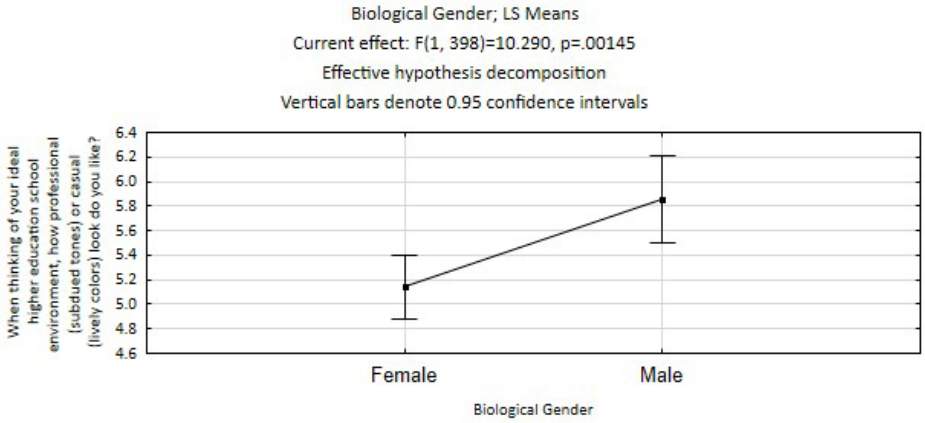


Figure 2: Degree of preference between professional to casual ambiance of school environment.

Further co-relating this finding with frequencies from gender identity as seen in Table-1, female respondents lean toward professional looking while male respondent leans toward casual looking. Non-binary genders tend to lie in the middle of the spectrum between professional looks and casual looks.

Table 1: Sex and gender identity frequency on ambiance preference of the school environment

Female	Male	← Sex - Gender →			Male	Female	Gay	Lesbian	Bisexual	Pansexual	Queer	Transgender
256	144	Rating	Remarks	No. of Respondents	113	201	17	4	52	4	7	2
1.56%	3.47%	0	Very Professional	9	4.42%	1.99%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
1.17%	0.69%	1		4	0.00%	1.00%	0.00%	0.00%	1.92%	25.00%	0.00%	0.00%
3.91%	2.78%	2	Professional	14	3.54%	3.98%	0.00%	0.00%	3.85%	0.00%	0.00%	0.00%
11.72%	7.64%	3		41	5.31%	10.95%	11.76%	25.00%	13.46%	0.00%	42.86%	0.00%
14.45%	7.64%	4	Balanced Blended	48	7.96%	17.41%	11.76%	0.00%	1.92%	25.00%	0.00%	0.00%
34.77%	28.47%	5		130	29.20%	33.83%	23.53%	50.00%	36.54%	50.00%	14.29%	50.00%
12.11%	9.03%	6		44	7.08%	10.45%	29.41%	0.00%	15.38%	0.00%	28.57%	0.00%
7.42%	16.67%	7	Casual	43	16.81%	6.97%	11.76%	0.00%	13.46%	0.00%	14.29%	0.00%
7.03%	9.72%	8		32	9.73%	8.46%	5.88%	0.00%	5.77%	0.00%	0.00%	0.00%
1.17%	4.17%	9	Very Casual	9	5.31%	1.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4.69%	9.72%	10		26	10.62%	3.48%	5.88%	25.00%	7.69%	0.00%	0.00%	50.00%

The second section of the survey focuses on the classroom environment. Based on the frequency, see Table-2, the top 2 challenges faced by students in traditional armchair setup rooms have been the sleepy ambiance and uncomfortable seat, while the next third difficulty differs for sex and genders. On sex, female difficulties stem from visual sight lines while male on audio resonance. Non-binary individuals often experience a range of challenges that, while distinct, share similarities with the issues faced by those categorized by sex.

