**Redefining Power Structure: STEMinism and Intersectional Activism**

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**ABSTRACT**

In recent years, there has been a growing movement called STEMinism, which includes feminism and areas in the STEM field. This movement aims to fight against sexism and promote women’s rights in a male-oriented society. This paper tries to understand what is STEMinism, how it has evolved, what problems prevail, and how it may alter the course of STEM subjects. Utilizing a feminist lens along with critiques of the STEM education and workforce, the research aims to prove that for STEMinism feminists’ consciousness is a possibility to define and fight with structural oppression in STEM. Based on literature review of STEMinism it was apparent that certain dimensions were fixed rather thoroughly examined that include women in STEM fields, inequalities, stereotypes and prejudice rising in the career ladder as well as positionality and intersectionality of feminist reviews in and of STEM. Subsequently, there are important gaps that still need to be explored like parts located in the intersectional focus on STEMinism and issues of oppression of certain groups within STEMinism. What is clear is that through an analysis of race, gender, class and other identifying characteristics within the discipline such as STEMinism, one is able to appreciate the challenges facing minority groups and the relations of power within these structures more vividly. Overall, in this paper, this factor is intended to underscore the importance of using an intersectionality approach when investigating STEMinism. This restates the real need of allowing the eloquent connection between sociocultural identities and the power relations when building a more egalitarian and inclusive STEM community for all.

**Keywords:** STEM, Women, Gender, Class, Identity, Power structures, Experience.

**I. INTRODUCTION**

STEMinism is a development that advocates for orientation balance and strengthening in the field of science, innovation, designing, and math (STEM). Coming from the more extensive women's activist development, STEMinism looks to address the foundational obstructions and predispositions that have generally minimized women and other underrepresented bunches in STEM disciplines. By advancing variety, inclusivity, and equivalent open doors in these fields, STEMinism expects to make a more impartial and creative society. At its centre, Lundy-Wagner and his team along with McGee argues that, STEMinism challenges the generalizations and misinterpretations that have long propagated the possibility that STEM fields are innately male-overwhelmed or more qualified for men [1]. In addition, Kahn and Ginther comments, it perceives the commitments of women over the entire course of time in progressing logical information and mechanical headways, while additionally recognizing the relentless orientation differences that keep on existing in STEM [2]. By bringing issues to light of these issues and upholding for change, STEMinism looks to move and support women and young women who are keen on seeking after professions in STEM. One of the vital parts of STEMinism is the significance of portrayal. Ceci explains that, at the point when women and other underrepresented bunches see themselves reflected in STEM fields, whether as scientists, specialists, software engineers, or mathematicians, it can effectively affect their goals and feeling of having a place [3]. By featuring the accomplishments and encounters of different people in STEM, STEMinism attempts to destroy the idea that these fields are selective to a specific orientation or segment. Additionally, McKinnon and O’Connell discuss that, STEMinism perceives that accomplishing orientation correspondence in STEM requires tending to clear segregation, yet additionally the unobtrusive predispositions and underlying boundaries that can impede the headway of women and underrepresented gatherings [4]. This incorporates handling issues, for example, oblivious predisposition in recruiting and advancement processes, absence of admittance to mentorship and systems administration, amazing open doors, and inconsistent compensation and acknowledgment for similar work. According to Walker, by upholding fair and comprehensive practices inside STEM establishments and working environments, STEMinism plans to establish conditions where all people can flourish and contribute their interesting viewpoints and abilities [5].

Intersectionality is another imperative viewpoint of STEMinism, recognizing that gender disparity in STEM is frequently compounded by other shapes of segregation based on race, ethnicity, sexuality, inability, or financial status, states Garcia-Holgado and his researchers [6]. By taking an intersectional approach, STEMinism looks to address the complex and interconnected ways in which people encounter segregation and drawbacks in STEM, and to advocate for arrangements that are comprehensive and even-handed for all. Sajjad and his team argues, in expansion to advancing differing qualities and inclusivity in STEM, STEMinism moreover emphasizes the significance of instruction and outreach to rouse the following era of researchers, technologists, engineers, and mathematicians [7]. By locking in with understudies at an early age, giving mentorship and back, and exhibiting the assorted career openings accessible in STEM, STEMinism points to break down boundaries and generalizations which will dishearten youthful individuals from seeking after these areas. Durrani and other researchers’ comments that, STEMinism moreover advocates for policy changes and regulation changes to form a stronger and more comprehensive environment for every woman and also underrepresented bunches in STEM [8].This incorporates activities to extend financing for investigating gender differences in STEM, move forward to instruction and preparing programs, and actualize measures to address badgering and segregation in scholarly and proficient settings is argued by Sunaryo and his researchers [9]. STEMinism aims to create a sustainable and positive change for everyone in these fields by attempting to change the systems and frameworks that maintain imbalance in STEM. STEMinism is rather monumental because it attempts to improve the gender gap and empowerment issues in science, technology, engineering, and mathematics. By challenging generalizations, pushing for representation and inclusivity, tending to inclination and separation, taking an intersectional approach, and advancing instruction and arrangement changes, STEMinism points to form a more even-handed and inventive STEM community. Almukhambetova breaks in the idea, through collective activity and backing, STEMinism clears the way for a promised scope where every individual has a great chance to provide an advantage from the headways in STEM areas, driving to a more assorted, comprehensive, and affluent society for all [10].

