Campus Adaptations of Engineering Undergraduates by Gender

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Abstract

The study aims to empirically test the relationship between types of campus adaptations across gender engineering undergraduate B.Tech students alone pursuing a four year study at Indian Institute of Technology (IIT’s) and National Institute of Technology (NIT’s) in India. The independent t – test was run with SPSS vs 21 to determine the nature of campus adaptations of IIT’s and NIT’s between undergraduate male students (n = 1268) and female students of (n = 152) with the multistage random sample of n = 1420. There is a significant relationship on campus adaptations among students by gender indicating that; campus adaptations did vary which could be attributed to the lower strength of the sample size. However, if a qualitative approach is adopted with interviews held to seek out information on nature of adaptability to campus environments, it could introspect more in-depth on the nature and levels of adaptability of female students witnessing challenges at campuses of higher learning.

Keywords: Campus, Adaptation, Academic, Social, Physical – Psychological, Institutional, engineering undergraduates

1. Introduction

Gender equality is a lame equality as knowledge continues to be male centric (Y. Liu & Wang, 2009). The gender gap in current school enrolment selection among “irregular” student impacts participation of students in higher education (L. Morley, Leach, & Lugg, 2009). Gender stereotypes surround girl and technology (Johnson, 2009) where gender stereotype theory focuses on low level of enrolment in science among women (Delisle, Guay, Senécal, & Larose, 2009). The gender differentials in education exploring the capabilities approach in India (Unni, 2009) views higher education equity as a say on income equity distribution (Gao, Zhao, & Xing, 2009) with perspective on board of how women engineers do and undo gender (A. Powell, Bagilhole, & Dainty, 2009) contributing to future mapping on international perspectives on gender in engineering education research (Beddoes, Borrego, & Jesiek, 2009). This discloses that perceptions and role of women in engineering is changing among women (Kongar, Kontogiorgis, Russo, & Sohb, 2009). The vicinity in time for this could be sharing personal stories as informal learning experience on women’s learning experience in science and engineering (Sahib & Vassileva, 2009b). To this however the ‘downside’ of women empowerment in India an experimental inquiry into the role of expectations (Kempen, 2009) is often felt to extend student pipeline in engineering towards women students (P. Doerschuk et al., 2009) as when a person thinks of engineer, it’s that “think engineer think male” reveres the gender image of engineer (Male, Bush, & Murray, 2009). Further the transformative possibilities of feminisms in engineering education (Riley, Pawley, Tucker, & Catalano, 2009) is finding more women and diversity in engineering fields (Hopewell, McNeely, Kuiler, & Hahm, 2009) that could transform women in non-traditional sectors of the economy with less gender segregation in workplace (Potter & Hill, 2009). It’s a teaser to worry about women in science (Rosser & Taylor, 2009) though the larger concern would be women stand out as a highly efficient way of shaping more gender-equitable situation in higher education (Tjomsland, 2009)

Understanding women’s underrepresentation in engineering (Morganson, Jones, & Major, 2010) states back to identifying low representation of women in engineering with fewer opportunities than male peers and acutely feel the lack of role models, in work domain and indirect roles (A. E. Smith & Dengiz, 2010). Education, hence by far is gender shaped (Apple, 2010) with feminism in engineering being just more than a girls talk (Larkin & Quinn, 2010). Feminism on campus today (Agness, 2010) with feminist stand point theory on experiences of women college students (Cox & Ebbers, 2010) vindictively pointing out that experience, motivation and gender difference in undergraduate studies persist (Mirjana, 2011). The “door theory” states that there are gender differences in attainment of engineering education (Ma, 2011)
believing that human capita in India with transition probabilities of moving from a number of different educational levels to higher educational levels is low and worse for women in India (Chakrabarty & Bhaumik, 2012) giving its confirmation that the legitimacy of female participation in engineering (Watermeyer, 2012) especially of women undergraduates in engineering education in India is growing (N. Gupta, 2012). Lastly the dilemmas of girls and women in engineering from masculine world versus feminine world (Saavedra, Araújo, Taveira, & Vieira, 2013) with true stance for value of the capability policy model of world bank approach (Manion & Menashy, 2013) need to look into student satisfaction that differs by gender (Strayhorn & Johnson, 2014).

The study seeks to analyse the relationship among gender on campus adaptations of students with the following research question and research objective:

1.1 Research Question

What makes campus adaptations of academic, social, physical - psychological and institutional environments be unique by gender?

1.2 Research Objectives

To examine by gender among campus adaptations of academic, social, physical psychological and institutional environments.

