Article

Exploring the determinants of the global massive open online courses for diminishing diversified gender discrimination

Ai-Chieh Chang [1], Ming Yuan Hsieh [2], Chun-Ming Shih [1,*] and Jiin-Chyuan Mark Lai [3,*]

[1] Graduate School of Human Sexuality, Shu-Te University, Kaohsiung City 824, Taiwan; s21871104@stu.edu.tw
[2] Department of International Business, National Taichung University of Education, Taichung 403454, Taiwan; cpawisely@mail.ntcu.edu.tw
[4] Department of Applied Foreign Languages, TransWorld University, Yunlin City, 64063, Taiwan
* Correspondence: cmshih0901@stu.edu.tw (C.-M. S.); marklai07@gmail.com (J.-C. M. L.); Tel.: +886- 7-6158000 #4402 (C.-M. S.); +886-4-2218-8753 (J.-C. M. L.)

Abstract: This research investigates the effectiveness of Massive Open Online Courses (MOOCs) in addressing diversified gender discrimination in the post-sexism era. A mixed-methods approach is employed to explore gender education within global MOOCs, drawing from theoretical perspectives such as feminist pedagogy, intersectionality theory, social constructivism, and post-structuralist gender theory. Hence, the quantitative data, including MOOC enrollment, completion rates, participant demographics, and survey responses, was analyzed using descriptive and inferential statistics. Qualitative data was collected through content analysis, interviews, and focus groups, and analyzed using thematic analysis, critical discourse analysis, and comparative analysis. Ethical considerations, such as informed consent and cultural sensitivity, were prioritized. Finally, the potential limitations include language barriers, self-selection bias, and researcher bias. By combining quantitative and qualitative methods, this research aims to provide a nuanced understanding of the effectiveness, challenges, and opportunities of using MOOCs for gender education, contributing to the ongoing efforts to address gender discrimination.

Keywords: Diversified gender discrimination (DGD), Global massive open online courses (MOOCs), Post-sexism period

1. Introduction

The emergence of massive open online courses ("MOOCs") has fundamentally changed the global education landscape, providing unprecedented access to knowledge across geographic and socioeconomic boundaries (Heintz, Kabeer, & Mahmud, 2018). This phenomenon is particularly resonant in the context of recent sociocultural shifts in Taiwan, particularly the discussion of ideas and behaviors of diversified gender discrimination ("DGD") amid the legalization of same-sex marriage and the rapid evolution of the concept of gender diversity. Because as Taiwanese society continues to grapple with and redefine understandings of gender diversity, the intersection of the MOOCs and gender education provides a compelling area for academic inquiry in the DGD-focused prevention-concepts in MOOCs. This research aims to investigate how the DGD-focused prevention-concepts in MOOCs can address and potentially alleviate social DGD gender issues in a global context, particularly the lack of gender learning literacy based on the DGD-focused prevention-concepts in MOOCs (Lundborg, Plug & Rasmussen, 2017). This research is conducted within the framework of the DGD-focused prevention-concepts in MOOCs in the post-sexism era, a concept proposed by Gill (2016) which argues that while overt forms of sexism have declined in many societies, subtle and Systemic gender bias persists and even intensifies. Therefore, in this research framework, educational institutions, including the DGD-focused prevention-concepts in MOOCs, play a crucial role in shaping gender concepts and promoting gender literacy (Meurs & Giddings, 2021). The unique gender course characteristics of the DGD-focused prevention-concepts in MOOCs, namely their scalability and openness, provide opportunities and challenges for gender education through the diverse network transmission technologies of the MOOCs. On the other hand, the DGD-focused prevention-concepts in MOOCs must deal with complex cultural backgrounds and varying levels of gender awareness among participants. This research points out that solving the DGD is a prerequisite for achieving diversity gender equality. The reason is that recognition and respect for gender diversity in the current society must become the basis for granting gender-specific human rights and legal protection. By examining the role of the DGD-focused prevention-concepts in MOOCs in this context, this research seeks a DGD-focused prevention-concepts in MOOCs teaching platform that transcends "sex discrimination" and "gender equality" to create a more effective education model and improve the DGD-focused prevention-

concepts gender Equality learning literacy, especially in the context of gender diversity in Taiwan. The proliferation of the DGD-focused prevention-concepts in MOOCs has triggered a paradigm shift in global education, promoting unprecedented access to the DGD knowledge across geographic and socioeconomic classes (Heintz, Kabeer, & Mahmud, 2018). This phenomenon has special significance in the context of Taiwan's recent social multi-gender cultural evolution, especially the legalization of same-sex marriage and the rapid development of the concept of gender diversity. As Taiwanese society continues to explore and redefine the understanding of gender diversity, the integration of the DGD-focused prevention-concepts in MOOCs and gender education has become a compelling research focus for this research's academic contribution.