Table 2: Frequency of Challenges in Traditional Classroom

Female	Male	← Sex - Gender →	Male	Female	Gay	Lesbian	Bisexual	Pansexual	Queer	Transgender
		Top 3 Difficulties in Traditional Classroom								
12.89%	13.61%	Arm chair is uncomfortable	13.58%	12.69%	15.56%	16.67%	16.26%	8.33%	14.29%	0.00%
11.78%	13.95%	I can't hear the speaker	15.23%	12.19%	15.56%	8.33%	11.38%	8.33%	9.52%	16.67%
13.11%	10.88%	I can't properly see the board/instructor/student	11.93%	12.44%	8.89%	8.33%	17.89%	16.67%	23.81%	16.67%
7.11%	3.40%	My personal space is being disturbed	3.70%	6.97%	2.22%	0.00%	4.07%	8.33%	4.76%	0.00%
11.11%	10.20%	Outside noise is transferred inside the	10.29%	11.69%	11.11%	16.67%	8.94%	16.67%	0.00%	16.67%
9.11%	11.56%	Poor lighting	9.88%	9.20%	6.67%	8.33%	7.32%	16.67%	4.76%	16.67%
7.56%	7.82%	Seats are always in disarray	7.00%	6.97%	8.89%	16.67%	6.50%	0.00%	9.52%	16.67%
16.67%	17.69%	Sleepy ambiance	17.28%	16.92%	17.78%	25.00%	18.70%	16.67%	23.81%	16.67%
10.67%	10.88%	Space is too tight	11.11%	10.95%	13.33%	0.00%	8.94%	8.33%	9.52%	0.00%

In Figure-3, male participants generally exhibit greater comfort in any classroom setup compared to female participants. Both sexes show a significant increase in comfort with flexible individual table setups. However,

male comfort decreases when armchair room setup is enlarged, resulting in nearly equal comfort levels for both sexes.

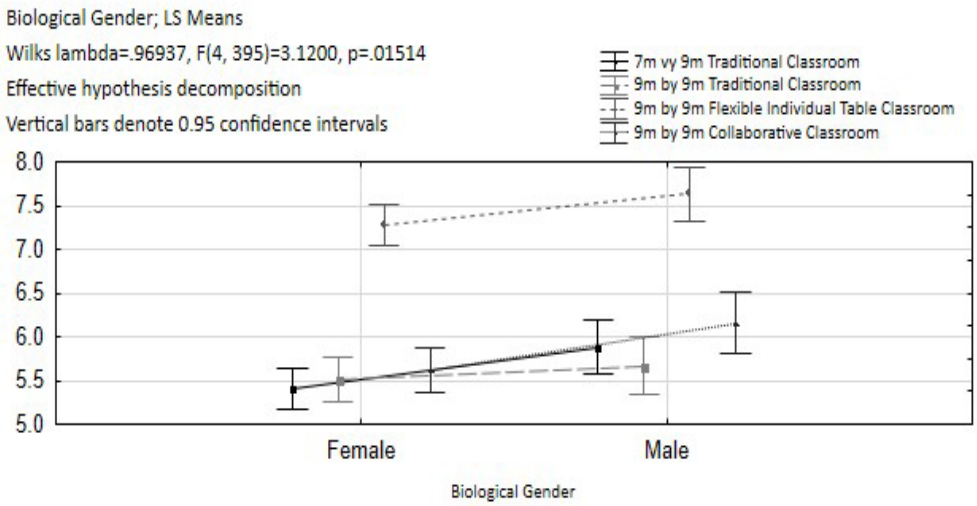


Figure 3: Comfortableness of Different Classroom Set-up

Regarding classroom wall color accents, both female and male participants, across categories of sex and gender, feel more focused and comfortable with single accent walls, as demonstrated in Tables-4 and 5. However, there is a notable decrease in comfort with single accent walls as the frequency of comfort levels evens out between double accent and monotone walls. Non-binary participants exhibit similar focus levels to binary genders but find double accent walls more comforting.

Table 3: Room Color frequency for they feel most comfortable.

Female	Male	← Sex - Gender → Classroom accent wall location they feel most comfortable	Male	Female	Gay	Lesbian	Bisexual	Pansexual	Queer	Transgender
25.39%	27.78%	Double Accent Wall Color	24.78%	22.89%	**29.41%**	**75.00%**	**34.62%**	0.00%	**57.14%**	**50.00%**
10.55%	13.89%	Half Wall Accent Color	12.39%	10.95%	23.53%	25.00%	7.69%	25.00%	0.00%	**50.00%**
21.88%	25.00%	Monotone Wall Color	24.78%	22.89%	23.53%	0.00%	23.08%	25.00%	14.29%	0.00%
42.19%	**33.33%**	Single Accent Wall Color	**38.05%**	**43.28%**	23.53%	0.00%	**34.62%**	**50.00%**	28.57%	0.00%

Table 4: Room Color frequency for they feel most focused.