2. Campus Adaptation

2.1 Academic Adaptation

It is vital to debunk myths on gender and academic achievement (Kane & Mertz, 2012) as academic failure differs by gender where for male students teacher student interaction and socio demographic factors contribute towards it (Jeludar, Jeludar, Shayan, & AhmadiGatab, 2012). The need for horizontal analysis of gender equality in different academic areas (Silander, Haake, & Lindberg, 2013) stresses on academic experiences that differed among undergraduates on man hood and masculinity identities (Strayhorn & Tillman-Kelly, 2013). Gender bias in engineering admission persists in Karnataka state of India (Rajasenan, 2014) as fundamentally its gender difference in learning styles that impact academic performance of students (Rahimabadi, 2014). Teachers’ effect on students' creative self-beliefs is moderated by students’ gender (Kanowskii, Gralewski, & Szumski, 2015). So gender difference exist in attitude, knowledge and career choice among students (Mudavanhu, 2016) influencing academic success (Altermatt & Painter, 2016)

2.2 Social Adaptation

The transition of women students from higher education to industry is a poisoned chalice with short term benefits only (A. Powell, Dainty, & Bagilhole, 2011) as socialisation process of engineering students differ by gender (Riney & Froschle, 2012). Attachment styles scores too differ in terms of gender and presence or absence of a romantic relationship in the past and their settlement (Tagay & Karatas, 2012). In brief social experiences differed among undergraduates on man hood and masculinity identities (Strayhorn & Tillman-Kelly, 2013) revering benevolent sexism with men’s advantage on the prescription of warmth to women (Delacollette, Dumont, Sarlet, & Dardenne, 2013). In short females in science are affected by underlying gendered assumptions and structural power relationships (R. Watts, 2014).

2.3 Physical – Psychological Adaptation

2.3.1 Physical adaptation

Physical activity is found to be lower among female college students (Rajappan, Selvaganapathy, & Liew, 2015) influencing psycho social adjustment and weight status (Y. Chang & Halgunseth, 2015). The mindful eating among women college students can impact their physical health positively (Smart, Chisum, Robertson-pfeffer, & Tsong, 2015) with reproductive health education towards safe sexual health behaviours among female students (Akinsoji, Olufunmilola, Idowu, & Pius, 2015) could avoid the feeling of being unsafe on campus. Institutions safety provision should meet criteria’s especially for sexual minority students (Mooij, 2015). Further gender difference in sleep deprivation impacts
physical health (Ferrara et al., 2015) where cognitive performance of students is associated with sleep symptoms and sleep duration varying by gender (Sufrinko, Johnson, & Henry, 2016). Moreover personality and alcohol expectancies discriminate alcohol consumption patterns among female students (Pilatti, Cupani, & Pautassi, 2015). However motivation towards physical activity among women college students can positively impact health of college students (Al-Eisa et al., 2016).

2.3.2 Psychological Adaptation

Gender differences exist in applying social cognitive career theory in engineering students (Inda, Rodríguez, & Peña, 2013). Emotional intelligence is related to gender, academic performance and intellectual capacity of university students (Sierra, del Rosal, Romero, Villegas, & Lorenzo, 2013). Perception of masculinity persist among undergraduate male students (Fazli Khalaf, Low, Ghorbani, & Merghati Khoei, 2013) that gender roles on technology self-efficacy impacts use of technology in higher education (Huffman, Whetten, & Huffman, 2013). Self-efficacy the core construct in social cognitive career theory impacts persistence in engineering by gender (Saifuddin, Dyke, & Rasouli, 2013) where persistence of women in engineering careers is also due to self-efficacy on the challenges and novelty associated with the profession (Buse, Bilimoria, & Perelli, 2013). Gender and emotional intelligence impacts emotional self-efficacy among undergraduates (Tariq, Qualter, Roberts, Appleby, & Barnes, 2013) making demographic determinants of gender, age and life environment on academic adaptation towards stress among first year students (Clinciu, 2013). Lastly though stress and its coping strategies differ among college students by gender (D. S. Lee & Padilla, 2014); self-esteem and gender was negatively correlated with anxiety among college students (Mustafa, Melonashi, Shkembi, Besimi, & Fanaj, 2015).

2.4 Institutional Adaptation

Female graduates from elite institutions have lower labour market involvement(Hersch, 2013) as the discourse of academic major choice determines persistence of gender inequalities in higher education in engineering (Beddoes & Pawley, 2013). It is the supportive environment that persists women in non traditional fields like science and engineering (Galeshi, 2013) barging against the tide of stereotypes on undergraduate womens achievement and identification towards persistence(B. D. Jones, Ruff, & Paretti, 2013). Gender Role Attitudes of Female Students in Single-Sex institution is better off than in coeducational institution(Erarslan & Rankin, 2013). This is evident in the Gender Gaps in College Attendance and Completion(Flashman, 2013). Much more evidently, locality of the institute impacts academic achievement of students (Raju, Chittoor, & Prades, 2013). Off recent, academic website impression and its navigation by gender(Ramakrishnan, Prybutok, & Peak, 2014) has its aura on choice of institution by gender(Squire & Mobley, 2014) playing its major stroke of impact on college experiences and there on towards degree completion among four year institutions (Gayles & Ampaw, 2014). Lastly, Off-campus house too serve as signs of cultural texts on gender and sexuality(Weinzimmer & Twill, 2015) with gender, distance from home,and duration of stay at dormitory significantly impacting students attachment to place or institution(M. Xu, de Bakker, Strijker, & Wu, 2015).

