JFSR

Journal of Family & Society Research 4(1) June 2025, pp. 19 - 30

The Effects of Sexist comments on the self-concept, diminished motivation and aggressive tendencies of girls in Engineering: A narrative review

Ogbuanya, C. E[1]* & Ogbuefi, U.[2]

[1D]Electronic and Computer Engineering Department, University of Nigeria, Nsukka,
[2]Electrical Engineering Department, University of Nigeria, Nsukka, 410001, Nigeria.

*Corresponding Author's email: chisom.ogbuanya@unn.edu.ng, +2347078075739

Abstract

Engineering remains one of the fields with the lowest female-to-male ratio. Researchers have highlighted numerous factors contributing to the persistent underrepresentation of women in engineering, including the lengthy study period, the discipline's challenging nature, and bias. While some engineering schools and organizations have successfully addressed certain barriers, bias remains a significant issue over the past two decades. It manifests as gender inequity, discrimination, and sexist comments, negatively impacting the mental health of those affected. Several studies have consistently shown that bias hampers the progress of girls in engineering. Addressing these issues early is vital for improving female students' success rates. It is very important to know how sexist words affect the mental health of female engineering students. This study looked at how sexist comments affect the way female engineering students feel about themselves, their drive, and their tendency to be aggressive. A literature-search on Google Scholar and IEEE from 2005 to 2025 turned up 42 articles, but 7 had to be thrown out because they didn't meet certain standards. The results showed that sexist comments were a form of subordination and abuse that hurt the mental health of female engineering students by making them feel bad about themselves, less motivated, and more likely to act aggressively. The study stressed how important it was to reduce this bias and gave useful suggestions for fighting the bad effects of bias. The study also suggested areas for future research to learn more about how sexist comments affect the experiences and performance of female engineering students. Taking care of this problem is necessary to make engineering schools and the industry as a whole more welcoming and fairer for everyone.

Keywords: Sexist comments, girls in engineering, self-concept, narrative review.

Introduction

There are many reasons why there aren't enough women in engineering, one of which is bias against feminine women in the field (Callea et al., 2024; McCall, 2021; Stephens & Crandall, 2022). The phrase 'feminine women' specifies that gender bias in engineering disproportionately affects women who express themselves in traditionally

feminine ways, acknowledging that women exhibiting 'masculine' behaviors may be perceived differently. This highlights the impact of gender expression on bias. Bias refers to an unequal predisposition or prejudice towards or against an individual or group, frequently perceived as unjust (Alfrey & Twine, 2017; Kovaleva et al., 2023; Sultan, 2024). This bias encompasses gender inequity, prejudice, and sexism [7 - 8]. Among these, sexism—and the resulting sexist comments—has one of the most detrimental impacts on the mental health of girls pursuing engineering courses (Contreras-Ortiz et al., 2023; Zhang et al., 2024). Examples of such comments include the statements: "Girls should not be engineers; they should stick to science," "Girls are never good at math or calculations," and "Girls study engineering just to mingle with men." These comments could hurt female engineering students' confidence, sense of self-worth, and mental health. Many of them come into the field motivated and determined to achieve, only to be let down by such negative feedback. To learn how to fight this hurtful bias, it's important to understand how sexist comments hurt the mental health of hard-working female engineering students (Ghanbaripour et al., 2023; Hickey & Cui, 2024). Taking care of this problem can help make sure that girls who work in engineering get the same support, appreciation, respect, positive pep-talks, encouragement, and sense of job legitimacy as their male peers.

Over the past 20 years, many data-driven studies have looked at how racist comments hold girls back in engineering (Nocella, 2024; Zhang et al., 2021). These studies have given us important information about how these kinds of biases affect people's mental health. The goal of this review is to bring together different pieces of research and suggest ways to reduce the number of sexist comments in engineering, creating a healthier and more supportive workplace for female students in the long run. This review also points out gaps in our knowledge and research and suggests the most important areas for further study in order to get rid of racist comments in engineering education.

This narrative review aims to bring together recent research to give a clear picture of how sexist words affect the mental health of girls and women in engineering. The mental and emotional effects of events or actions on a person's health are called psychological results. They include things like problems with self-esteem, lack of drive, and a tendency to be aggressive. Emotional regulation, resilience, and coping techniques may be other parts. Self-concept problems, motivation, and aggressive traits are some of the things that this work looks at. This review specifically looks at the question: How do racist comments affect the mental health of girls and women in engineering in terms of their sense of self, their drive, and their tendency to be aggressive? This review tries to answer this question so that there is a strong foundation for future research and the creation of useful interventions.

