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Gender differences in perceptions of workplace interactions among University students' in male-dominated work

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Purpose of this paper
This study explores university students' perceptions of gendered interactions in male-dominated environments. The paper assess whether gender differences affects the perceptions of students regarding gendered workplace cultures.

Design/methodology/approach
Using a quantitative descriptive survey design, 76 university students conveniently sampled across different levels of study were required to complete a questionnaire with closed-ended questions. The samples were drawn from student cohorts enrolled in the construction studies; civil engineering, property development, land surveying and civil engineering program. The independent *t*-test was performed to determine if significant differences in responses exist by gender.

Findings
Majority of the students experienced consistent gendered interactions or practices at their workplaces. These practices included marginalising stereotypical feminine interests, belittling women and making requests based on gender. Students indicated that they responded to these experiences by tolerating and adapting to the situation and sometimes by justifying the interactions they experienced.

Research limitations/implications
The sample is drawn from only one university in South Africa and findings cannot be confirmed as indicative of all students in male-dominated professions in South Africa as they represent only perceptions of a small group.

Practical implications
The study reveals the need for educators to review existing curricula in relevant courses. This would ensure that university students are well informed and prepared for workplace realities. Employers need to re-examine their workplace policies and make conscious effort to provide strategies that address gendered workplace cultures through training, mentorship and enforcement.

Keywords: **Education**, **Gender, Male-dominated work, Women, Workplace cultures.**

1. INTRODUCTION

Numerous studies have reported that despite an extensive range of transformational legislations such as the Employment Equity Act developed to promote women's growth in the economy, women continue to be under-represented in the construction industry and more so among construction students (Gurjao, 2006; Madikizela and Haupt, 2010; English and Hay, 2015; Male, Gardner, Figueroa and Bennett, 2018). Factors ranging from differential socialization and aspirations along gender lines to the culture of the industry have been identified as principal reasons for the under-representation (Hartman and Hartman, 2009; Haupt, 2010).

Of the total employed South African population in 2017, 44% were women, and only 13% of these women were employed in the construction industry (Statistics South Africa, 2017). No changes have occurred over the years, as it has been 44% since September 2002. Furthermore, sectors of the economy such as mining and transportation had low concentrations of female employees (Ibid). Out of the total female workforce which is estimated at 10,250,000, the construction industry only contributes 174,000 (Ibid).

Although women are more successful than their male counterparts as students (English, 2007; Lourens, 2014), women leave the construction profession at higher rates than men (Kaspura, 2014). The masculine culture of the workplace, where interactions marginalize the identities of female engineers has been identified as a prevalent contributor towards women's refusal to take up careers in the construction industry (Hatmaker, 2013). Women experience challenges resulting from the deep-rooted masculinity of the industry which forces them to choose between undoing their gender

or acting like the men (Hartman and Hartman, 2009; Franzway, Rhonda, Mills and Gill, 2009).

Numerous initiatives targeted to increase the representation of women within the construction industry have been established (Worral, Harris, Stewart, Thomas and Mcdermott, 2010; Fox, Sonnert and Nikiforova, 2011). Initially, these programmes were designed to create awareness and familiarise female engineering students with engineering courses, and eventually incorporated initiatives focused on improving curriculum, in light of recommendation from studies that concentrate on gender inclusivity in engineering curricula (Godfrey 2003; Godfrey and King 2011; Alves and English, 2018).

Emphasis has been placed on the applications of engineering science and project-based learning (Louw-Harmse, 2015). According to Alves and English (2018), the role of the curriculum is to educate engineering students on how to manage and respond to social challenges at the workplace and should be part of the engineering curriculum. Gill, Julie, Mills and Rhonda (2008) recommended that comprehensive and inclusive curricula should prepare students for the engineering workplace culture. However, suitability of the curriculum as an instrument to engage students on social issues in the industry has not received much attention, which is disturbing, as engineering students experience workplace cultures even before they are out of school (Male *et al*., 2018). At most universities and higher learning institutions offering engineering degree programmes in South Africa, students are required to undergo at least 12 months of relevant work experience.

Numerous studies have investigated the experience of gendered cultures, and gender inclusivity of students in male-dominated workplaces (Schmitt, Branscombe, Kobrynowicz and Owen, 2002; Male *et al.*, 2017; Male and MacNish, 2015; Alves and English, 2018; Madikizela and Haupt, 2010; Powell, Bagilhole, and Dainty 2009). Studies in Europe, America, Australia and Africa have revealed attitudes and experiences consistent with gendered cultures in male-dominated workspaces.