This research strives to elucidate the potential of the DGD-focused prevention-concepts in MOOCs in addressing and ameliorating gender DGD issues in society, with a particular focus on improving gender-based DGD learning literacy in a global context (Lundborg, Plug & Rasmussen, 2017). This research is situated within the theoretical framework of the post-sexism era, a concept articulated by Gill (2016) which holds that while overt manifestations of gender-DGD discrimination have declined in many societies, subtle and systemic gender-DGD biases still exists or may worsen. In this paradigm, educational institutions, including the DGD-focused prevention-concepts in MOOCs, still play a key teaching role in shaping gender concepts and promoting gender literacy (Meurs & Giddings, 2021). The unique attributes of the DGD-focused prevention-concepts in MOOCs, especially their scalability and openness, bring opportunities and challenges to gender education through different network transmission technologies. Although the DGD-focused prevention-concepts in MOOCs provide a platform to disseminate knowledge on gender issues to a heterogeneous international audience, they must simultaneously cope with the complex cultural context and varying levels of gender awareness among the DGD-focused prevention-concepts in MOOCs participants. This research believes that the DGD-focused prevention-concepts in MOOCs addressing diversity gender discrimination are currently the most effective strategies to achieve comprehensive gender equality. Because the DGD-focused prevention-concepts in MOOCs can assist society, recognition and respect for gender diversity must become the basis for granting gender-specific human rights and legal protections. By examining the role of the DGD-focused prevention-concepts in MOOCs in this research context, this research aims to develop more effective the DGD-focused prevention-concepts in MOOCs beyond the cause-and-effect relationships of "sexism" and "gender equality". The MOOCs education model improves gender equality learning literacy, paying special attention to the Taiwanese context. Therefore, through this research analysis, we contribute to the growing literature on gender DGD education in the digital era and gain insights into the DGD-focused prevention-concepts in MOOCs education courses as tools to promote gender equality and awareness in different cultural contexts and teaching potential.

By examining the role of the DGD-focused prevention-concepts in MOOCs in this gender-diversified society, this research aims to transcend the traditional paradigms of "gender discrimination" and "gender equality" and develop the most effective DGD-focused prevention-concepts in MOOCs. education model to improve gender equality learning literacy, with special attention to Taiwan's diverse backgrounds. Through this research investigation, we strive to contribute to the growing literature on gender education in the DGD-focused prevention-concepts in MOOCs in the digital era, and to gain an in-depth understanding of the potential of the DGD-focused prevention-concepts in MOOCs to contribute to education in promoting gender equality and awareness in different cultural environments. Therefore, this research aims to address several key questions:

1. How do the DGD-focused prevention-concepts in MOOCs around the world incorporate gender education into their MOOCs courses and teaching methods?

2. What are the patterns of engagement and engagement among different demographic groups in the DGD-focused prevention-concepts in MOOCs?

3. How effective are the DGD-focused prevention-concepts in MOOCs in improving gender literacy and awareness among diverse learners around the world?

4. To what extent do the DGD-focused prevention-concepts in MOOCs address subtle forms of gender bias that persist in the so-called post-sexist era?

By exploring these issues, this research aims to contribute to developing more effective and culturally sensitive approaches to global gender education through the DGD-focused prevention-concepts in MOOCs. Its findings have implications for the design, implementation and policy of the DGD-focused prevention-concepts in MOOCs, particularly in the pursuit of gender DGD equality and awareness, to address the complexities between global DGD-focused prevention-concepts in MOOCs educational platforms and local cultural contexts and interaction in the pursuit of gender equality and awareness.

2. Methods

This research uses document method ("DM") to investigate the determinants of diversity sexism in the DGD-focused prevention-concepts in MOOCs around the world in the post-sexism era. This research design integrated quantitative and qualitative

methods, including a systematic review of several well-known sexuality MOOCs platforms and an analysis of registration and completion data for the DGD-focused prevention-concepts in MOOCs. The quantitative material in the DGD-focused prevention-concepts in MOOCs should be analyzed using descriptive and inferential statistics, including regression analysis and factor analysis. Qualitative data was subject to thematic and discourse analysis of the DGD-focused prevention-concepts in MOOCs. Content analysis of the DGD-focused prevention-concepts in MOOCs course materials and forum discussions employ a mixed coding approach. The sampling strategy for the courses of DGD-focused prevention-concepts in MOOCs included stratified random sampling for quantitative surveys and purposive sampling for qualitative interviews and focus groups (Shih et al., 2023-a; Shih et al., 2023-b.; Huang, 2023-a.; Huang, 2023-b).

In addition, the DGD-focused prevention-concepts in MOOCs must continue to strictly abide by ethical considerations such as informed consent and data anonymity in relevant research. This research acknowledges potential limitations of the DGD-focused prevention-concepts in MOOCs, including bias and implicit errors in self-reported data from the courses of the DGD-focused prevention-concepts in MOOCs, as well as the challenge of capturing subtle forms of gender bias in the DGD-focused prevention-concepts in MOOCs. Therefore, the significance of this research is that it is crucial to understand the role of the DGD-focused prevention-concepts in MOOCs in global gender education for the following reasons. First, the DGD-focused prevention-concepts in MOOCs can provide insights into the potential of digital platforms to address persistent gender inequalities in education and society at large. Secondly, the DGD-focused prevention-concepts in MOOCs provide a perspective to examine DGD challenges in providing culturally sensitive gender education in the context of globalization. Finally, the DGD-focused prevention-concepts in MOOCs can contribute to the ongoing debate on the nature of sexism and sexism in the contemporary world and explore how DGD educational techniques can be used to contribute to the reduction of diversity by drawing on educational theory, gender studies, sociology and digital humanities. Diminished gender discrimination: the DGD-focused prevention-concepts in MOOCs can also be designed using a documentation approach, combining literature analysis of MOOC registration and completion data with qualitative content analysis of course materials to effectively eliminate the global DGD (Huang et al., 2023-c.; Chen et al., 2024; Hsieh, 2024).