**II. REVIEW OF LITERATURE**

Research already done on STEMinism indicates that every woman has typically been limited to jobs and sectors that are traditionally feminine in nature, linked to lower pay [11] [12] [13]. There is widespread agreement that gender disparities in income, resulting from the feminization of certain industries and occupations, have detrimental effects on both present and future generations, impacting the prosperity and development of a society [14]. According to the research by Sax et al., women show a stronger dedication to social activism than to making theoretical advancements in science (2017) [15]. On the whole, findings from both historical and recent research suggest that women's confidence in mathematics, strong verbal skills, and personal barriers like low self-assurance and varying priorities takes a great task in their own decision to get a computer science degree.

Racial and gender politics can deepen differences in performance and activity outputs and are best implemented at organizational levels and within a culture, arguably where paradoxical dualities are frequently encouraged. Crenshaw’s theory of intersectionality (2013) enables one to appreciate particularities whereby a particular social identity, such as gender, race, or class can create oppression as well as privilege in new ways [16]. According to scholars such as Collins (2000) and other modern sociologists, the methodology of intersectionality remains relevant in understanding inequalities in education and the work environment as well [17]. Adopting this lens to STEMinism illustrates levels of oppression for those who are at the intersection of several marginalizations. A further key element of activism as an intersectional practice is that of the effectiveness of acting together. Bhopal and Jackson (2013) focus on anticipated outcomes related to inclusiveness. It is easier to challenge the suppression of certain institutional norms when there is collective action by members of different groups. For example, the formation of social clubs like Black Girls CODE and Girls Who Code demonstrates how structured programs can harness resources and support for diversity within the girl child and technology [18].

Curriculum change is of major importance within the contexts of STEMinism, and intersectional activism. As shown in the studies conducted by Pasillas (2017), integration of feminist and other intersectional approaches to STEM subjects increases interest and relevance of participants to the issues. Such strategies not only sound formal to the students but also help them develop basic fundamental attitudes towards real issues [19]. Availability of mentors and role models is crucial in the integration of marginalized students in STEM related disciples. Jennifer (2021) also points out how programs that take an intersectional approach to identity can come up with mentorship pathways. These programs offer the necessary assistance that would counter feelings of deficiency and seclusion that accompany underrepresentation There are challenges though, for instance when trying to make change, when aspiring for STEMinism and activist intersectionality, which are quite useful [20]. Heisler (2022) notes that there is a common tendency of institutional inertia making it very difficult to make advancements as such movements threaten established societal structures. Apart from these, there is a danger of tokenism which is the risk in these programs where they are carried out but in an empty skin [21].

**III. METHODOLOGY**

This research was carried out using a qualitative approach in the field of critical investigations on how and why STEM feminism and intersectional activism can help prevail against existing power relations in STEM. Furthermore, the case studies of STEM in which the practice of intersectional activism is provided will complement the research. The thematic analysis will allow the researcher to identify the themes and patterns present in the data and how such changes in social relations, or movements, come about.

**IV. DISCUSSION**

1. **Historical Perspectives on STEM**

Enclosed by the field of Science, Technology, Engineering, and Mathematics (STEM), control structures have played a noteworthy part in forming the chronicled viewpoints and encounters of people inside these disciplines. All through history, control flow has impacted assets, openings, acknowledgment, and decision-making forms in STEM areas. Understanding the verifiable setting of control structures in STEM is fundamental for tending to issues of differing qualities, value, and incorporation in these areas. One of the most punctual signs of control structures in STEM can be followed back to the avoidance of women and minorities from formal instruction and proficient openings. Verifiably, women and people from underrepresented bunches were methodically denied the opportunity to instruct, educate, finance, and investigate openings in STEM areas. This avoidance restricted their capacity to contribute to logical progressions and development, propagating a cycle of imbalance and marginalization. Besides, control structures in STEM have been strengthened through social standards, generalizations, and predispositions that have moulded recognition of who has a place in these areas. Pedersen and Minnotte has a notion stating, generalizations about sexual orientation, race, and ethnicity have affected enlisting homes, advancement choices, and the allotment of assets in STEM disciplines. These inclinations have made boundaries for people from assorted foundations to completely take an interest and flourish in STEM situations [22]. In expansion to individual biases, organization control structures in STEM have too played a part in sustaining disparity. Scholarly teach, inquire about organizations, and financing offices have verifiably been ruled by people from favoured foundations, driving to a need of differing qualities in authority positions and decision-making parts. This need of representation has constrained the viewpoints and encounters that advise investigating motivation, approaches, and homes in STEM areas.