In Australia, Male *et al.* (2017) interviewed nine female and four male students from three universities about their experiences and responses to gendered cultures during their workplace learning placements. All students reported experiences consistent with gendered cultures. The study identified marginalization of women or stereotypically feminine practices or privilege of stereotypically masculine practices or traits.

In the United Kingdom, Powell *et al.* (2009) investigated the perception and responses of female students to the construction industry's masculine culture during their industry placements through interview sessions for 26 female engineering students. The study highlighted the experiences of female students as being assigned to fill in co-worker position and execute supporting activities. The students further reported that women regularly had to work twice as hard as their male colleagues to prove themselves.

In South Africa, Alves and English (2018) interviewed 17 female students about their perceptions and preparedness for male-dominated workplaces, such as the construction industry. Findings showed that the

students perceived that they need to act like their male counterparts to be able to prove their worth and continually accept discrimination from male colleagues. Responses from the study are similar to findings from Hatmaker's (2013) study investigating how women in engineering professions in the United States of America created their professional identities and how their interpersonal interactions at the workplace influenced their sense of belonging at the workplace. Using data from interviews with 52 female engineers, the study identified women proving themselves and continuously striving to achieve a reputation. Also, the study found that women responded to these masculine cultures by rejecting gendered expectations.

Madikizela and Haupt's (2010) study surveyed 1435 industry practitioners, 141 first and final year construction students and 17 professional women. The study revealed experiences of gender-based discrimination and sexual harassment.

According to Sipe, Johnson and Fisher (2009) university student's ignore the likelihood of the existence of gendered cultures and interactions in the workplace. Ngo, Foley, Wong and Loi (2003) found that gender differences existed in the perception of gendered interactions in the workplace. Therefore, we hypothesize that the perceptions and experiences of gendered workplace interactions differ between male and female students in male-dominated environments. The aim of the study was to evaluate the perceptions, experiences and coping mechanisms of university students in male-dominated fields in relation to their workplace interactions. The objectives were to present strategies for the elimination of stereotypes, promotion of inclusivity in the workplace interactions of students and recommendation of response mechanisms to better equip students to be able to handle the realities of gendered cultures in the work place. Some limitations noted by previous studies were addressed in this study.

2. THEORETICAL FRAMEWORK

In the feminist theory, the issue of gender is emphasised, and the differences in the experiences of men and women are acknowledged (Schmitt et al, 2002; Steele, James and Barnett, 2002; Ropers-Huilman and Winters, 2011). Feminism recognises that the oppressions and injustices women encounter have developed over time and has emanated from structural problems embedded in the society (Smith and Gayles, 2018). The study is conceptualised from an understanding of masculine cultures in male-dominated workplaces that relegate women and stereotypical feminine traits while promoting men and appreciating stereotypical masculine traits.

Specifically, the study relies on the feminist theory for an in-depth understanding of the influence of social and structural issues on gender and how it relates to the academic and workplace experiences of female students in construction. Intemann (2010) argued that feminist theory creates knowledge by reflecting critically on the experiences and perceptions of women.

Studies have shown that women are more disadvantaged in almost all economic indicators compared to men (Schmitt *et al*, 2002; Madikezela and Haupt, 2010). Most times women find themselves in situations where they are the only female engineers in a workplace, and their needs are often neglected. Physical strength, technical skills and knowledge of construction support stereotypically masculine practices, which are considered as significant in the industry. Unlike professions like medicine, dentistry and law, in the construction industry, the majority of the engineers engage with people in stereotypically masculine domains such as technicians and tradespeople rather than those occupying administrative positions (Faulkner 2007, 2009). A study by Hatmaker (2013) identified imposed gendered expectations, demeaning women and making requests based on gender as types of personal interactions reported by female students that diminish the professional identity of women in male-dominated workspaces.

Bible and Hill (2007); Boselovich (2006) found that persistent gender stereotypes are often reproduced in traditional workplace cultures. Schmit et al (2002) revealed that female students were found to experience more gendered interactions than male students, consequently resulting in negative psychological effects. Female students reported greater experiences of gendered cultures and discrimination than their male counterparts. Although, it has been observed that women tend to experience prejudices, they are often reluctant to confirm the discriminations they are confronted with (Faulkner, 2009; Hartman and Hartman, 2009; Seron, Silbey, Cech and Bubineau, 2016).

Hartman and Hartman (2009) revealed that although only minor differences exist in academic qualifications and performance of male and female and university students, significant gender differences exist in terms of self-confidence, satisfaction and commitment to a future in male-dominated work. To understand the workplace perceptions of students in male-dominated spaces and prepare them for the realities of gendered cultures, the study sought to identify exhibitions of gendered cultures as experienced by students and the coping mechanisms adopted by the students. Furthermore, the study sought to investigate whether gender affected student's perceptions gendered interactions in the workplace.

