

Gender, Technology and Nursing

Impacts of Technological
Advancements on Women
Nurses in Norway

The
Gender
Equity
Initiative



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Acknowledgement of Country

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The Gender Equity Initiative hosts talented University of Melbourne Master's student interns who lead projects across a range of gender equity issues. The interns produce reports covering pressing and timely topics in this area.

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1.Introduction

Technological leaps increasingly affects nursing worldwide, bringing about substantial change and subversion. The new landscape of global health systems, reshaped by technology, poses complex and unprecedented challenges to the nursing profession. With the changes in global demographic structure and the crisis of population aging, nursing shortage has become one of the most urgent public concerns. In particular, the outbreak of COVID-19 has made the importance of public health and nursing acutely recognized and discussed. Nordic welfare states have been quick to incorporate new technological advances into the future of care with the aim of improving care efficiency and reducing economic costs (Archibald & Barnard, 2018). Technological advances such as artificial intelligence (AI), automated machines, 5G, virtual reality (VR) and augmented reality (AR), and the intelligent Internet of Things (IoT) have been widely used in public health and nursing fields. Predictably, there is a growing trend to adopt technoscience as a solution to future healthcare challenges.

However, gender power disparities and inequalities in nursing have persistently existed, deeply entrenched in historical and institutional contexts. It is considered a female-dominated profession, with low wages and grossly undervalued labor (Ravenswood & Harris, 2016). Nursing work is inherently gendered – it is expected to be done by women and is seen as an innate female quality (Nentwich & Kelan, 2014). Despite Norway's many efforts to eliminate gender inequality, its workforce is still marked by traditional gender patterns, especially in the nursing field. In addition, the emergence of technological advancements will have gender-differentiated impacts. Frennert's (2021) research on gender and technology shows that when technological changes occur in the workplace, jobs previously performed by women will be replaced, but job opportunities for men will increase. Equality issues are today more widely exploited to serve the goals of development and economic efficiency (Faulkner, 2001). Failure to examine whether and how the integration of technology and nursing reproduces and amplifies gender inequalities risks undoing the gains that have been made toward gender equality, while missing out on the opportunities it could have to improve women's future in the workplace.

In this sense, we cannot address workplace gender relations without sensitively scrutinizing technological advances and judiciously exploiting them. This study focuses on how new technologies impact the labor market in traditionally gendered industries. There is abundant research on how technology affects gender power gaps and inequalities in male-dominated tech industries, especially AI companies, but there is little research on how technology affects female-dominated sectors such as nursing, teaching, etc. In order to fill this gap, we chose the field of nursing in Norway as the context for this study, which involves two reasons: 1) the Norwegian nursing industry is internationally renowned and is generally regarded as an advanced and high-quality nursing system that actively incorporates new technologies, such as electronic medical record systems (EMR), smart health devices, remote monitoring and remote care, robot-assisted care, etc.; 2) , Norway is recognized as one of the

countries with the highest rates of gender equality, and the income of nursing staff is also ranked fourth in the world (annual salary is 108,072 US dollars, twice the average annual income per capita in Norway of 60,000 US dollars). This report will examine how, even in a society where a career in nursing is promising, gender inequality manifests and is shaped by the incorporation of new technologies. By excluding the interference of major structural factors that exist in other societies (such as religion, poverty, etc.), Norway can be relatively representative and persuasive in examining the impact of technology on gender inequality in the nursing field.

This report is structured as follows: First of all, it discusses the hijacking of technology, revealing how technology creates more tasks for women and reproduces unhealthy work environments; second, it reveals that technology is reshaping the gender division of labor, displacing more women and absorbing more Many males; finally, based on the above findings we explore how to pursue more positive and equitable gender transformative changes in the future of nursing.

Method

This is a qualitative study using methods including a literature review, internet information retrieval and data analysis. First of all, it sorts out the research results and theoretical perspectives in the fields of feminism, technology and nursing through a systematic and focused literature review, providing a theoretical framework for the exploration of research issues. Using network information retrieval, especially on social-media platforms such as instagram, twitter, and tiktok, a lot of empirical data is collected, allowing for an objective understanding and analysis of the research object. Finally, through data collection and analysis, we combined them with academic evidences to arrive at conclusions and findings. The combination of these research methods provides a comprehensive and in-depth perspective for this study, which helps to solve the research problem and achieve the goal.