Female	Male	← Sex - Gender → Classroom accent wall location they feel most focused	Male	Female	Gay	Lesbian	Bisexual	Pansexual	Queer	Transgender
16.41%	**19.44%**	Double Accent Wall Color	**15.04%**	**15.42%**	**35.29%**	50.00%	**23.08%**	**25.00%**	**14.29%**	**0.00%**
6.25%	8.33%	Half Wall Accent Color	6.19%	6.47%	17.65%	0.00%	5.77%	**50.00%**	0.00%	**0.00%**
8.98%	9.03%	Monotone Wall Color	9.73%	9.45%	5.88%	0.00%	9.62%	0.00%	0.00%	**0.00%**
68.36%	**63.19%**	Single Accent Wall Color	**69.03%**	**68.66%**	**41.18%**	50.00%	**61.54%**	**25.00%**	**85.71%**	**100.00%**

On room positioning, there is a noticeable discrepancy between sex and gender. Initially, as shown in Table-5, consideration based on sex indicates that both female and male participants prefer seats in zone 4. However, this preference changes when consideration shifts from sex to gender. Male and queer participants opt for zone 3 window-side seats, while female participants and bisexuals prefer the zone 4 middle seats at the window side. Although more participants are needed to justify an emerging seating pattern, it is observed that lesbians prefer zone 8 door-side seats, while gay-identified participants choose the opposite side cluster nearer to the door but in the centre in zone 7. Transgender-identified participants prefer seats nearer to exits, and pansexual-identified participants tend to avoid the line of sight from the instructor's table.

Table 5: Preferred Seat in standard classroom based on Biological Sex and Gender Identity

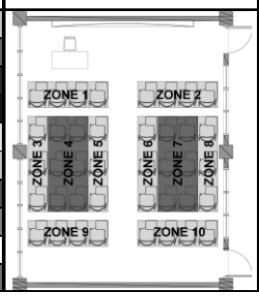
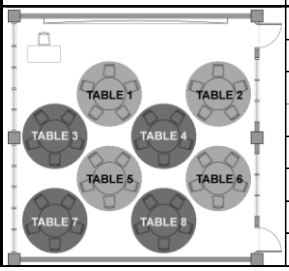
Female	Male	Room Layout	Gender	Male	Female	Gay	Lesbian	Bisexual	Pansexual	Queer	Transgender
256	144		Zone	113	201	17	4	52	4	7	2
7.42%	7.64%		Zone 1	7.96%	6.97%	5.88%	25.00%	9.62%	25.00%	0.00%	0.00%
15.23%	10.42%		Zone 2	11.50%	12.94%	5.88%	25.00%	19.23%	0.00%	14.29%	50.00%
16.02%	14.58%		Zone 3	15.04%	15.42%	23.53%	0.00%	11.54%	0.00%	57.14%	0.00%
19.53%	15.97%		Zone 4	13.27%	20.40%	17.65%	0.00%	21.15%	25.00%	28.57%	0.00%
5.08%	6.94%		Zone 5	7.08%	5.47%	5.88%	0.00%	5.77%	0.00%	0.00%	0.00%
4.69%	7.64%		Zone 6	7.96%	5.47%	5.88%	0.00%	3.85%	0.00%	0.00%	0.00%
12.89%	11.81%		Zone 7	8.85%	14.43%	29.41%	0.00%	9.62%	25.00%	0.00%	0.00%
11.33%	9.03%		Zone 8	11.50%	10.95%	0.00%	50.00%	9.62%	0.00%	0.00%	0.00%
3.13%	6.25%		Zone 9	6.19%	1.99%	5.88%	0.00%	7.69%	25.00%	0.00%	0.00%
4.69%	9.72%		Zone 10	10.62%	5.97%	0.00%	0.00%	1.92%	0.00%	0.00%	50.00%

Table 6: Preferred Seat on Collaborative Set-up based on Biological Sex and Gender Identity