3. METHODOLOGY

The study implemented a descriptive survey design adopting a quantitative research approach (means, percentage and the standard deviation). Data was obtained through self - administration of a questionnaire with close-ended questions. SPSS version 25.0 was used to capture and compute the data. The independent *t* -test was performed to assess whether gender had influenced the experiences and perceptions of gendered workplace interactions and their responses to these interactions.

As illustrated in Table 3.2, the nine items consisting of interactions consistent with gendered workplace cultures scale had a Cronbach's coefficient alpha of 0.78.

For the five items comprising of students' responses to gendered cultures dichotomous scale, the Krippendorff's alpha test was used to estimate the inter-coder reliability (Hayes and Krippendorff, 2007). Alpha scale points of 1.000 are defined as perfectly reliable and 0.000 as totally unreliable.

Table 3.2 presents results from the Krippendorff's test. A modest degree of inter-coder reliability was found with a nominal α of 0.82.

Table 3.1 Cronbach's Alpha reliability statistics for interactions consistent with gendered workplace cultures scale

Cronbach's Alpha	Cronbach's Alpha based on Standardized Items	N of items
0.78	0.79	9

Table 3.2 Krippendorff's reliability statistics for students' responses to gendered cultures scale

	Alpha	LL95%CI	UL95%CI	Units	Observrs
Nominal	0.82	0.76	0.80	40.000	5.0000

3.1 Participants

Participants in the study were 76 undergraduate students (men=52.6%, women = 47.4%) at a University in the KwaZulu-Natal province of South Africa. The study conveniently sampled a cross section of students across different levels of study enrolled in various courses in the School of Engineering. (e.g. construction studies; civil engineering, property development, land surveying and civil engineering program). The sample was selected from classes that comprise of full time students. These classes were selected based on the researcher's availability to administer the questionnaires in person and the faculty member's flexibility in the classroom. Because the questionnaires were self-administered during class periods, response rate was nearly 100%.

4. DATA ANALYSIS

4.1 Participants Demographics

Participants in the study were confirmed to represent students in male-dominated disciplines. 76 undergraduate students at a University in the

KwaZulu-Natal province of South Africa were the participants in this study. Table 4.1 presents the demographic information of students who participated in the study. 48.7% (37) were enrolled in property development, 32.9% (25) were enrolled in land surveying, and 10.5% (4) were studying construction studies and 7.9% (6) were in the civil engineering discipline.

Primarily, participants were 1st year students (2.6%), 2nd year (36.8%) and 3rd year (60.5%). The majority of the respondents had completed their 2nd year of study (55.3%) while the rest had completed 1st year (27.6%) and 3rd year (17.1%).

Table 4.1 Participant Demographics

Characteristics	Description	No of Participants	%
Discipline	Property Development	37	48.7
	Construction Studies	8	10.5
	Land Surveying	25	32.9
	Civil Engineering	6	7.9
Level of Study	1st year	2	2.6
	2nd year	28	36.8
	3rd year	46	60.5
Degree completed at time placement	1st year	21	27.6
	2nd year	42	55.3
	3rd year	13	17.1

Table 4.2 Details about participant's most influential placement

Characteristics	Description	No of Participants	%
Significant work placement	Part-time work	19	25.0
	Vacation employment	33	43.4
	Internship	24	31.6
Number of Professional female engineers at the workplace	1	5	6.6
	2	17	22.4
	3	24	31.6
	4	16	21.1
	5	12	15.8
	6	1	1.3
	9	1	1.3

Details on respondents nominated most prominent placements are represented in Table 4.2. The table shows that 25% (19) respondents

indicated that undertaken part-time work was their most influential work placement. 43.4 % (33) indicated vacation employment and 31.6% (24) confirmed internship as their most significant work placement.

Respondents were required to specify the number of professional female engineers employed at their workplace. It is evident from Table 4.2 that the maximum number of female engineers was 9 and was indicated by 1 student (1.3%).

4.2 Frequency of interactions with professional engineers

Relative to being asked about how often the respondents interacted with professional engineers at their workplace; almost all respondents reported that they had frequent interactions with the engineers at their place of work. In Table 4.3, 32.9% (25) indicated that they had “sometimes” interacted while 36.8 %(28) students reported that they “often” had interactions with professional engineers at their workplaces.