The study proposes the following research hypothesis:

\[ H_0 \] - Campus adaptations of academic, social, physical – psychological and institutional adaptations did not differ by gender among undergraduate students.

\[ H_1 \] - Campus adaptation of academic, social, Physical – Psychological and institutional adaptations varied by gender among undergraduate students.

3. Methods

3.1 Participant

The reference population were undergraduate 4-year B. tech students enrolled on a regular study mode at IIT’s and NIT’s. A total of 1460 students participated with 1420 of valid responses for an overall 97.26 percent participation rate after deducting the questionnaire that contained empty answers. Data was collected for 20 weeks across institutions of IIT’s and NIT’s. Of the 1420 undergraduate respondents 89.29% were male students and 10.70% were female students.
3.2 Sampling

Probability sampling technique with multistage sampling followed by cluster sampling in identification of institutes of IIT’s and NIT’s was adopted. This is followed up with stratified sampling in sample choice of undergraduate students’ population and simple random in collecting data from the chosen student population stated above.

3.3 Instrument and Procedure

The survey was conducted using a structured online questionnaire with reference to student’s campus and non-campus email accounts. At all times, the students were informed of the anonymous, confidential, and voluntary nature of their participation and any doubts that arose were clarified.

3.4 Measures

All the 21 items in the questionnaire were measured with rating on a five point Likert scale ranging from “1 = strongly disagree” to “5 = strongly Agree”. Reliability and validity of the questionnaire was tested.

4. Data Analysis

4.1 Independent t – test

On an average, male students (n = 1268) had higher level of academic adaptation (M = 2.62, SE = 0.0199) than female students (n = 152) with (M = 2.40, SE = 0.049). This mean difference of 0.224, BCa95% CI [0.11945, 0.32938], was significant at t (203.584) = 4.215, p = 0.000 (p < 0.05).

On an average, female students (n =152) had higher level of social adaptation (M = 2.79, SE = 0.05) than male students (n = 1268) with (M = 2.71, SE = 0.021). The mean difference of -0.077, BCa 95% CI [-0.19675, 0.04114] was not significant at t (197.111) = -1.290, p = 0.199 (p > 0.05).

On average female students (n =152) had higher level of physical – psychological adaptation with (M = 2.30, SE =0.050) than of male students (M = 2.28, SE = 0.022). The mean difference of -0.0150, BCa 95%, CI [-0.12361, 0.09354] was not significant at t (213.782) = -0.273, p = 0.785 (p > 0.05).

On average male students (n = 1268) had higher level of institutional adaptation with (M =2.15, SE = 0.022) than of female students (n = 152) with (M = 2.09, SE = 0.05). This mean difference of (-0.059), BCa 95% CI [-0.07241, -0.19187] was not significant at t (1418) = 0.887, p = 0.375 (p > 0.05).

In short, we accept the alternate hypothesis (H1) that there is a substantial difference in campus adaptations of academic, social, physical – psychological, institutional adaptations among students by gender.

5. Conclusion

Undoing gender at campus though has remained a debated concept for long. The work towards equality in higher education is pacing up slowly much to the distraught of educationalists where tracking the gap leaves things questionable. The diligence of support to success is though on active pedagogy and pushing towards cutting edge of content, the nourishment stimulation and engagement of students is always transcending through their mind body and soul. The creative and compassionate education to know themselves inside out with power and potential; is the way to navigate the inner self of the girl which is filled with confidence and aspirations. So it’s time for every one of us to leave the concept of gender to be baked a little more always and chance upon not ‘equal opportunity’ but pounce of ‘every opportunity’ as for a girl to embrace on an educational path of fulfillment is not for one side of the coin in terms of gender alone but it’s more for a humane cause that could help glass ceiling come crashing down all way for future generations to come.

6. Implications

It is vital to prepare a class of women to the notion of reality i.e. efficiently transcend the path from mere participation to transformation so that a system of higher education is created helping out more and more students to trust their inner voices more to which they sincerely lean out. The spaces in those superficial statistics need to share bigger picture of
radical ideas with enhanced and pronounced voices of female students. This cross sectional study paves way for ample scope of future work on similar lines with longitudinal study that could significantly highlight the persistent need for introspection of adaptability of female students at multi institutional campuses

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