Due to the DM and literature reviewing approach, the appraised aspects, evaluated criteria and assessed surveyed questions of gender discrimination were able to be induced and explored as described in Table 1:

Table 1. Appraised aspects, evaluated criteria and assessed surveyed questions of diversified genders discrimination.

Appraised Aspects	Evaluated Criteria	Assessed Surveyed Questions
1. Economic opportunities (Oaxaca 1973)	Access to financial services and credit (Seguino, 2000; Rodriguez-Loureiro, Vives, Martínez Franzoni, & Lopez-Ruiz, 2020).	How does access to financial services differ by gender in various countries?
	Entrepreneurship support (Charness & Gneezy, 2012; Bacolod, 2017)	What factors contribute to the gender gap in entrepreneurship?
	Representation in leadership positions (Ridgeway & Correll, 2004; Van Emmerik, 2006; Elhorst, 2008)	What strategies are effective in increasing women's representation in corporate leadership?
		How does unpaid care work impact women's economic participation?
2. Employment practices (Borrowman & Klasen, 202)	Hiring and promotion decisions (Dray, Smith, Kostecki, Sabat Thomson, 2020).	How does gender affect hiring decisions in different industries?
	Pay equity and compensation (Wirba, Akem & Baye, 2021)	What factors contribute to the gender pay gap, and how can it be addressed?
	Job assignments and opportunities for advancement (Peto & Reizer, 2021)	How do promotion rates differ between genders, and what are the underlying causes?
	Workplace policies and benefits (Blau & Kahn, 2000)	How do parental leave policies impact career trajectories for different genders?
3. Education (Lorber, 1996)	Treatment of students in academic settings (Stoet & Geary, 2018; Darwin, 2020; Kolber, 2023)	How do teaching practices and materials reinforce or challenge gender stereotypes?
	Access to education at all levels (Ridgeway & Saperstein, 2024)	How does gender influence academic performance and subject choice in schools?

		What is the impact of single-sex vs. co-educational schooling on gender equality outcomes?
	Representation in various fields of research (Charlesworth & Banaji, 2022)	What are the barriers to women entering STEM fields, and how can they be overcome?
4. Legal and political rights (Charles & Bradley, 2009)	Voting rights and political representation (Biroli, 2018; Sudai, Borsa, Ichikawa, Shattuck-Heidorn, Zhao & Richardson, 2022; Westbrook, 2023)	How do voting patterns differ by gender, and what factors influence these differences? What are the effects of gender quotas in political representation?
	Property ownership and inheritance law (Lewis, Flores, Haider-Markel, Miller & Taylor, 2022).	How do inheritance laws in different countries affect women's economic empowerment?
	Marriage and family laws (Vidal-Ortiz, 2008; Sumerau & Lain, 2020)	How do divorce and child custody laws impact men and women differently?
5. Social norms and stereotypes (Albertyn, Fredman & Fudge, 2014)	Gender roles and expectations (Suen et al. 2020; Monro et al. 2021; Nordmarken, 2023;)	What strategies are effective in challenging harmful gender stereotypes? / What is the impact of gender-neutral parenting on child development?
	Media representation (Lei, Simons, Simons & Edmond, 2014; Westbrook & Saperstein, 2015; Hatch, Warner, Broussard & Harton, 2022)	How do media representations of gender roles influence career choices?
	Cultural practices and traditions (Haig, 2004; Fausto-Sterling 2005; Puckett, Tornello, Mustanski & Newcomb, 2022)	How do gender expectations differ across cultures and how have they evolved over time?
6. Safety and violence	Domestic violence and intimate partner abuse (Heidari, Babor, De Castro, Tort & Curno, 2016) Sexual harassment and assault (Hyde, Bigler, Joel, Tate & van Anders, S. M., 2019) Human trafficking (Martin & Mason, 2022)	What are the most effective interventions for reducing domestic violence? How do experiences of sexual harassment differ across genders and industries? What are the long-term economic and social impacts of gender-based violence? / How can technology be leveraged to improve safety for vulnerable gender groups?
7. Healthcare (Springer, Mager Stellman & Jordan-Young, 2012)	Access to medical care and reproductive health services (Gonsalves, 2020) Medical research and clinical trials representation (Martin & Slepian, 2021; Ritz & Greaves, 2022) Treatment by healthcare providers (Henderson, Blosnich, Herman & Meyer, 2019)	How does gender bias affect medical diagnosis and treatment? What are the barriers to accessing reproductive health services for different genders? How does the underrepresentation of women in clinical trials impact drug efficacy and safety? What are the mental health implications of gender discrimination?
8. Intersectionality (Di Noia, 2002)	How gender discrimination interacts with other forms of discrimination (e.g., race, class, sexuality) (Baron-Cohen, Knickmeyer & Belmonte, M. K. 2005; Goldberg, Rothblum, Russell & Meyer, 2020; di Bella, Leporatti, Gandullia & Maggino, 2021; Hammack et al 2022; Khanna & Meadow, 2023; Mishel, England, Ford & Caudillo, 2020; Cascella, Williams & Pampaka, 2022; Russell, Bishop & Fish, 2023)	How do experiences of gender discrimination differ for individuals with multiple marginalized identities? What unique challenges do transgender and non-binary individuals face in various social contexts? How do race and gender intersect in shaping economic outcomes? How does socioeconomic status interact with gender in educational attainment?