Table 4.3 Frequency of interaction with professional engineers

Response	**N**	**%**
Never	8	10.5
Rarely	8	10.5
Sometimes	25	32.9
Often	28	36.8
Always	7	9.2
Total	76	100

4.3 Perceptions of gendered interactions

This section sought to investigate the experience and perceptions of respondents on the occurrence of gendered interactions at their work placements. Students were required to rate the level to which they experienced and observed a set of gendered cultures using a Five-point Likert scale, where 1 = Never, 2 = Rarely, 3 = Sometimes, four = Often, and 5 = Always. Table 4.4 shows that marginalizing stereotypically feminine interests (mean score= 3.32), making requests based on gender (mean score = 3.32) and belittling women or drawing attention to their gender (mean score= 3.10) were ranked as the most frequently experienced gendered interactions by the respondents. With a mean score of (1.98), students indicated that they least experienced negative attitudes from their superiors.

Table 4.4 Perceptions of gendered interactions

Experiences	1	2	3	4	5	T	M	SD	R
Marginalizing stereotypically feminine interests	15.8	7.9	31.6	17.1	27.6	76	3.32	1.37	**1**
Making requests based on gender	13.2	14.5	19.7	31.6	21.1	76	3.32	1.32	**2**
Belittling women or drawing attention to their gender	15.8	25.0	18.4	14.5	26.3	76	3.10	1.44	**3**
Lack of respect from tradespeople or technicians e.g. being ignored by male team members	13.2	23.7	34.2	22.4	6.6	76	2.85	1.11	**4**
Imposing gendered expectations e.g. keeping female engineers from going site	25.0	22.4	26.3	14.5	11.8	76	2.65	1.32	**5**
Difficulty asking for support e.g. difficulty seeking help due to macho expectations	26.3	25.0	38.2	3.9	6.6	76	2.39	1.12	**6**
Rough culture on site	34.2	25.0	18.4	15.8	6.6	76	2.35	1.28	**7**
Unfair judgement of women's work	28.9	31.6	21.1	14.5	3.9	76	2.32	1.15	**8**
Negative attitude from superiors	46.1	27.6	11.8	10.5	3.9	76	1.98	1.17	**9**

4.4 Responses to gendered workplace interactions

Table 4.5 Responses / coping mechanisms to gendered cultures

Responses	Yes		No	
	N	%	N	%
Leaving the workplace	11	14.5	65	85.5
Tolerating and adapting	62	81.6	14	18.4
Justifying interactions experiences	37	48.7	39	51.3
Denying the gendered culture	33	43.4	43	56.6
Reporting	31	40.8	45	59.2

Respondents were required to indicate how they responded or coped with the gendered interactions at their work placements. In Table 4.5, 14.5% (11) reported that they left the job to avoid the culture while 85.5% (65) indicated that they stayed in the workplace. 81.6 %(62) of the students reported that they tolerated and adapted to the gendered interactions. In terms of justifying the gendered interactions experienced, 48.7% (37) indicated that they made excuses for the culture while 51.3% (39) reported otherwise. Notably, more than half of the respondents indicated that they recognise the occurrence of gendered interactions but did not report the issues.

4.5 Independent *t* Test Results

Table 4.6 Group Statistics: Perception of gendered workplace interactions

	Gender	N	Mean	SD
Gendered interactions	Male	40	2.43	0.79
	Female	36	3.00	0.61

Table 4.7 Independent *t* Test Results or Gender differences in the Factor Analysis Groupings: Perception of gendered workplace interactions

Factor grouping	df	*t*	p
Perception of workplace gendered interactions			
Gender	74	-3.48	0.07

Table 4.8 Group Statistics: Responses to gendered workplace interactions

	Gender	N	Mean	SD
Responses to gendered interactions	Male	40	1.56	0.18
	Female	36	1.51	0.23

Table 4.9 Independent *t* Test Results or Gender differences in the Factor Analysis Groupings: Responses to gendered workplace interactions

Factor grouping	df	*t*	p
Responses to gendered interactions			
Gender	74	1.01	0.09

For questions on perceptions of gendered workplace interactions and responses to interactions, the mean response in each factor analysis

grouping for perception of gendered interactions and responses to gendered interactions was calculated.

These variables were then tested to determine the significance of gender on students' perceptions of gendered workplace interactions.

An independent sample *t* test was conducted to determine whether a significance difference exists in the responses of men and women in each factor grouping. In the factor grouping, equal variances were assumed because Levene's test of equality of variance was not significant.

Table 4.6 and 4.8 shows that no statistically significant difference in the meaning ratings among the gender groups.

From the independent *t* test results shown in Table 4.7 it was found that male students experienced gendered workplace interactions as much as the female students did t (74)= -3.48, $p < .07$. Table 4.9 presents the sample test results for gender differences in the responses to gendered workplace interactions. No statistically signiicant differences were found in the reponses of male and female students t (74)= 1.01, $p < .09$.