Female	Male	Room Layout	Gender	Male	Female	Gay	Lesbian	Bisexual	Pansexual	Queer	Transgender
256	144		Zone	113	201	17	4	52	4	7	2
5.86%	6.94%		Table 1	5.31%	3.98%	5.88%	25.00%	15.38%	0.00%	0.00%	50.00%
14.84%	9.03%		Table 2	10.62%	14.93%	0.00%	0.00%	11.54%	50.00%	14.29%	0.00%
19.92%	16.67%		Table 3	17.70%	19.40%	5.88%	25.00%	23.08%	0.00%	28.57%	0.00%
21.88%	22.22%		Table 4	18.58%	24.88%	35.29%	0.00%	11.54%	25.00%	57.14%	0.00%
10.55%	13.89%		Table 5	13.27%	11.94%	23.53%	0.00%	7.69%	0.00%	0.00%	0.00%
19.14%	12.50%		Table 6	15.04%	18.91%	5.88%	50.00%	15.38%	25.00%	0.00%	0.00%
4.30%	6.25%		Table 7	7.08%	2.99%	5.88%	0.00%	9.62%	0.00%	0.00%	0.00%
3.52%	12.50%		Table 8	12.39%	2.99%	17.65%	0.00%	5.77%	0.00%	0.00%	50.00%

The third section of the survey form is about their preferences for a computer library. Frequently, students' set-up in the traditional computer library is facing each other where the table length is parallel to the long side of the room. Results for both sexes, see Table-7, show challenges with visual sights as top issue followed by sleepy ambiance in computer laboratories. The third challenge for male is that space is too tight while female have difficulty in audio resonance. These difficulties are also echoed when category is shifted to gender.

Table 7: Frequency of Challenges in Traditional Computer Laboratory

Female	Male	← Sex - Gender →	Male	Female	Gay	Lesbian	Bisexual	Pansexual	Queer	Transgender
		Top 3 Difficulties in Traditional Computer Laboratory								
17.71%	14.81%	I can't hear the speaker	15.63%	17.25%	9.80%	25.00%	19.23%	16.67%	9.52%	16.67%
23.18%	19.21%	I can't properly see the board/instructor/student	18.29%	23.05%	21.57%	25.00%	23.72%	16.67%	33.33%	0.00%
3.65%	5.79%	My personal space is being disturbed	5.90%	2.99%	5.88%	0.00%	7.05%	8.33%	0.00%	0.00%
4.04%	3.01%	Outside noise is transferred inside the classroom	2.95%	4.48%	1.96%	0.00%	3.21%	0.00%	0.00%	16.67%
5.99%	9.26%	Poor lighting	10.91%	6.63%	1.96%	16.67%	3.21%	8.33%	0.00%	0.00%
3.52%	4.40%	Seats are always in disarray	4.13%	3.65%	3.92%	0.00%	3.85%	0.00%	4.76%	16.67%
17.19%	16.90%	Sleepy ambiance	16.81%	17.25%	23.53%	16.67%	13.46%	16.67%	23.81%	33.33%
16.02%	16.90%	Space is too tight	16.81%	16.09%	17.65%	8.33%	17.31%	16.67%	14.29%	0.00%
8.72%	9.72%	Table height is uncomfortable especially in long hours	8.55%	8.62%	13.73%	8.33%	8.97%	16.67%	14.29%	16.67%

Similarly, with classroom set-ups, male participants tend to be more comfortable in the space than female participants. Figure-4 shows that front-facing computer laboratory set-up is preferred by both genders while collaborative set-up is least likely. Size adjustment has seen a small improvement in comfort levels for both genders.

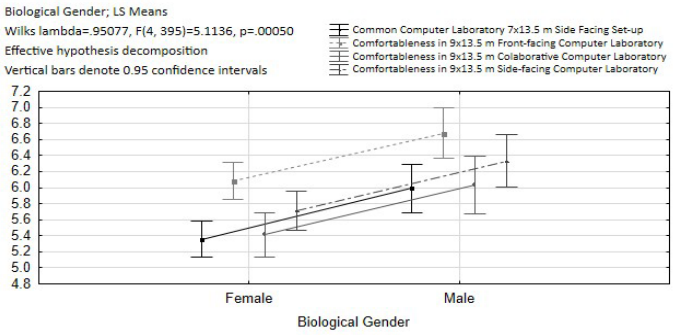


Figure 4: Comfortableness of Different Computer Laboratory Set-up

Likewise, with the classroom environment, participants were also asked to find their preferred seat inside facing computer laboratory and collaborative computer laboratory. Consideration based on sexes appears male prefers seating in zone 4 and table 03 as seen in Table-8 and 9 respectively which is also like male-identified individuals. Similarly female, both on gender and sex, appear to be dispersed in three different zones with highest preference on zone 2 and table 03. On non-binary gender, emerging pattern exist for gays as they tend to sit at the center similarly with other room set-up.