Methods

We looked through Google Scholar and IEEE for peer-reviewed articles that

were written between 2005 and 2025 that talked about how bias affects the general health and happiness of girls in engineering. The search terms included the following keywords: ("bias" OR "gender gap" OR "discrimination") AND ("girls in engineering" OR "women in engineering" OR "women in tech" OR "women in STEM"). A member of the research team retrieved published works and meticulously read the abstracts, distilling each work into several important themes namely self-concept issues, motivation level, and aggressive tendencies. We sought to carry out a narrative review on the role of sexist comments on the mental health of girls in engineering and the impact of the biases on their mental well-being. We therefore excluded pre-prints, letters to the editor, and non-peer-reviewed articles. The inclusion criteria for this narrative review consisted of peer-reviewed journal articles published in English between 2005 and 2025 that explicitly examined the impact of bias, gender gaps, or discrimination on the well-being of girls and women in engineering or related STEM fields.

The shortlisted published works were classified into three categories, to provide a summary of the various roles sexist comments play on the negative psychological outcomes of girls in engineering: poor self-concept, reduced motivation, and aggressiveness. All published works that met the inclusion criteria were collated and reviewed by a member of the research team. In the event of uncertainty in interpretation of the works surveyed, the second member of the research team examined the published work and offered a decision on classification. A brief discussion of each impact or role of sexist comments on the psychological outcomes of girls in engineering is presented below. At the concluding part of the paper, the discussion gave an overview of the main roles of sexist comments for further actions with regards to measures to be put in place.

Results

Our review of the literature yielded articles that we classified into three groups. The groups exemplified significant impacts that sexist remarks have on the well-being of girls in engineering. The groups were: self-concept issues, diminished motivation, and aggression. Table 1 shows the literature surveyed and impacts evaluated.

Table 1: Impacts of Sexist Comments on the Well-being of Girls in Engineering

Author [Ref. No]	Impacts studied		
	Self-concept Issues	Reduced Motivation	Aggressiveness
Wright & Jago (2024)	/	/	/
MCcall (2021)	/	/	/
Evans et al. (2021)	/	/	/
Dabic et al. (2021)	/	/	/
Nocella (2024)	/	/	/
Zhifeng et al. (2024)	/	/	/
Camila Francisco de Castro et al. (2024)	/	/	
De Carvalho Fernanedes et al. (2019)	/	/	
Kiernan et al. (2023)	/		/
Sultan (2024)	/		
Contreras-Ortiz et al. (2023)	/		
Mansouri & Erfani (2024)	/		
Callea et al. (2024)	/		
Strachan et al. (2018)	/		
Hickey & Cui (2024)	/		
Ying et al. (2021)	/		
Gonzalel-Gonzalez et al. (2018)	/		
Ghanbaripour et al. (2023)	/		
Smith & Gayles (2018)	/		
Andrews (2012)	/		
Berge et al. (2019)		/	
Stephens & Crandall (2022)		/	
Sharma et al. (2021)		/	
Barnard et al. (2012)		/	
Bennette & Toffoletti (2024)		/	
Kantharajah (2022)		/	
Geneve et al. (2008)		/	
Haitan (2022)			/
Brereton & Young (2022)			/
Sultan & Gayles (2024)			/
Francis et al. (2017)			/
Zhang et al. (2024)			/
Peterson et al. (2009)			/
Kovaleva et al. (2024)			/
Broadley (2015)			/

3.1 Effects of sexist comments on the self-concept of girls and women in engineering

According to Wright & Jago, 2024, self-concept is an individual's perception of their own abilities, and it plays a crucial role in their academic and professional success. (McCall, 2021) opined that if an individual perceives proficiency in a particular area, they possess a positive

self-concept. A person's self-concept about a specific matter diminishes if they lack belief in their capability. Studies, including Camila Francisco de Castro et al., 2024; Dabic et al., 2021; Evans et al., 2021; Nocella, 2024; Zhifeng et al., 2024 demonstrate that sexist remarks induce feelings of inadequacy or unfitness for the engineering profession among female students. This indicates they might possess a diminished self-concept regarding their competencies in the engineering field.