2. Technological hijacking: Improving efficiency at the cost of burdening caregivers

2.1 Generating more workload

Nursing has historically been regarded as a low-value labor job. This is firstly because it is not considered a real “job”, which relates to a prejudice that care work is a part-time job undertaken by some housewives to supplement family income rather than a real career (Folbre & Nelson, 2000), and secondly It’s because nursing skills and knowledge are under-recognised or, in other words, grossly undervalued. In a male-dominated public business society, nursing was once viewed as an unskilled job based on traditional skills assessment, requiring few formal or professional skills (Ravenswood & Harri, 2016). However, nursing is a highly skilled job that requires tertiary study. Nursing work involves not only the physical tasks of cleaning, dressing and feeding, but also sometimes technical tasks (Cohen, 2015), with the basic task of maintaining the recipient's health system and assisting with necessary activities (Kitson et al., 2013). Importantly, nursing places high demands on observation, judgment, cognitive and emotional intelligence, and relationship-building abilities, all of which are largely aided in assessing the physical and psychological state of the recipient in order to provide appropriate care.

Partly due to this bias, people take it for granted that technologies such as artificial intelligence, automation, and robotics can aspects of caregiving including simple or basic tasks, thereby greatly improving the efficiency of caregiving. However, a large number of studies have found that the application of technology in public health and nursing does not automatically improve efficiency and save time. Counterintuitively, it even creates a greater workload for caregivers. Bergschöld (2018) demonstrated that the incorporation of technology in the Norwegian nursing field has brought about requirements and expectations that were not previously placed on employees. For example, nursing staff must record all visits in a digital manner and perform nursing services in accordance with the instructions of technical equipment to a large extent. This results in not only failing to improve nursing efficiency, but also increasing workload and sacrificing the quality of nursing care. There is a lively debate on this point. Proponents argue that technology-based applications and devices can maximize the well-being of care recipients by integrating health data and tailoring information to personalize health care regimens. Opponents, on the other hand, stress that technology-based care often leads to depersonalization of care due to an overreliance on algorithms and data. In addition, a significant obstacle in nursing work is the decentralization of nursing tasks, and the participation of robots in drug administration will exacerbate its decentralization (Archibald and Barnard, 2018). Leonardsen et al. (2023) investigated the attitudes of nurses working in geriatric care towards the implementation of digital technologies in healthcare, uncovering a significant amount of negative feedback on the use of digital technology devices in geriatric care. Specifically, while the use of digital devices

enables more efficient communication between medical professionals and faster access to patient information, caregivers need to devote more time and patience to teaching older adults how to use digital technology, and sometimes even couldn't successfully explain it to the elderly. Also, older adults can be resistant to using digital technology devices for fear of being deceived. Hence, the application of technology for the purpose of improving efficiency has caused a greater workload for nursing staff (mostly women), both physical and mental.

2.2 Reproducing unhealthy workplaces for women

The nursing profession has traditionally been dominated by women, and female-dominated workplaces are often characterized by strict supervision, which has long caused physical and mental stress for women, as evidenced by the very high rate of sick leave reporting among women (Frennert, 2021). The inclusion of technology will worsen the working environment for women. Bergschöld's (2018) study on the integration of community nursing and digital systems found that digital technologies reproduce the demanding working patterns and environments for community nursing staff to work in. Specifically, some digital systems require nursing staff to report entering and leaving recipients. Nursing services are provided according to routine nursing tasks and prescribed rhythm during home hours. This harsh supervision can cause an increase in mental load. Another study showed that the introduction of ICT not only harms nursing staff's working conditions but also reduces their work discretion (Kirchhoff et al., 2021). Furthermore, some cases of digital transformation failure are often blamed on human behavioral issues and on caregivers' lack of skills, motivation, and diligence, which subtly echoes the stereotype that women are not good with technology (Frennert, 2021). Overall, the incorporation of technology into nursing practice has the potential to worsen the work environment for female employees..