Table 8: Standard Computer Laboratory Set-up preferred seat based on Sex and Gender Identity

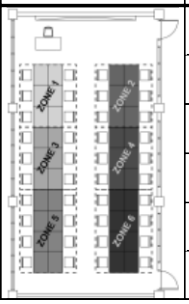
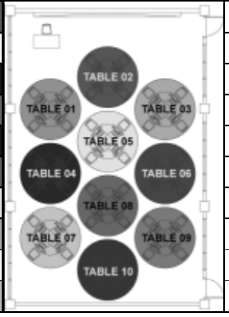
Female	Male	← Sex - Gender →		Male	Female	Lesbian	Gay	Bisexual	Pansexual	Queer	Transgender
		Plan	Seating Zone								
15.23%	13.89%		Zone 1	12.39%	13.93%	**50.00%**	23.53%	13.46%	**25.00%**	**28.57%**	**50.00%**
25.00%	**20.14%**		Zone 2	**22.12%**	**25.87%**	0.00%	5.88%	**25.00%**	**25.00%**	14.29%	0.00%
23.44%	19.44%		Zone 3	15.93%	**24.38%**	0.00%	**35.29%**	**25.00%**	0.00%	**28.57%**	0.00%
21.09%	**27.08%**		Zone 4	**27.43%**	21.89%	**50.00%**	**35.29%**	17.31%	0.00%	14.29%	0.00%
8.20%	7.64%		Zone 5	8.85%	6.97%	0.00%	0.00%	11.54%	0.00%	14.29%	**50.00%**
7.03%	11.81%		Zone 6	13.27%	6.97%	0.00%	0.00%	7.69%	**50.00%**	0.00%	0.00%

Table 9: Collaborative Computer Laboratory Set-up preferred seat based on Sex and Gender Identity

Female	Male	← Sex - Gender →		Male	Female	Lesbian	Gay	Bisexual	Pansexual	Queer	Transgender
		Plan	Seating Zone								
12.50%	11.81%		Table 01	11.50%	11.94%	0.00%	11.76%	15.38%	**25.00%**	14.29%	0.00%
11.33%	4.17%		Table 02	5.31%	10.45%	25.00%	5.88%	7.69%	**25.00%**	14.29%	0.00%
28.52%	**20.14%**		Table 03	**19.47%**	**28.36%**	25.00%	11.76%	**28.85%**	**25.00%**	**42.86%**	**50.00%**
14.06%	10.42%		Table 04	9.73%	14.93%	**50.00%**	11.76%	11.54%	0.00%	0.00%	0.00%
10.16%	**20.14%**		Table 05	15.93%	11.94%	0.00%	**41.18%**	9.62%	0.00%	0.00%	**50.00%**
6.25%	11.11%		Table 06	12.39%	6.47%	0.00%	11.76%	5.77%	0.00%	0.00%	0.00%
4.69%	4.86%		Table 07	6.19%	4.48%	0.00%	0.00%	3.85%	0.00%	14.29%	0.00%
5.86%	6.94%		Table 08	7.08%	4.98%	0.00%	5.88%	9.62%	0.00%	14.29%	0.00%
4.69%	4.17%		Table 09	4.42%	4.98%	0.00%	0.00%	3.85%	**25.00%**	0.00%	0.00%
1.95%	6.25%		Table 10	7.96%	1.49%	0.00%	0.00%	3.85%	0.00%	0.00%	0.00%

The third section of the survey form deals with the mini-library, hallways, and canteen. When the space to be considered is a mini library, male respondents are also more comfortable than female respondents as seen on Figure-5. Their preference in seat choice shows the occupation of the larger table as compared to the female spatial choice of single seats along the window.