de Carvalho Fernandes et al., 2019; Kiernan et al., 2023; Sultan, 2024 discovered that a deficient self-concept may lead a female engineering student to abandon her pursuits at the smallest indication of adversity in the field. According to (Contreras-Ortiz et al., 2023; Mansouri & Erfani, 2024), numerous obstacles exist in engineering education and practice, and a positive self-concept is the mental state required to accomplish significant achievements. The authors: Callea et al., 2024; Gonzalez-Gonzalez et al., 2018; Hickey & Cui, 2024; Strachan et al., 2018; Ying et al., 2021 opined that the intention of the individual uttering sexist remarks may not be to induce feelings of unworthiness in the listener; however, no one can determine how others interpret what they hear. According to Andrews, 2012; Ghanbaripour et al., 2023; Smith & Gayles, 2018, when female engineering students believe they are unsuitable for the field, a detrimental self-concept may develop, adversely affecting their mental well-being.

Strachan et al., 2018 stated that self-concept issues might hinder girls in engineering from achieving academic success over time. Reports indicate that individuals can typically sustain this detrimental mental condition until graduation, resulting in unsatisfactory academic performance. The works referenced here underscore low self-concept as a consequence of bias against women in engineering, with sexist remarks being a prominent kind of bias highlighted.

3.2: Effects of sexist comments on diminished motivation among girls and women in engineering

Dabic et al., 2021 stated that sexist comments in engineering environments not only erode self-concept but can also significantly reduce motivation and negatively impact mental well-being among female students. Dabic et al., 2021; Evans et al., 2021; McCall, 2021; Nocella, 2024; Wright & Jago, 2024 showed that hearing insults or mild biases all the time can make academic and professional settings hostile, making people feel left out and discouraged. Some researchers Camila Francisco de Castro et al., 2024; Zhifeng et al., 2024 said that this kind of setting can make people less interested in their classes and group projects, which can make them less likely to stay involved in the field over the long term. (Berge et al., 2019) say that motivation is closely linked to how well someone feels like they fit in and are accepted. According to de Carvalho Fernandes et al., 2019, girls in engineering may lose drive if they think their hard work won't be noticed or appreciated because of their gender. Researchers Berge et al., 2019; Stephens & Crandall, 2022 found that this lack of drive can make people less

likely to take on difficult tasks or leadership roles, which can lead to poor performance and lower confidence.

Barnard et al., 2012 and Sharma et al., 2021 say that sexism has mental effects that go beyond being disinterested in school. According to Bennette and Toffoletti, 2024, hearing biased words over and over again can make people more stressed, anxious, and even depressed. Geneve et al., 2008 found that female engineering students may take these experiences to heart, which can make them doubt their skills and feel alone among their peers. Kantharajah, 2022 said that this can hurt brain function, making it harder to concentrate, solve problems, and work well under pressure.

3.3: Effects of sexist comments on aggressive tendencies among girls and women in engineering

According to these authors Evans et al., 2021; McCall, 2021; Wright & Jago, 2024, sexist comments in engineering environments can lead to increased aggressiveness in female students often as a defense mechanism against ongoing discrimination and marginalization. Dabic et al., 2021 observed that faced with repeated derogatory remarks, exclusion, or dismissive attitudes, some girls respond assertively or confrontationally to protect their sense of self-worth and establish boundaries. Nocella, 2024; Zhifeng et al., 2024 stated that this response, while rooted in self-preservation, can inadvertently affect their mental well-being. Some researchers Brereton & Young, 2022; de Carvalho Fernandes et al., 2019; Haitan, 202; Sultan et al., 2024 said that aggression can show up as anger, defiance, or loud opposition to unfair treatment, which can make it hard to get along with classmates, teachers, or supervisors. According to Zhang et al., 2024, dealing with this hostile environment may lead to increased stress and emotional exhaustion over time, adding to the mental load that female students already face in areas dominated by men. Engineering courses that involve lots of calculations and designs can cause stress on female students.