Furthermore, as the public health and nursing sectors in Norway expanded, demand for labor resulted in a large number of unskilled workers being employed as nursing assistants, who have a greater disadvantage in understanding, learning and using new technologies than those with adequate education in health and nursing. In particular, in the municipal nursing and care sector at the lower end of the medical hierarchy, unskilled nursing staff make up the majority of all nursing staff, while registered nurses still account for less than 30% (Høst, Seland & Skålholt, 2015). Although this is to some extent beneficial to female applicants who plan to combine family care and paid work, assistant nurses do not gain more flexibility and autonomy, but instead replicate the vulnerable situation of nurses (Henriksson, 2008). First of all, with the widespread and in-depth application of technology in nursing, part-time nursing staff who originally do not have sufficient technical and professional knowledge will face a major challenge - how to adapt to new technologies and equipment to provide basic care in an understanding way, which requires additional time invested in learning and training. Secondly, considering the high labor costs, employers may be inclined to reduce full-time positions and adopt a recruitment model in which part-time work dominates, which will affect the employment opportunities and stability of nursing staff. Employment uncertainty is

positively associated with high turnover rates and the consequent costs are reflected in the quality of care (Brannon et al., 2002). This is because care is a personal relationship that relies on the caregiver's knowledge of the recipient's health status and preferences. Employee turnover suspends the relationship, and both the new employee and the recipient need to readjust to each other (Castle et al., 2007).

3. Reshaping the gender division: More men are included while women are replaced?

3.1 Replacement of both physical and emotional labor

The replacement of human labor by AI and automation has been discussed for a long time. Robotic technology has independently and directly participated in basic care, and is rapidly growing and being diversified in the medical and nursing fields. For example, NurseBot, an intelligent nursing robot designed specifically for the medical field, can manage medication for patients, prepare and deliver food, drive cars and provide automatic shower services. IoT is used to collect patient health data and monitor movement to prevent falls (Mieronkoski et al., 2017). Robots HelpMate and CareOBot can transport medicines and move patients independently (Archibald & Barnard, 2018). It is foreseeable that many tasks that rely on human labor in the nursing environment can be completed by technology, which first means that the work performed by women in the past is replaced. Notably, in addition to physical labor, there is an essential invisible labor in nursing work-emotional labor. According to Hochschild's (1983) emotional labor theory, emotional labor is when workers control their emotional states so that their feelings and/or visible emotional expressions meet organizational or management requirements and expectations. In particular, she notes that in service industries, emotional labor is often closely tied to gender and class. In professions such as nursing that involve emotional communication and emotional expression, women are expected to provide emotional labor, which is seen as a necessary "soft skill." Nursing practice methods related to emotional labor include emotion recognition and management, listening and building emotional connections, etc. Emotional labor is critical in care work, particularly for care recipients who suffer from depression, have few visitors, and mobility impairments (Lopez, 2006).

Due to society's gender stereotypes and gender expectations, emotional labor has been primarily performed by women, which gives women a certain advantage when hiring. However, technological applications are eroding this last advantage of women. Recently, robots have emerged in the role of emotional care, with more professional, intelligent and humane designs. For example, the companion robot JustoCat and the therapeutic seal PARO can provide complex emotional services such as psychological support and treatment, which indicates that robot care can become an alternative in the future and

accelerate the replacement of manual care (Archibald & Barnard, 2018). This transfer of “soft skills” can profoundly impact the nursing labor market. As the function of providing emotional support and care is replaced, the labor skills of female caregivers will be further devalued, followed by fewer employment opportunities and more limited promotion opportunities. However, despite significant progress in AI in emotion recognition and generation, such as emotion recognition and natural language processing, there are still significant limitations, especially when it comes to flexibility in response. For example, human caregivers are able to flexibly adjust their emotional expressions according to specific situations, while technology is difficult to achieve this level of sophistication and complexity. In addition, nursing involves a complex understanding of the patient's cultural background and ethical needs in order to provide appropriate and necessary care, which is difficult to achieve with current technology. In summary, it is widely recognized that technology can mainly perform mechanical tasks and cannot truly communicate with humans emotionally, which is why the emotional labor dominated by women in nursing should not be underestimated or replaced by technological applications.