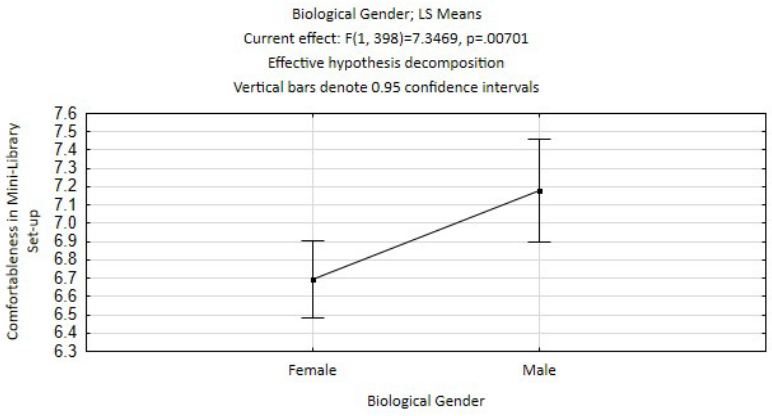


Figure 5: Comfortableness in mini library based on Biological Sex

When consideration for seating preference is based on gender identity, see Table-10, males still opt for the largest table near the window seat followed by a single seat farthest from entry. Female preferences are in 3 areas notably with varying numbers of seats such as from large group tables to window side seats to individual

chairs. For non-binary genders, all except pansexual has established likeness to group table near the window side while having alternative preference for single seats. Notably, none of the non-binary genders chose the seat where they were turned back from group seats.

Table 10: Seating Preferences in Mini Library based on Biological Sex and Gender Identity

Female	Male	← Sex - Gender →		Male	Female	Gay	Lesbian	Bisexual	Pansexual	Queer	Transgender
256	144	Room Layout	Table	113	201	17	4	52	4	7	2
3.52%	6.25%		S1A	6.19%	3.48%	11.76%	25.00%	1.92%	0.00%	0.00%	0.00%
5.08%	4.17%		S1B	3.54%	5.47%	5.88%	0.00%	5.77%	0.00%	0.00%	0.00%
2.73%	4.17%		S2A	4.42%	2.49%	5.88%	0.00%	1.92%	0.00%	0.00%	**50.00%**
17.97%	15.28%		S2B	17.70%	18.41%	5.88%	0.00%	15.38%	0.00%	28.57%	0.00%
5.86%	4.17%		S3A	4.42%	6.47%	0.00%	0.00%	3.85%	25.00%	0.00%	0.00%
4.30%	5.56%		S3B	7.08%	5.47%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
2.73%	3.47%		S4A	4.42%	2.49%	0.00%	0.00%	1.92%	25.00%	0.00%	0.00%
7.03%	6.94%		S4B	7.08%	6.97%	5.88%	0.00%	9.62%	0.00%	0.00%	0.00%
22.66%	13.19%		S5	13.27%	**21.39%**	5.88%	0.00%	**25.00%**	**50.00%**	**42.86%**	0.00%
8.20%	13.19%		S6A	9.73%	6.97%	23.53%	25.00%	19.23%	0.00%	0.00%	0.00%
19.92%	**23.61%**		S6B	**22.12%**	20.40%	**35.29%**	**50.00%**	15.38%	0.00%	28.57%	**50.00%**

On the result of survey for hallway, as seen on Figure-6, it shows that male participants are more comfortable than females in hallways. Furthermore, both sexes opted for bench seats with no partitions when asked to choose hallway set-ups.

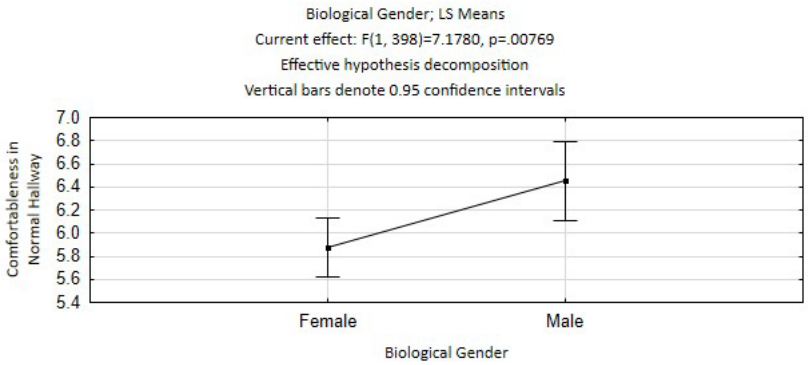


Figure 6: Comfortableness in Hallway based on Biological Sex

Finally, based on the result of the survey for the level of comfortableness in different canteen setups, the male still has a higher degree of comfortableness than females, but the margin is closer when the set-up is round tables. However, the result is insignificant due to its p-value of .126.