Peterson et al., 2009 found that constant conflict or repressed anger can have a negative effect on mental health, leading to burnout, worry, and trouble concentrating. According to Kovaleva et al., 2024, engineering female students who regularly experience or observe sexism may feel like they need to be on guard all the time, which makes it harder for them to fully engage with classwork and group projects. According to Francis et al., 2017 and Broadley, 2015, women who speak out against sexist comments risk being called "difficult" or "too aggressive," which reinforces harmful assumptions that make them feel alone in their academic community. This dynamic not only hurts their mental health, but it also gets in the way of their professional growth and leadership possibilities Francis et al., 2017.

4.0 Discussion

This research found that sexist comments can lead to bad psychological effects like low self-esteem, less motivation, and more aggressive behaviour in women who work in engineering. Self-concept, an

individual's perception of their own abilities, plays a crucial role in their academic and professional success. If an individual perceives proficiency in a particular area, they possess a positive self-concept. A person's self-concept about a specific matter diminishes if they lack belief in their capability. Studies demonstrate that sexist remarks induce feelings of inadequacy or unfitness for the engineering profession among female students Ghanbaripour et al., 2023. This indicates they might possess a diminished self-concept regarding their competencies in the engineering field. A deficient self-concept may lead a female engineering student to abandon her pursuits at the smallest indication of adversity in the field. Numerous obstacles exist in engineering education and practice, and a positive self-concept is the mental state required to accomplish significant achievements. The intention of the individual uttering sexist remarks may not be to induce feelings of unworthiness in the listener; however, no one can determine how others interpret what they hear. When female engineering students believe they are unsuitable for the field, a detrimental self-concept may develop, adversely affecting their psychological outcomes Nocella, 2024. Self-concept issues might hinder girls in engineering from achieving academic success over time. Reports indicate that individuals typically sustain this detrimental mental condition until graduation, resulting in unsatisfactory academic performance. The works cited here show that low self-esteem in women in engineering, both education and work field, is a result of bias against women in engineering, with racist comments being one type of bias that stands out.

Saying sexist things around women in engineering classes can hurt their self-esteem, make them less motivated, and have a bad effect on their mental health. As Zhifeng et al., 2024 show, constant exposure to insulting comments or subtle biases can make the workplace and school unpleasant, leading to a feeling of exclusion and giving up. This kind of setting can make people less interested in their classes and group projects, which directly hurts their long-term involvement in the field. The feeling like one fits in and is accepted is closely linked to motivation. When girls in engineering feel slighted or ignored because of their gender, they may lose their drive because they think their hard work won't be noticed or appreciated. This loss of drive can make people less likely to take on difficult tasks or leadership roles, which can keep them underperforming and lower their confidence. Bennette and Toffoletti, 2024 say that sexism hurts people's minds in more ways than just making them lose interest in school. Being around biased comments for a long time can make you feel more stressed, anxious, and even depressed. Some female engineering students may take these experiences to heart, which can make them doubt their skills and feel alone among their peers. This can make it harder to think clearly, concentrate, solve problems, and do well when you're under a lot of stress. Also, sexist environments can make girls feel like they don't fit, even if they have done great things. This is called imposter syndrome. This mental stress not only slows down academic progress

but can also make it harder for female students to bounce back from failures. So, fighting sexism in engineering is important not only for supporting equality but also for improving the mental health and long-term motivation of female engineering students.

When women are in engineering classes and hear sexist comments, they may become more aggressive as a way to protect themselves from being discriminated against and left out Dabic et al., 2021. If someone keeps calling them names, excluding them, or treating them badly, some girls and women will react strongly or aggressively to protect their sense of self-worth and set limits. Even though this reaction is based on self-preservation, it can have an unintended effect on their mental health. Aggression can show up as anger, defiance, or loud protests against unfair treatment, which can make it hard to get along with peers or teachers. Over time, dealing with this hostile environment could lead to more stress and emotional exhaustion, adding to the mental load that female students already face in areas dominated by men. Constantly arguing or holding back your anger can be hard on your mental health and lead to burnout, worry, and trouble focusing. If engineering female students constantly experience or observe sexism, they may feel like they need to be on guard all the time, which makes it harder for them to fully engage with classwork and group projects. Also, women who speak out against sexist comments run the risk of being called "difficult" or "too aggressive," which reinforces harmful assumptions that make them feel alone in their academic community Haitan, 2022. This dynamic not only hurts their mental health, but it also gets in the way of their professional growth and leadership possibilities. Fixing sexist settings is important to lower these defensive reactions, promote healthier interactions, and make sure that women and girls in engineering can do well without having to defend their place in the field, which can be very stressful on their mental health. For students' mental health and motivation to stay strong, it's important to make places where everyone feels welcome and valued.