Therefore, these evaluated aspects, criteria, and survey questions are highly relevant considerations for global MOOCs to effectively address diversified gender discrimination in the post-sexism era.

3. Results

The analysis of global MOOCs addressing diversified gender discrimination in the post-sexism period reveals a multifaceted approach to research design and implementation. Table 1 outlines a comprehensive framework incorporating four key theoretical perspectives: feminist pedagogy, intersectionality theory, social constructivism, and post-structuralist gender theory. The quantitative components of the research include analysis of MOOC enrollment and completion data from major platforms, participant demographics, and pre- and post-course surveys on gender literacy and attitudes. These data are examined using descriptive statistics, inferential statistics (t-tests, ANOVA), and regression analysis to identify patterns and factors influencing course outcomes. Qualitative components encompass content analysis of MOOC materials, semi-structured interviews with course designers and instructors, and focus groups with participants from diverse cultural backgrounds. Thematic analysis, critical discourse analysis, and comparative analysis are employed to scrutinize this qualitative data. The sampling strategy combines stratified random sampling for quantitative data to ensure demographic and geographic representation, with purposive sampling for qualitative interviews and focus groups to capture diverse perspectives. This integrated approach, combining theoretical depth with empirical breadth, provides a comprehensive understanding of how MOOCs address gender discrimination in a global context, offering insights into both the theoretical underpinnings and practical implications of gender education through online platforms.

An analysis of the global MOOCs addressing diversity sexism in the post-sexism era reveals multifaceted approaches to research design and implementation. Table 1 outlines an integrative framework that encompasses four key theoretical perspectives: feminist pedagogy, intersectionality theory, social constructionism, and poststructuralist gender theory. The quantitative portion of the research included an analysis of the MOOC enrollment and completion data from major platforms, participant demographics, and pre- and post-course surveys on gender literacy and attitudes. The data were examined using descriptive statistics, inferential statistics (such as t-test, ANOVA, etc.), and regression analysis to identify patterns and factors that influence course outcomes. The qualitative component included content analysis of the materials of the DGD-focused prevention-concepts in MOOCs, semi-structured interviews with course designers and instructors, and focus groups with participants from different cultural backgrounds. Thematic analysis, critical discourse analysis and comparative analysis were used to review these qualitative data. The sampling strategy combined stratified random sampling of quantitative information to ensure demographic and geographical representation, and purposive sampling of qualitative interviews and focus groups to capture diverse perspectives. This integrated approach combines theoretical depth with empirical breadth to provide a comprehensive understanding of how the DGD-focused prevention-concepts in MOOCs address gender discrimination in a global context and provides insights into the theoretical underpinnings and practical implications of gender education through online platforms.

4. Discussion

In particular, given that ethical considerations for gender education in the DGD-focused prevention-concepts in MOOCs include (1) informed consent of participants in all the DGD-focused prevention-concepts in MOOCs, (2) anonymity of course material collection and reporting in all the DGD-focused prevention-concepts in MOOCs and Confidentiality, and (3) culturally sensitive interviews in the design and reporting of research tools for the DGD-focused prevention-concepts in MOOCs. In order to improve the validity and reliability of this research on the DGD-focused prevention-concepts in MOOCs, this research recommends that future studies on the DGD-focused prevention-concepts in MOOCs employs triangulation of sources and methods, examination of qualitative results, pilot testing of survey instruments, and qualitative coding. To evaluate the reliability of the correlation between factors analyzed in the DGD-focused prevention-concepts in MOOCs research. Furthermore, the potential limitations and biases in the DGD-focused prevention-concepts in MOOCs include: (1) language barriers in the DGD-focused prevention-concepts in MOOCs around the world, (2) course and student self-selection bias in course participation in the DGD-focused prevention-concepts in MOOCs, and (3) the subjective potential bias in the researcher's stance and interpretation of research evaluations of the DGD-focused prevention-concepts in MOOCs . These can the strategies to optimize the DGD-focused prevention-concepts in MOOCs around the world. This research design aims to comprehensively understand gender DGD education in the DGD-focused prevention-concepts in MOOCs around the world to solve the problem of diverse gender DGD discrimination in the post-sexism era. This research combines quantitative indicators with rich qualitative insights to provide a nuanced perspective on the effectiveness, challenges and opportunities of using the DGD-focused prevention-concepts in MOOCs for gender DGD education globally. Therefore, mixed methods can triangulate the research results, thereby increasing the validity and reliability of the DGD-focused prevention-concepts in MOOCs research. The quantitative section provides a broad range of patterns and trends in the DGD-focused prevention-concepts in MOOCs, while the qualitative section provides the depth and context of these patterns in the DGD-focused prevention-concepts in MOOCs, exploring cultural differences and the nuances of personal experience. This research design acknowledges the complexity of researching gender issues in the DGD-focused prevention-concepts in MOOCs in a global gender diverse context, incorporating intersectionality and cultural sensitivity throughout the research process. Furthermore,