3.2 The surge in technical jobs, often male-dominated

The replacement of some manually performed jobs by automated systems has not only led to a significant reduction in female-dominated nursing jobs, but has also led to an increase in technical and managerial positions that are often male-dominated. Men generally enjoy higher technical status than women, especially technical abilities (Faulkner, 2001). On the surface, more men entering the nursing field will help weaken the traditional concept and social prejudice that “nursing is a profession for women”. However, evidence of the “glass escalator effect” of Williams (1992) shows that men entering female-dominated occupations will quickly advance to positions of authority such as managers and receive higher salaries, exacerbating the gender gap. Data indicate that in the aged care sector, 92% of nurses are female and 16.5% of managers are male (Hedlin, 2023). In addition, the wage gap between men and women is particularly obvious in the public health sector, where it is 26% in high-income countries such as Nordic countries and 29% in middle-income countries (Betron, 2019). Additionally, research on nursing education and training environments demonstrates the existence of gender asymmetries. Ethnic minority men have more educational opportunities than minority women, and male nursing apprentices enjoy a certain special status and receive various types of benefits such as salary bonuses that female nursing apprentices do not have (Brunila & Ylöstalo, 2015).

Although nursing is considered a feminine profession, men have historically and currently held leadership roles in the nursing field, and this leadership and decision-making position for men also extends to the context of technology inclusion in nursing. A recent study uncovered that most IT technicians are male and hold high power in technology decisions, and interestingly, rarely have any nursing work experience (Frennert, 2021). This indicates that

men in nursing technology have greater decision-making power and privileges than women in the procurement and implementation of care, which may involve changes to care applications, equipment, and care services. As mentioned earlier, nursing work, which is mainly dominated by women, has been viewed as unskilled. The role of female care workers is seen as an undifferentiated extension of their caring role within the family (Brunila & Ylöstalo 2015) and is therefore low-valued and poorly paid. When nursing jobs are reduced, those who remain are often in part-time, assistant positions, with limited career options and vertical mobility. Men are considered more qualified for technical jobs, and these technical positions are usually well paid (García-Ull & Melero-Lázaro, 2023). As a result, men entering the nursing field will enjoy more material and symbolic advantages than women in terms of salary, promotion opportunities and job positions, which will lead to an increase in the gender gap in the labor market and further widening inequality.

In addition, when artificial intelligence is applied in the recruitment and hiring process, although it improves efficiency and accuracy, it can cause gender bias and make discriminatory decisions. Gender stereotypes are inherent ideas and biases of a society about gender, involving perceptions of the characteristics, behaviors, and expectations of men and women. Research by García-Ull & Melero-Lázaro (2023) found that images generated in the health and science fields perpetuate gender stereotypes. Specifically, women in the medical field, particularly nursing, are highly represented in the AI-generated images. When the word "doctor" is introduced, the generated results include 77% male images and 23% female images. However, when searching for the word "nurse," 100% of the results generated were images of women. This is because the data used to train the artificial intelligence model lacks diversity and contains gender stereotypes, causing the artificial intelligence model to learn and reproduce gender stereotypes. It is also because developers and designers, who are mainly male in the AI industry, may reflect their gender expectations in design and testing, leading to the continuation of gender stereotypes. AI that perpetuates gender bias can exacerbate gender discrimination by making automated decisions. For example, designers exclude women by incorporating stereotypically masculine gender characteristics such as leadership into hiring. Also, AI assistants with a feminine temperament are always designed to be beautiful and service-oriented, while AI assistants with a masculine temperament are designed to be powerful and domineering. This kind of stereotypical ideas and gender bias reflected in AI products are fueling gender discrimination and perpetuating inequality in ways that cannot be predicted and controlled.