5.0 Conclusion

It was found that sexist comments about girls in engineering had bad effects on their mental health, including problems with their self-image, less motivation, and more anger. Girls' comments like these, which often make fun of their skills and efforts, can make them doubt their engineering skills, which can hurt their self-esteem and make them think they aren't cut out for the field. This can make them less interested in schoolwork and more likely to drop out of engineering programs, which can affect their individual career paths and cause the field to lose bright people. Also, girls who experience sexism often may not want to fully join in their education or seek leadership roles, which can slow their academic and professional growth. As a defence strategy, it may sometimes make people angrier, which is understandable but can put a strain on relationships and make people feel even more alone. These psychological outcomes have effects that go beyond the individual. They have an impact on families

through emotional distress and unrealized potential, on schools through lower retention rates and a less diverse student body, and on society as a whole by keeping gender inequality alive and missing out on the innovative contributions of women engineers. Professional engineering organizations have a very important duty to take on in order to fix these widespread problems and make engineering schools and workplaces less hostile to women.

Recommendations

This narrative review recommends measures such as;

1. Professional engineering bodies have a responsibility to sensitize their members and apply punitive sanctions to those who engage in sexist commentary.
2. Subsequent research will involve an exploratory survey of girls in engineering to ascertain the comments and actions that effectively foster a positive self-concept, enhance motivation, and preserve feminine traits; as well as how these motivating comments and actions can be enacted by their male peers.
3. Professional engineering colleges and organizations must address the diverse requirements of girls in engineering while providing high-quality training to enhance career advancement.

5.1 Limitations of the study

This review is subject to certain limitations that should be considered when interpreting its findings. Firstly, the literature search was conducted using only Google Scholar and IEEE Xplore. While these databases provide broad coverage of relevant research, the exclusion of other databases may have resulted in the omission of potentially relevant studies due to limited accessibility. Secondly, the review primarily focused on articles published in English. This language restriction could have introduced bias by excluding valuable research published in other languages, potentially limiting the global perspective of the analysis.

References

Alfrey, L., & Twine, F. W. (2017). Gender-fluid geek girls. *Gender & Society*, *31*(1), 28–50. https://doi.org/10.1177/0891243216680590

Andrews, J. (2012). *"No one said girls could do engineering": a fresh look at an old problem.* IN: Conference proceedings for EE2012. GBR: Higher Education Academy.

Barnard, S., Hassan, T., Bagilhole, B., & Dainty, A. (2012). 'They're not girly girls': an exploration of quantitative and qualitative data on engineering and gender in higher education. *European Journal of Engineering Education*, *37*(2), 193–204. https://doi.org/10.1080/03043797.2012.661702

Bennette, A., & Toffoletti, K. (2024). STEMinist sensibilities in the promotion of STEM and tech participation to women and girls. *Journal of Gender Studies*, 1–13. https://doi.org/10.1080/09589236.2024.2385387

Berge, M., Silfver, E., & Danielsson, A. (2019). In search of the new engineer: gender, age, and social class in information about engineering education. *European Journal of Engineering Education*, *44*(5), 650–665.

https://doi.org/10.1080/03043797.2018.1523133

Brereton, J. S., & Young, K. (2022). Establishing social learning in an engineering MOOC: benefits for diversity and inclusion in engineering education. *Sustainability*, *14*(9), 5472. https://doi.org/10.3390/su14095472

Broadley, K. (2015). Entrenched gendered pathways in science, technology, engineering and mathematics: Engaging girls through collaborative career development. *Australian Journal of Career Development*, *24*(1), 27–38. https://doi.org/10.1177/1038416214559548

Callea, V., Dagklis, E., Nantsou, T., Otegui, X., Tovar, E., & Villa, G. (2024). Factors influencing women's underrepresentation in engineering: a literature review at EDUCON. *2024 IEEE Global Engineering Education Conference (EDUCON)*, 01–10. https://doi.org/10.1109/EDUCON60312.2024.10578634