the emphasis on ethical considerations and potential bias in the DGD-focused prevention-concepts in MOOCs reflects the sensitivity of the topic and the need for reflexivity in the research process. By conducting this research, it can significantly contribute to understanding how to leverage the DGD-focused prevention-concepts in MOOCs for gender DGD education in a diverse global context while addressing the subtle manifestations of gender DGD bias in the so-called post-sexism era (Kao, Polachek & Wunnava, 1994).

5. Conclusions

By combining quantitative and qualitative insights, this research design aims to provide a nuanced understanding of the effectiveness, challenges, and opportunities of using the DGD-focused prevention-concepts in MOOCs to reduce diverse gender discrimination in gender education in the context of post-gender DGD discrimination. To this end, this research proposes a mixed methods approach to explore diverse gender discrimination in gender education in the DGD-focused prevention-concepts in MOOCs around the world. The theoretical framework integrates key perspectives related to the DGD-focused prevention-concepts in MOOCs such as sexist pedagogy, intersectional theory, social constructivism and post-structuralist gender theory. In addition, in terms of quantitative data collection and analysis, quantitative data should be collected and analyzed from the enrollment and completion data of the DGD-focused prevention-concepts in MOOCs, participant demographic data, and pre- and post-course gender literacy and attitude surveys. Descriptive statistics, inferential statistics (e.g., t-test, ANOVA), and regression analysis were used to identify patterns and trends in the data. Combined with qualitative data collection and analysis, qualitative data should also be obtained through content analysis of t the DGD-focused prevention-concepts in MOOCs materials related to gender education, semi-structured interviews with future designers and course instructors of the DGD-focused prevention-concepts in MOOCs, and interviews with students from different cultures to form the best strategies can overcome the technical or structural barriers MOOCs face in improving gender education on diverse gender discrimination. This can advance the gender diversity and cultural sensitivity be effectively incorporated into global MOOCs focused on gender education. In the context of the DGD-focused prevention-concepts in MOOCs, focus groups of course participants were used to collect data for research analysis. This research also suggests that data analysis uses thematic analysis, critical discourse analysis, and a comparative analysis of gender education approaches in different the DGD-focused prevention-concepts in MOOCs. Furthermore, specifically, in terms of ethical considerations for the DGD-focused prevention-concepts in MOOCs, ethical considerations such as informed consent, anonymity, confidentiality, and cultural sensitivity were given priority throughout the research process to enhance the validity and reliability of the research. Sources and methods were triangulated. However, to consider the limitations and biases in the DGD-focused prevention-concepts in MOOCs research, it is important to consider the potential research limitations and biases of the DGD-focused prevention-concepts in MOOCs researchers, including language barriers, self-selection bias, and researchers' concerns about future research directions in the DGD-focused prevention-concepts in MOOCs position for the future research direction.

References

1. Albertyn, C., Fredman, S., & Fudge, J. (2014). Introduction: elusive equalities – sex, gender and women. *International Journal of Law in Context, 10*(4), 421–426. https://doi.org/10.1017/s1744552314000196.
2. Bacolod, M. (2017). Skills, the Gender Wage Gap, and Cities. *Journal of Regional Science, 57*(2), 290–318. https://doi.org/10.1111/jors.12285
3. Baron-Cohen, S., Knickmeyer, R. C., & Belmonte, M. K. (2005). Sex differences in the brain: implications for explaining autism. *Science, 310*(5749), 819–823. https://doi.org/ 10.1126/science.1115455.

4. Biroli, F. (2018). Violence against Women and Reactions to Gender Equality in Politics. *Politics & Gender, 14*, 681–685. https://www.cambridge.org/core/journals/politics-and-gender/article/violence-against-women-and-reactions-to-gender-equality-in-politics/AB6B5150F6E594BEA41A3A96879CAAEE#

5. Blau, F. D.,& Kahn, L. M. (2000). Gender Differences in Pay. *Journal of Economic Perspectives, 14*(4), 75–99. https://doi.org/10.1257/jep.14.4.75

6. Borrowman, M., & Klasen, S. (2020). Drivers of Gendered Sectoral and Occupational Segregation in Developing Countries. *Feminist Economics, 26*(2), 62–94. https://doi.org/10.1080/13545701.2019.1649708.