Additionally, Fouad along with other researchers makes a statement that control differentials in STEM have too been apparent within the dispersion of assets and openings. Subsidizing for inquiries about ventures, get to state of the art gear, and collaboration openings have often been concentrated within the hands of some persuasive people or education [23]. This concentration of assets has made a competitive environment in which as it were, a select few have the means to seek after inventively investigate and make noteworthy commitments to their areas. Danbold and Huo also proves that tending to control structures in STEM requires a multi-faceted approach that addresses systemic disparities, inclinations, and boundaries to incorporation. Endeavours to advance differences and value in STEM areas must include approach changes, regulation changes, and social shifts that challenge existing control elements and make more comprehensive situations for all people [24]. One way to address control structures in STEM is through mediations that advance differing qualities and incorporation at all levels of instruction and proficient advancement. As stated by Almukhambetova and Kuzhabekova, activities that give mentorship, organizing openings, and bolster for people from underrepresented bunches can offer assistance to even the playing area and pave the way for victory in STEM areas [25]. Furthermore, efforts to mitigate control gaps in STEM should encompass a reconsideration of the associated contracting bracketing, advancement benchmarks, and evaluation systems to ensure they are prejudiced, clear, and simplified. Constructing multidisciplinary and fairer STEM workplaces demand an understanding of diversity, equity, and inclusion by leadership and a willingness to confront deep-seated norms and practices that maintain inequity. Pursuant to Dávalos, historical perspectives on control structures in STEM areas highlight the ways in which imbalances, predispositions, and boundaries have moulded the encounters of people inside these disciplines [26]. Tending to control differentials in STEM requires a concerted exertion to challenge existing standards, approaches, and homes that propagate imbalance and prohibit Clancy and the team adds up the point in different articles each. [27]. By advancing differences, value, and incorporation in STEM areas, we will make a more fair and impartial future for all people in these basic areas of consideration and advancement.

1. **Challenges faced and Strategies followed to overcome**

Women’s challenges in STEM are primarily societal views on gender and sexual orientation. Women are often perceived in comparison to men and are deemed either overqualified or underqualified, thus leading to discrimination in hiring, promotion or acceptance. Stereotypes in mathematics and science fields propagate the smaller number of women in the STEM field. Less number of women role models in STEM can be a serious impediment for women wishing to work in these fields. Saxena incorporates a statement that the absence of women at senior management and academic levels can create difficulty in aspiring to be successful in STEM for women [28]. This difference may hinder the advancement of women’s careers and lead to their low representation in STEM fields. For example, women bear the brunt of coping with dual responsibilities of career and home especially in the STEM fields, states Babalola and his fellow researchers [29]. Women also have to adhere **to** the compulsory need of work-life balance since work in the STEM fields involves long hours and regular travel. In consonance with Wachter, women in STEM fields may also face a hostile working environment marked by harassment, discrimination, and microaggressions [30]. Such a problematic culture can serve as a hindrance to women's professional progress and cause a lack of diversity and inclusion in STEM fields. Many women in STEM grapple with having imposter syndrome’, some questioning their abilities and others simply having an internalized trauma of having been projected as a phony. This socio psychological barrier could negatively impact the self-esteem and self-image of a woman and self-unleashing her performance and career progression in STEM areas.

To eliminate the gender stereotype cycle, especially in STEM fields, it is necessary to start encouraging girls to study STEM subjects from an early age. This could be achieved through targeted campaigns, providing leadership roles, and programs that break stereotypes regarding sex and motivate young women to follow their jobs in STEM disciplines. In Sinnes and Løken’s view, it is vital to uplift the quantity of women in STEM fields, especially in leadership roles, because that provides support and guidance for the aspiring female professionals. Businesses and educators can implement diversity and inclusion strategies to help raise women's career advancement and create a more open environment [31]. It is equally important to educate individuals about gender implicit bias and deploy measures to reduce its consequences, to improve conditions for women in STEM fields. These steps taken, such as diversity initiatives and need-based recruitment, help address implicit bias while ensuring a multi-ethnic workforce. Women in STEM and physics, in particular, can be better supported through policy provisions like flexible work parental leave as well as programs that enable one to work and take care of personal life simultaneously. Embracing a culture that encourages work-life integration may enhance overall job satisfaction and retention rates of females working in STEM fields.