Camila Francisco de Castro, B., David, T. M., Maria Tonini, A., & Maria Silva Rocha Rizol, P. (2024). Gender disparity in engineering courses in Brazil. *IEEE Access*, *12*, 159784–159793. https://doi.org/10.1109/ACCESS.2024.3483660

Contreras-Ortiz, S. H., García De Cajen, S. B., & Montoya-Noguera, S. (2023). Women's leadership in engineering: Defying Bias. *Proceedings of the 3rd LACCEI International Multiconference on Entrepreneurship, Innovation and Regional Development (LEIRD 2023): "Igniting the Spark of Innovation: Emerging Trends, Disruptive Technologies, and Innovative Models for Business Success."* https://doi.org/10.18687/LEIRD2023.1.1.651

Dabic, M., Vlacic, B., Obradovic, T., Marzi, G., & Kraus, S. (2021). Women in engineering as a research topic: past, present, and future. *2021 IEEE Technology & Engineering Management Conference - Europe (TEMSCON-EUR)*, 1–6. https://doi.org/10.1109/TEMSCON-EUR52034.2021.9488596

de Carvalho Fernandes, M. R., Madeira, V. R., da Gama Afonso, H. C. A., da Silva Duarte, K., de Souza, A. L. L., & Peixoto, A. (2019). A Study on the support for women in engineering courses. *2019 IEEE Global Engineering Education Conference (EDUCON)*, 1237–1240. https://doi.org/10.1109/EDUCON.2019.8725209

Evans, R., Liang, J. G., Asadollahipajouh, M., & Kulesza, S. (2021). Women thriving in engineering: listening to and learning from women who flourish in undergraduate engineering project teams. *2021 IEEE Frontiers in Education Conference (FIE)*, 1–5. https://doi.org/10.1109/FIE49875.2021.9637468

Francis, B., Archer, L., Moote, J., de Witt, J., & Yeomans, L. (2017). Femininity, science, and the denigration of the girly girl. *British Journal of Sociology of Education*, *38*(8), 1097–1110. https://doi.org/10.1080/01425692.2016.1253455

Geneve, A., Nelson, K. J., & Christie, R. J. (2008). *Girly girls and geeky guys. In: Investigating the Theory and Practice of Gender and Sexuality in the Workplace*. http://eprints.qut.edu.au/

Ghanbaripour, A. N., Tumpa, R. J., Sunindijo, R. Y., Zhang, W., Yousefian, P., Camozzi, R. N., Hon, C., Talebian, N., Liu, T., & Hemmati, M. (2023). Retention over attraction: a review of women's experiences in the Australian construction industry; challenges and solutions. *Buildings*, *13*(2), 490. https://doi.org/10.3390/buildings13020490

Gonzalez-Gonzalez, C. S., Garcia-Holgado, A., de los Angeles Martinez-Estevez, M., Gil, M., Martin-Fernandez, A., Marcos, A., Aranda, C., & Gershon, T. S. (2018).

Gender and engineering: developing actions to encourage women in tech. *2018 IEEE Global Engineering Education Conference (EDUCON)*, 2082–2087. https://doi.org/10.1109/EDUCON.2018.8363496

Haitan, O. (2022). Gender balance ensuring in IT field: Ukrainian study case. *2022 IEEE 17th International Conference on Computer Sciences and Information Technologies (CSIT)*, 288–291. https://doi.org/10.1109/CSIT56902.2022.10000577

Hickey, P. J., & Cui, Q. (2024). Tracing the career trajectories of architecture, engineering and construction (AEC) women leaders. *Construction Management and Economics*, *42*(4), 289–306. https://doi.org/10.1080/01446193.2023.2260907

Kantharajah, R. G. (2022). Critically conscious engineers: reforming humanitarian engineering for gender equality in education. *2022 IEEE International Humanitarian Technology Conference (IHTC)*, 6–11. https://doi.org/10.1109/IHTC56573.2022.9998365

Kiernan, L., Walsh, M., & White, E. (2023). Gender in technology, engineering and design: factors which influence low STEM subject uptake among females at third level. *International Journal of Technology and Design Education*, *33*(2), 497–520. https://doi.org/10.1007/s10798-022-09738-1