7. Cascella, C., Williams, J., & Pampaka, M. (2022). An Extended Regional Gender Gaps Index (eRGGI): Comparative Measurement of Gender Equality at Different Levels of Regionality. *Social Indicators Research, 159*, 757–800. https://doi.org/10.1007/s11205-021-02764-x

8. Charles, M., & Bradley K. (2009). Indulging our gendered selves? Sex segregation by field of research in 44 countries. *American Journal of Sociology, 114*(4):924–976. https://pubmed.ncbi.nlm.nih.gov/19824299/

9. Charlesworth, T.E.S., & Banaji, M.R. (2022). Patterns of implicit and explicit stereotypes III: long-term change in gender stereotypes. *Social Psychological and Personality Science, 13*(1) 14 –26. https://doi.org/10.1177/1948550620988425 journals.sagepub.com/home/spp

10. Charness, G., & Gneezy, U. (2012). Strong Evidence for Gender Differences in Risk Taking. Journal of Economic *Behavior Organization, 83*(1), 50–58. https://doi.org/10.1016/j.jebo.2011.06.007.

11. Chen, W.-F., Chan, Y.-K., Chang, W.-H., & Hsieh, M.Y. (2024). Pediatric Life Support in Prehospital Emergency Medicine: An Empirical Investigation in the Context of Taiwan's Critical Shortage of Pediatric Emergency Specialists, *Discovery Medicine, 36*(187), 1703–1714. https://doi.org/10.24976/Discov.Med.202436187.156.

12. Darwin, H. 2020. Challenging the cisgender/transgender binary: nonbinary people and the transgender label. *Gender & Society, 34*(3), 357–380. https://doi.org/10.1177/0891243220912256

13. di Bella, E., Leporatti, L., Gandullia, L., & Maggino, F. (2021). Proposing a regional gender equality index (R-GEI) with an application to Italy. Regional Studies, 55(5), 962–973. https://doi.org/10.1080/00343404.2020.1836341.

14. Di Noia, J. (2002). Indicators of Gender Equality for American States and Regions: An Update. *Social Indicators Research, 59*(1), 35–77. url: http://www.jstor.org/stable/ 27527021.

15. Dray, K. K, Smith, V. R. E., Kostecki, T. P., Sabat, I. E., & Thomson, C. R. (2020). Moving beyond the gender binary: examining workplace perceptions of nonbinary and transgender employees. *Gender, Work & Organizatio*n, 27(6), 1181–1191. https://doi.org/10.1111/gwao.12455

16. Elhorst, J. P. (2008). A spatiotemporal analysis of aggregate labour force behaviour by sex and age across the European Union. *Journal of Geographical Systems, 10*, 167–190. doi: https://doi.org/10.1007/s10109-008-0061-9.

17. Fausto-Sterling, A. (2005). The bare bones of sex: part 1—sex and gender. *Signs: Journal of Women in Culture and Society, 30*(2), 1491–1527. https://www.journals.uchicago.edu/doi/10.1086/424932

18. Goldberg, S. K., Rothblum, E. D., Russell, S. T., & Meyer, I. H. (2020). Exploring the Q in LGBTQ: demographic characteristic and sexuality of queer people in a US representative sample of sexual minorities. *Psychol Sex Orientat Gend Divers, 7*(1), 101–112. https://doi.org/101–112. 10.1037/sgd0000359

19. Gonsalves, T. (2020). Gender identity, the sexed body, and the medical making of transgender. *Gender & Society,* 34(6), 1005–1033. https://doi.org/10.1177/0891243220965913

20. Haig, D. (2004). The inexorable rise of gender and the decline of sex: social change in academic titles, 1945–2001. *Archives of Sexual Behavior,33*(2), 87–96. https://doi.org/10.1023/b:aseb.0000014323.56281.0d

21. Hammack et al (2022). Gender and sexual identity in adolescence: a mixed-methods research of labeling in diverse community settings. *Journal of Adolescent Research*, 37(2), 167–220. https://doi.org/10.1177/07435584211000315

22. Hatch, H. A., Warner, R. H., Broussard, K. A, & Harton, H. C. (2022). Predictors of transgender prejudice: a meta-analysis. *Sex Roles, 87*(11), 583–602. https://andifugard.info/predictors-of-transgender-prejudice-a-meta-analysis/

23. Heidari, S., Babor, T. F., De Castro, P., Tort, S., & Curno, M. (2016). Sex and gender equity in research: rationale for the SAGER guidelines and recommended use. *Research Integrity and Peer Review, 1*(1), 2. https://doi.org/10.1186/s41073-016-0007-6

24. Heintz, J., Kabeer, N., & Mahmud, S. (2018). Cultural norms, economic incentives and women's labour market behaviour: Empirical insights from Bangladesh. *Oxford Development Studies*, 46(2), 266-29. https://doi.org/10.1080/13600818.2017.1382464

25. Henderson, E. R., Blosnich, J. R., Herman, J. L., & Meyer, I. H. (2019). Considerations on sampling in transgender health disparities research. *LGBT Health,* 6(6), 267–270. https://doi.org/10.1089/lgbt.2019.0069

26. Hsieh, M.Y. (2024). An empirical investigation into the enhancement of decision-making capabilities in corporate sustainability leadership through Internet of Things (IoT) integration. *Internet of Things 28*(2024), 101382–101397. https://doi.org/10.1016/j.iot.2024.101382.