4. Discussion: How to promote gender transformative changes?

4.1 Alleviating gender segregation in VET

To improve gender equality in the nursing field, first of all, we should focus on the supply of talents-Vocational Education and Training (VET). Formal nurse training in Norway dates back to 1886. Since then, health and nursing have been the most popular vocational education and training programs for female applicants. Despite numerous efforts to eliminate gender segregation through decades of gender research and policy initiatives, as well as changes in the labor market brought about by trends such as globalization and digitalization, traditional patterns of gender segregation persist in Norway (Imdorf et al., 2015). Men and women are segregated in different social, educational, work or public spaces, with restricted interactions and activities (de Beauvoir, 1949). Even in Nordic welfare countries such as Norway, Sweden, and Finland, the equality policies promoted by the government are mainly aimed at workplace life, and education policies contain relatively few specific measures to integrate gender equality into all educational activities. In numerous education policy statements, gender equality remains on paper, without providing any substantive guidance on how to take action to promote equality. Although public administration is committed to gender mainstreaming, this effort is not applied in education (Brunila & Ylöstalo, 2015). The Norwegian government has been trying to actively seek changes in the field of VET in the field of nursing. However, path dependence is likely to be caused and reproduced by multiple factors such as technological changes and cultural traditions. When it comes to nursing education and training, gender segregation still prevails (Sörensdotter, 2008). In order to adapt to new needs, nursing education must seek gender-transformative changes. There are a number of recommendations that could be made to mitigate gender segregation in nursing through equal participation in the transition from school to work, including:

- 1) Challenging traditional "gender roles." Through mixed gender education in the early education stage, for example, boys and girls study nursing technology, handicrafts, sports and other subjects together in ordinary courses, and encourage teamwork to encourage students to develop their personal interests in an all-round way without gender differences.
- 2) Using technology to make nursing more attractive to male students. Gender equality can be improved by making traditionally female-dominated professions more enticing to men. For example: using virtual reality technology (VR) to develop nursing-related educational games to simulate real nursing scenarios, and attract boys to understand and challenge nursing work through gamified experiences and practical learning methods.

3) Setting role models. Through channels such as social media, online forums and campus events, we can vigorously promote male role models in nursing and share the experiences and stories of men who have successfully entered nursing careers to show boys that nursing is not only a female domain but also a field for men. Areas where talents can be used.

4) Revising nursing education curricula to accommodate the integration of nursing and technology to take into account the acceptance and implementation of technology. Educational institutions need to focus on cultivating the technical knowledge and operational abilities of nursing staff. Besides, social forces should jointly promote interdisciplinary collaboration in nursing education, such as creating more opportunities for nursing students to collaborate with engineers and technical experts and providing them with more gender-inclusive learning spaces.

In short, we need to integrate gender-inclusive awareness and practice into technology-nursing integrated education with a long-term mindset, focusing on disrupting the equation between masculinity and technology, while undermining women's internal and external resistance to technology, which should be an ongoing and dynamic agenda.

4.2 Call for power related to technology and gender equality at the decision-making level

Technology is not gender-neutral and has been constructed through inequalities, exclusions, power and privilege in the context of who is and is used, and in turn replicates these inequalities (Atenas et al., 2022).

There may be a material relationship between gender and technology that shapes each other, with technology being both the source and the result of gender (Faulkner, 2001). As a consequence, despite the challenges, how women's empowerment can be used to reverse-shape the gender and impact of technology is a possible opportunity. A major challenge to gender change in the healthcare sector is the absence of female representation in decision-making positions. Only 25% of global health organizations have achieved gender parity in senior management. This is not due to lack of interest in expertise and educational attainment or career commitment. It is due to systemic gender discrimination and denial of promotion opportunities (Betron, 2019). Decision-making in the health and nursing fields is still dominated by men, with implicit patriarchal norms and the same glass ceiling for women's career advancement as in other fields. Based on this, the starting point for change is to systematically empower and opportunity women in decision-making leadership positions. Possible strategies and methods include:

First, the national government should ensure that more women occupy decision-making positions in the public health sector through legislation and politics, and encourage and support women to actively contribute their opinions in policy making. For example, gender

quotas can be adopted to stipulate a certain proportion of medical institution board members. In addition, an equal and supportive maternity and paternity leave system should be promoted for all medical staff to ensure that women are not treated differently or discriminated against because of childbirth. At this point, we must recognize that men play a vital role in the fight for gender equality.