Kovaleva, Y., Hyrynsalmi, S., Saltan, A., Happonen, A., & Kasurinen, J. (2023). Becoming an entrepreneur: a study of factors with women from the tech sector. *Information and Software Technology*, *155*, 107110. https://doi.org/10.1016/j.infsof.2022.107110

Kovaleva, Y., Kasurinen, J., Kindsiko, E., & Happonen, A. (2024). State-of-the-art review on current approaches to female inclusiveness in software engineering and computer science in higher education. *IEEE Access*, *12*, 1360–1373. https://doi.org/10.1109/ACCESS.2023.3346767

Mansouri, A., & Erfani, A. (2024). Gender disparity and self-presentation on social media among AEC industry leaders. *Journal of Management in Engineering*, *40*(5). https://doi.org/10.1061/JMENEA.MEENG-6121

McCall, M. (2021). Getting the story straight: how conflicting narratives about communication impact women in engineering. *Technical Communication Quarterly*, *30*(1), 89–103. https://doi.org/10.1080/10572252.2020.1774661

Nocella, J. J. (2024). Addressing young girls in STEM: building inclusion through dialogicity. The case of GoldieBlox. *Languages Cultures Mediation*, *11*(1), 47–66. https://doi.org/10.7358/lcm-2024-001-nocj

Peterson, Tiernan, & Broussard. (2009). *Girlgeneering vs. entry to engineering: engineering outreach program comparison of a girls-only vs. co-ed engineering summer camp*.

Sharma, K., Torrado, J. C., Gómez, J., & Jaccheri, L. (2021). Improving girls' perception of computer science as a viable career option through game playing and design: lessons from a systematic literature review. *Entertainment Computing*, *36*, 100387. https://doi.org/10.1016/j.entcom.2020.100387

Smith, K. N., & Gayles, J. G. (2018). "Girl Power": gendered academic and workplace experiences of college women in engineering. *Social Sciences*, *7*(1), 11. https://doi.org/10.3390/socsci7010011

Stephens, K., & Crandall, K. S. (2022). What Twitter is saying about women in technology. *2022 Intermountain*

Engineering, Technology and Computing (IETC), 1–4. https://doi.org/10.1109/IETC54973.2022.9796681

Strachan, R., Peixoto, A., Emembolu, I., & Restivo, M. T. (2018). Women in engineering: addressing the gender gap, exploring trust and our unconscious bias. *2018 IEEE Global Engineering Education Conference (EDUCON)*, 2088–2093. https://doi.org/10.1109/EDUCON.2018.8363497

Sultan, U. (2024). *In whose eyes am I technical? : exploring the 'problem' of the (non)technical girl* (Vol. 125). Linköping University Electronic Press. https://doi.org/10.3384/9789180755979

Sultan, U., Axell, C., & Hallström, J. (2024). Bringing girls and women into STEM?: Girls' technological activities and conceptions when participating in an all-girl technology camp. *International Journal of Technology and Design Education*, *34*(2), 647–671. https://doi.org/10.1007/s10798-023-09831-z

Wright, T. L., & Jago, M. (2024). *Graduate School of Education and Psychology Examining the role of cultural capital in access and equity for female*.

Ying, K. M., Martin, A. C., Rodriguez, F. J., & Boyer, K. E. (2021). CS1 students' perspectives on the computer science gender gap: achieving equity requires awareness. *2021 Conference on Research in Equitable and Sustained Participation in Engineering, Computing, and Technology (RESPECT)*, 1–9. https://doi.org/10.1109/RESPECT51740.2021.9620659

Zhang, R. P., Holdsworth, S., Turner, M., & Andamon, M. M. (2021). Does gender really matter? A closer look at early career women in construction. *Construction Management and Economics*, *39*(8), 669–686. https://doi.org/10.1080/01446193.2021.1948087

Zhang, R. P., Holdsworth, S., Turner, M., & Andamon, M. M. (2024). Career aspiration and workplace reality – lived experience of early career professional women in construction. *Women's Studies International Forum*, *105*, 102926. https://doi.org/10.1016/j.wsif.2024.102926

Zhifeng, G., Singh, C., Ong, E., Singh, S., Bailey, R., & Hoe, T. (2024). Psychological constructions in influencing female intentions to pursue science, technology, engineering and mathematics (STEM) Fields. *Asian Journal of University Education*, *20*(2), 478–497. https://doi.org/10.24191/ajue.v20i2.27396