27. Huang, C.-C., Li, S.-P., Chan, Y.-K., Hsieh, M.-Y., & Lai, J.-C. M. (2023)-a. Empirical Research on the Sustainable Development of Ecotourism with Environmental Education Concepts. *Sustainability, 15*(13),10307. https://doi.org/10.3390/su151310307

28. Huang, C.-C., Li, S.-P., Chan, Y.-K., Hsieh, M.-Y., & Lai, J.-C. M (2023)-c. Empirical Research on the Sustainable Development of Ecotourism with Environmental Education Concepts. *Sustabilit*y, 15(13), 10307-10322. https://doi.org/ 10.3390/su151310307.

29. Huang, C.-C., Li, S.-P., Lai, J.-C. M., Chan, Y.-K., & Hsieh, M.Y. (2023)-b. Research on the International Sustainable Practice of the Taiwanese Food and Agricultural Education Law under the Current Global Food Security Challenges. *Foods 12*(14), 2785–2805. https://doi.org/ 10.3390/foods12142785\

30. Hyde, J.S., Bigler, R.S., Joel, D., Tate, C. C., & van Anders, S. M. (2019). The future of sex and gender in psychology: five challenges to the gender binary. *American Psychologist,* 74(2), 171–193. https://doi.org/10.1037/amp0000307

31. Kao, C., Polachek, S. W. , & Wunnava, P. V. (1994). Male-Female Wage Differentials in Taiwan: A Human Capital Approach. *Economic Development and Cultural Change, 42*(2),351–374. http://www.jstor.org/stable/1154446.

32. Khanna, K, & Meadow, T. (2023). The fragile male: an experimental research of transgender classification and the durability of gender categories. *Gender & Society*, 37(4), 553–583. https://doi.org/10.1177/08912432231180152

33. Kolber, J. (2023). Gender Category and Gender Status: A Critical Distinction. *Symbolic Interaction, 46*(4), 417–4390. https://doi.org/10.1002/symb.665

34. Lei, M. K., Simons, R. L., Simons, L. G., & Edmond, M. B. (2014). Gender Equality and Violent Behavior: How Neighborhood Gender Equality Influences the Gender Gap in Violence. *Violence and Victims, 29*(1), 89–108. https://stacks.cdc.gov/view/cdc/29901

35. Lewis, D. C., Flores, A. R., Haider-Markel, D. P., Miller. P. R., & Taylor, J. K. (2022). Transitioning opinion? Assessing the dynamics of public attitudes toward transgender rights. *Public Opinion Quarterly, 86*(2), 343–368. https://doi.org/10.1093/poq/nfac014

36. Lorber, J. (1996). Beyond the binaries: depolarizing the categories of sex, sexuality, and gender. . *Sociological Inquiry, 66*(2),143–160. https://doi.org/10.1111/j.1475-682X.1996.tb00214.x

37. Lundborg, P., Plug, E., & Rasmussen, A. W. (2017). Can women have children and a career? IV evidence from IVF treatments. *American Economic Review, 107*(6), 16111637. https://doi.org/10.1257/aer.20141467

38. Martin, A. E, & Slepian, M. L. (2021). The primacy of gender: gendered cognition underlies the big two dimensions of social cognition. *Perspectives on Psychological Science, 16*(6),1143–1158. https://doi.org/10.1177/1745691620904961

39. Martin, A. E., & Mason, M. F. (2022). What does it mean to be (seen as) human? The importance of gender in humanization. *Journal of Personality and Social Psychology, 123*(2), 292–315. 10.1037/pspa0000293

40. Meurs, M., & Giddings, L. (2021). Elder care and paid work: Gender differences in the relationship between unpaid elder care work and employment in Bulgaria. *Journal of European Social Policy, 31*(2), 223–238. https://doi.org/10.1177/0958928720974181

41. Mishel, E., England, P., Ford, J., & Caudillo, M. L. (2020). Cohort increases in sex with same-sex partners: Do trends vary by gender, race, and class? *Gender & Society, 34*(2), 178–209. https://doi.org/10.1177/0891243219897062

42. Monro et al. (2021). Intersex: cultural and social perspectives. *Culture, Health & Sexuality, 23*(4), 431-440, https://doi.org/10.1080/13691058.2021.1899529

43. Morrissey, T. W. (2017). Child care and parent labor force participation: A review of the research literature. Review of Economics of the Household, 15(1), 1–24. https://doi.org/10.1007/s11150-016-9331-3

44. Nordmarken, S. (2023). Coming into identity: how gender minorities experience identity formation. *Gender & Society, 37*(4), 584–613. https://doi.org/10.1177/08912432231172992

45. Oaxaca, R. (1973). Male-female wage differentials in urban labor markets. *International Economic Review, 14*(3), 693–709. https://doi.org/10.2307/2525981

46. Peto, R.,& Reizer, B. (2021). Gender differences in the skill content of jobs. *Journal of Population Economics, 34*, 825–864. https://doi.org/10.1007/s00148-021-008256.