Second, mechanisms to promote gender diversity within medical institutions should be implemented, mainly including setting opportunity indicators, promotion and cooperation opportunities based on the principle of gender equality. For example, reserving a certain proportion of leadership positions for women in technical departments and establishing partnerships with technology suppliers committed to gender equality.

Third, support and resources. On the one hand, provide leadership training and development programs for female medical staff in the context of technology and nursing integration, including training in decision-making methods, management knowledge, technological change, etc., to systematically enhance the leadership potential of female nurses. On the other hand, individual-family friendly policies are advocated to assist female caregivers in balancing career, family and personal life, such as flexible work shift arrangements, menstrual leave and parental leave, etc.

Fourth, incentive mechanisms. Societies and communities should establish incentive and reward mechanisms, especially for female leaders and teams in the technical sector. They should be used as excellent female role models to vigorously publicize their contributions to the technological transformation of the organization, so as to inspire the career development of other women and form a virtuous leadership development cycle.

Women in global health are catalysts for change in health for all (Brunila & Ylöstalo, 2015). We propose the above strategies and approaches to promote gender transformative change at all levels of country, society, industry and community to promote gender in the health workforce equality and ensuring the representation and upward mobility of women in leadership positions in the health workforce. This requires ongoing consultation and effort among interests among policy makers, the education sector, employers, funders and equality promoters.

5. Limitations

This analysis is subject to the following limitations. First, the investigation was conducted primarily through a literature review, incorporating online information, which must be acknowledged as potentially limiting the timeliness and accuracy of the research results. The research subjects were only Norwegian nursing staff. However, to the extent that Norway's status as a gender equality success story fails to reflect the wider phenomenon of gender inequality, this may contribute to a lack of generalizability. Additionally, this analysis

incorporated nurses' self-reports on social media. These representations may not necessarily be true, given the ways people may exaggerate on social media to gain more attention and recognition. Additionally, our sample may be biased due to the rather limited number of caregivers with whom we had access. Despite these potential limitations, this analysis is contributory and illuminating. It reflects on the range of impacts and challenges that technology and care integration brings to gender equality, and advocate for a predictive perspective and transformative change. In particular, we extend the perspective from the labor market to the educational institutions that provide talent, which helps to understand the full picture of the health workforce and gender issues.

6. Conclusion

This research on the interplay of technology, care and gender in Norway shows that new technologies such as artificial intelligence, robotics and digitalization will exacerbate gender inequalities. First, technology hijacks the workload on female employees and worsens their workplace environment; in addition, technology has the potential to drive women out of the nursing labor market while incorporating more men, with a greater gender gap in income and promotion opportunities. Change for gender equality in nursing cannot wait. Adapting to this change requires a new narrative where we must connect technology, the care workforce and the gender equality work agenda. In the field of education, the goal of gender inclusivity must be achieved through changes step by step, and it is believed that one small change will initiate another change, and ultimately form an advanced new gender ecology. Changes in nursing labor market decision-making and behavior urgently require social policies that promote gender equality, incorporating concepts of gender inclusion, and technical training that transcends gender traditions.

Nordic welfare states such as Norway, Finland, and Iceland are often regarded as ideals of gender equality. However, gender equality is not an all-encompassing success story; it is often limited and partial. Sometimes the progress of equality that has been achieved, and the daily practice of inequality, may still conspire with new variables like technology to exacerbate existing inequalities, or even burn down the equality that has been achieved. At the intersection of gender, technology and care, gender inequality is not only presented as a phenomenon, but also reflected in methods, tools and processes. It is not enough to simply recognize that men as a group have historically and currently have supremacy over women, feminism needs to look to future dynamics. In this sense, gender equity requires the integration of a vision and agenda for technological change that transforms technology into a more inclusive, diverse and gender-friendly practice. We must first embed gender in the context of technology implementation as a way to calibrate the direction of change and correct possible missteps. Only by recognizing the deep-rooted ways it affects our work and lives, or the new tools it uses, can we make real change. Today, when technology is changing

with each passing day, understanding technology is the first step, and using technology critically is the second step. Finally, feminism requires in-depth dialogue, learning and reflection with new forces to create dividends of gender change in the future workplace.

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