The qualitative survey result reveals that biological males in nature are more naturally comfortable than females with mean margins ranging from .1 (non-preferred set-up) to .7 (preferred set-up. Furthermore, despite the need to increase the survey count if the parameter will be on gender identity, there is a developing pattern associated with preference of seating location from response frequency.

3.3 Integration of Qualitative and Quantitative Data

Given the collected results from the qualitative data and quantitative data gathering, the following are key findings of the research.

- *Male comfortableness in spaces:* During the qualitative inquiry, all biological male participants described their environment as comfortable. This aligns with the statistical survey results, where males felt more comfortable than females, with mean comfort levels above 6.0 on a 0 to 10 scale. Male seating preferences were more dispersed compared to gay participants, who preferred center seats. Notably, there was a dip in comfort when bench seats in the canteen were replaced with round tables. These findings align with Rozenberg's Gender Units, as benches have higher masculinity GU compared to round tables.
- *Preference for flexibility in movements:* Survey data shows that both biological genders prefer classroom setups with flexible furniture. This aligns with recorded responses highlighting the inconvenience of armchairs, which limit movement and are non-inclusive for left-handed individuals.

While students favor collaborative setups qualitatively, they show a stronger preference for flexible furnishings and improved orientation.

- *Room Positioning:* While qualitative data highlights the importance of comfort, quantitative survey results reveal differences in spatial positioning preferences. Biological sex shows slight preference characteristics, but gender identity offers clearer behavioral contrasts. For example, female participants tend to position themselves from the middle to the front of the room, male-identified participants have a well-distributed seating preference with some partiality towards the window side and back, and gay participants prefer the center of the room. Notably, in the mini library, non-binary individuals avoid seats where they must turn their back on large group seating.
- *Difficulty in sight lines and auditory resonance:* Both qualitative and quantitative data show visual sight line difficulties for students and faculty. This may be due to body build differences, with males generally being larger than females. Most students prefer seats beyond the first row, likely because the front row is too close to the board, making it difficult to view, and later rows offer a more comfortable view despite possible obstruction. Additionally, cramped room sizes hinder personal adjustments.
- *Ambiance of professionalism vs casualism:* In qualitative inquiry, respondents described their university as unrestrictive and open, indicating a sense of "freedom." This supports male respondents' preference for a more casual school environment. Conversely, female respondents preferred a professional ambiance. This difference in perception may explain why males generally feel more comfortable than females, as they perceive the space as less restrictive.

4. Conclusion

The current design and standards of higher education in classrooms, computer laboratories, hallways, cafeterias, and libraries are deemed more comfortable by males while tolerable by females creating a sense of inequality or insensitiveness to some classroom design. Spatial standards are seen as too tight by both genders limiting their movements and creating difficulty in having an interactive approach to pedagogy. This limitation in movements tends to make students passive in their seats despite preferring socialization as a means of learning through a collaborative approach to maintain their and other's spatial comfort. Furthermore, a developing behavioural spatial positioning difference between biological sex and gender identity can be observed which is a significant consideration for users' proxemics and sightlines as the distance between information sources affects learning efficiency. The conscious decision of male students to sit farther away may contribute to the reversal in the gender gap in education as cognitive load theory suggests that increased physical or psychological distance from the information requires more mental effort limiting learning capacity.

Thus, gender as the categorical variable reminds us that, gender in a biological sense has established differences in dimensional requirements in design but gender differences in social context disrupt the stereotypical presumption as expression and preference may not be aligned with the norms. Hence, it is important to design addressing the difference in dimensional scope with expectations that vary based on social anomaly to support the psychological safety of the user.

5. Recommendation

Aligned with the study's conclusion, future research can be replicated and further explored in experimental and exploratory contexts. For replication studies, focus on the robustness of the instrument to enhance validity, particularly in sample size selection and generalizability. Targeted selection of students' gender identity, especially non-binary genders, is recommended to strengthen and generalize the developing pattern of gendered positioning in learning spaces. Experimental research could simulate adjusted room designs to assess their impact on physiological, safety, social, and self-esteem needs, potentially improving design standards for higher education. Exploratory research should intersect gender responsiveness to spatial positioning with student performance and learning styles to validate the impact of built environment design interventions.

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