5. DISCUSSION

5.1 Interactions consistent with gendered cultures

Clearly students experienced interactions consistent with gendered cultures at their work placements. The study found that the most experienced gendered interactions were marginalising stereotypically feminine interests, making requests based on gender and belittling women or drawing attention to their gender.

Marginalising stereotypically feminine interests

It is apparent from the study that students experienced a gendered workplace culture where stereotypically masculine interest where prioritised over feminine activities. Connell (2013); Male et al. (2017) identified the presence of multiple masculine traits and practices in male-dominated workplaces which were mostly desired and given preference over stereotypically feminine traits. Martin and Barnard (2013) found that predominant gender stereotypes exist in the workplace and form the basis for discriminatory employment regulations and management strategies exist in the workplace and form the basis for discriminatory employment regulations and management strategies that hinder women from making progress in male-dominated professions.

Making requests based on gender

The survey showed that students confirmed that during their placements, tasks were assigned to them based on their gender. Male *et al*. (2017); English and Alves (2018) indicated that women were assigned to undertake supporting roles such as secretarial duties which limits their opportunities

and career progression. Although none of the women in the study intended to leave their male-dominated occupations, they demonstrated a reluctance to progress into the more intensely competitive male roles because of these negative self-perceptions. Rather, they opted for those 'softer' roles while remaining in male-dominated environments.

Belittling women or drawing attention to their gender

Respondents reported that they mostly experienced interactions that belittled women and drew attention to their gender. Hatmaker (2013) identified interactions that demeaned women as marginalising the interests and identities of professional women engineers. Similarly, Male et al. (2017); Male and McNish (2015) reported discomfort experienced by female students as a result of comments made about their gender. Examples were comments made by male contractors about prostitutes and comments on avoiding the use swear words because a woman was present.

5.2 Students coping strategies for gendered cultures

Findings from the study showed that students' response to the gendered interactions they experienced are as follows;

Leaving the workplace

Majority of students in this study reported that they did not resign from their jobs because of the gendered cultures they experienced at their work placements. Although Martin and Bardin's (2013) found that despite the negative work-identity interactions experienced, none of the women reported intentions to leave the workplace. However, the women displayed an attitude of low self-esteem and lack of confidence.

Reporting

In this study, respondents reported that they did not report the gendered interactions that they experienced. Male et al. (2017) argued that reporting discriminatory incidents and harassments to the appropriate authorities was one of the few responses that could initiate change and provide support.

Tolerating and adapting

Tolerating and adapting the interaction was one of the coping mechanisms reported by students as a response to gendered cultures. Franzway et al. (2009) indicated that many women choose to accept the masculine culture of the industry by trying to fit in because of the financial benefits they get

from their jobs. They are less concerned with the vulgar language and discrimination they experience.

Justifying the gendered culture

Findings from the study indicate that students were indifferent in their response to justifying the gendered interactions. Hatmaker (2013) found that students' justified and make excuses for the gendered interactions at their workplace which discriminated against stereotypically feminine practices and marginalised their professional identities. An example of excuses respondents made was making arguments that it was challenging for an employer to accommodate the needs of different genders.

Denying the gendered culture

The study findings suggest that majority of the students denied gendered interactions at their workplace. Seron et al. (2016); Powell et al. (2009) found that students did not recognise the interactions they experienced as gendered. The studies concluded that there was uncertainty about whether the students did not recognise these cultures or chose to deny it.

5.3 Gender Differences

Drawing from previous studies, the study expected to find that female students were more likely to perceive gendered work place interactions than would male students. In this study, students' responses rejected this hypothesis. Clearly, there are no differences in the perceptions of gendered workplace cultures among male and female students. The study found no relations between genders and perceived gendered interactions in the work environment.

6. CONCLUSION AND RECOMMENDATIONS

Findings from this study established that university students experienced gendered interactions at their work placement, especially against women. This is consistent with findings in Male et al (2017); Miller and Katz (2018); Alves and English (2018); Sipe et al. (2009) which reported that students are usually unprepared for the types of workplace interactions they experience in their professions. Consequences of this unpreparedness are noteworthy. The gendered workplace cultures and coping strategies reported shows that employers need to make efforts to recruit women by proactively providing support and opportunities to attract them into male-dominated professions.

Employers need to review their workplace policies and introduce solid initiatives geared towards creating a conducive environment which provides mentorship and accommodates the needs of women who are considering taking up careers in male-dominated fields. The realities of gender workplace cultures should be addressed in the development of curricula.

Students need to understand the layers of discrimination and the challenges in male- dominated industries from their first contact with the occupations.

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