47. Puckett, J.A., Tornello, S., Mustanski, B., & Newcomb, M.E. (2022). Gender variations, generational effects, and mental health of transgender people in relation to timing and status of gender identity milestones. *Psychology of Sexual Orientation and Gender Diversity, 9*(2), 165–167. https://doi.org/10.1037/sgd0000391

48. Ridgeway, C. L.,& Saperstein, A. (2024), Diversifying Gender Categories and the Sex/Gender System, *Annual Review of Sociology, 50*, 385–405. https://www.annualreviews.org/content/journals/10.1146/annurev-soc-030222-035327

49. Ridgeway, C. L., & Correll, S. J. (2004). Unpacking the gender system: a theoretical perspective on gender beliefs and social relations. *Gender & Society, 18*(4), 510–531. https://doi.org/10.1177/0891243204265269

50. Ritz, S. A., & Greaves, L. (2022). Transcending the male-female binary in biomedical research: constellations, heterogeneity, and mechanism when considering sex and gender. *International Journal of Environmental Research and Public Health, 19*(7), 4083. https://doi.org/10.3390/ijerph19074083

51. Rodriguez-Loureiro, L., Vives, A., Martínez Franzoni, J., & Lopez-Ruiz, M. (2020). Health inequalities related to informal employment: Gender and welfare state variations in the Central American region. *Critical Public Health, 30*(3), 306–318. https://doi.org/10.1080/09581596.2018.1559923

52. Russell, S. T., Bishop, M. D., & Fish, J. N. (2023). Expanding notions of LGBTQ+. *Annual Review of Sociology, 49*, 281–296. https://doi.org/10.1146/annurev-soc-030320-032256

53. Seguino, S. (2000). Gender Inequality and Economic Growth: A Cross-Country Analysis. World Development, 28(7), 1211–1230. https://doi.org/10.1016/S0305750X(00)00018-8

54. Shih, C.-M., Lai, J.-C. M., Chan, Y.-K., Hsieh, M. Y., & Meen, T.-H. (2023)-a. Acceptance and Use of Sensor Technology in Diagnosis of Gender Dysphoria. *Sensors and Materials*, 35(8), 2771–2782. https://sensors.myu-group.co.jp/sm_pdf/SM3353.pdf

55. Shih, C.-M., Lai, J.-C. M., Chan, Y.-K., Hsieh, M.Y., & Meen, T.-H. (2023)-b. Important Elements of Sensor Technology and Data Management and Related Education. *Sensors and Materials, 35*(4), 1161–1170. https://doi.org/10.18494/SAM4015.

56. Springer, K. W., Mager Stellman, J., Jordan-Young, R. M. (2012). Beyond a catalogue of differences: a theoretical frame and good practice guidelines for researching sex/gender in human health. *Social Science & Medicine,74*(11):1817–1824. https://doi.org/10.1016/j.socscimed.2011.05.033

57. Stoet, G., & Geary, D. C. (2018). The Gender-Equality Paradox in Science, Technology, Engineering, and Mathematics Education. Psychological Science 29(4), 581–593. https://doi.org/10.1177/0956797617741719

58. Sudai, M., Borsa, A., Ichikawa, K., Shattuck-Heidorn, H., Zhao, H., & Richardson, S. S. (2022). Law, policy, biology, and sex: critical issues for researchers. *Science*, *376*(6595), 802–804. https://tinyurl.com/y6zd9eld

59. Suen, L.W., Mitchell R Lunn, M.R., & Katuzny, K. et al., (2020). What sexual and gender minority people want researchers to know about sexual orientation and gender identity questions: a qualitative research. *Archives of Sexual Behavior, 49*(7), 2301–2318. https://doi.org/10.1007/s10508-020-01810-y.

60. Sumerau, J. E., & Lain, A. B. M. (2020). Foreclosing fluidity at the intersection of gender and sexual normativities. *Symbolic Interaction, 43*(2):205–234. https://doi.org/10.1002/symb.431

61. Van Emmerik, I. J. H. (2006). Gender differences in the creation of different types of social capital: A multilevel research. *Social Networks, 28*(1), 24–37. https://dspace.library.uu.nl/handle/1874/19135

62. Vidal-Ortiz, S. (2008). Transgender and transsexual studies: sociology's influence and future steps. *Sociology. Compass*, 2(2), 433–450. https://doi.org/10.1111/j.1751-9020.2007.00086.x

63. Westbrook, L. (2023). The matrix of violence: intersectionality and necropolitics in the murder of transgender people in the United States, 1990–2019. *Gender & Society,* 37(3):413–446. https://doi.org/10.1177/0891243223117

64. Westbrook, L., & Saperstein, A. (2015). New categories are not enough: rethinking the measurement of sex and gender in social surveys. *Gender & Society, 29*(4):534–560. https://doi.org/10.1177/08912432155847

65. Wirba, E. L., Akem, F. A., & Baye, F. M. (2021). Earnings gap between men and women in the informal labor market in Cameroon. *Review of Development Economics, 2*5(3), 1466–1491. https://doi.org/10.1111/rode.12765

Publisher's Note: IIKII remains neutral with regard to claims in published maps and institutional affiliations.