There is an absolute requirement for organizations to take further action in regard to segregation, badgering and other forms of inclination at their workplaces. This looking into ways of addressing these possible inequalities involves putting into place clear policies, allowing staff training on Diversity and Inclusion, and instilling respect and support in the work environment to promote women in STEM fields, comments Wood and Eagly [32]. Regrettably, efforts that have been made to incorporate and advance women and other minorities in STEM areas proceed to face different forms of challenges that hinder their effective engagement and progression. These challenges require this single way of provision towards a variety of ways whereby one of them is the promotion of STEM for young girls, improving the number of women in the fields, overcoming implicit bias, facilitating work-life balance, and providing safe environments. If these strategies help eliminate the biases that promote stereotypes women would no longer be socially studied but competent as productive workers in the STEM workforce.

**Fig. 1:** Proposed solutions for Women

**Source:** Authors’ elaboration

**C. Breaking Barriers and Cultivating Future Leaders**

STEM instruction development intends to narrow down gender disparities in professions. In particular, by aiding and encouraging girls who take up STEM subjects and to develop careers, there will be better representation of females in engineering, science, and mathematics. Variations in STEM professions lead to the wider horizon of viewpoints, ideas, and methods of solving a problem. This will encourage the nurturing of the young women's creativity and skills, which will certainly put an impetus on innovations to benefit mankind. Empowering young women going into STEM will lead to a number of breakthroughs in science, technology, and engineering that will address global challenges and improve the quality of life. According to Kenney, McGee, and Bhatnagerb Enabling young women through STEM instruction not as it were preparing them with specialized abilities and information but too develops fundamental authority qualities such as basic thinking, problem-solving, and resilience [33]. By providing girls with openings to investigate STEM subjects, lock in hands-on learning encounters, and be associated with part models within the field, we will support a modern era of certain and competent female pioneers who are balanced to create a positive effect on the world.

Perhaps of the greatest obstruction young girls face while chasing after STEM is the predominance of orientation generalizations that recommend STEM fields are male-ruled fields and more appropriate for men. These generalizations can affect young girls' self-discretion, certainty and premium in STEM subjects, prompting lower cooperation rates and restricted vocation desires in these fields. The lack of clear female good examples in STEM fields throws hindrances on the ability of young girls to picture themselves pursuing a career in STEM fields. Without mentors and role models to encourage and guide them, therefore, girls are driven away from or discouraged from pursuing any science-related fields. Expanding the portrayal of girls in STEM careers is fundamental in creating captivating and positive character images for young females. Murphy and Whitelegg portray their views, young girls from underserved or low-pay networks might confront extra hindrances in getting to quality STEM training and assets [34]. Restricted admittance to STEM projects, gear, and involved learning open doors can impede young girls' capacity to investigate their inclinations in STEM subjects and foster abilities expected to prevail in a STEM profession. Verifiable predisposition and segregation can establish an unfriendly climate for young girls in STEM schooling settings, subverting their certainty and feeling of having a place. One-sided mentalities, generalizations and inconsistent treatment in light of orientation can keep young girls from chasing after STEM subjects and add to an absence of variety in STEM fields.

**D. Significance of Intersectionality**

The concept of intersectionality in activism for STEM fields could be an important structure that identifies and deals with the different and simultaneous forms of discrimination and marginalization that individuals encounter within the domains of Science, Technology, Engineering, and Mathematics. Building on legal scholar Crenshaw’s work, [16] she notes that discrimination can involve more than just single social factors, such as race, gender, sexuality, social class, or ability. She aptly defines the term ‘intersectionality’ as the way various social identities overlap and shape individual experience and opportunities in society (2013). According to Williams and Halsey, in consideration of STEM activism, intersectionality is of essence in moving forward diversity, equity, and inclusion as well as addressing systemic barriers for the full engagement of underrepresented groups in STEM fields [35]. In order to understand the role of intersectionality in STEM activism, it is important to look at the past and present challenges of women, people of colour, LGBTQ+ individuals, people with disabilities, and those from low socioeconomic status STEM constituents. These bunches regularly involve crossing shapes of segregation and prohibition that are established in systemic imbalances and inclinations shown in instructive teaching, working environments, and society at large. Branson expresses his idea that by receiving an intersectional approach, STEM activism looks to address these complex and covering shapes of persecution and make more impartial and comprehensive situations for all people curious about seeking after careers in STEM [36]. Intersectionality in STEM activism is best illustrated by the recognition of the experiences and opinions of multi-marginalized individuals as being deeply engaging. Take, for instance, a black woman in STEM. The challenges she faces are distinctly different from those confronted by a white woman or a black man in the same field. Advocates in STEM develop specific approaches to address these complex forms of discrimination by studying how gender and race overlap and impact people's experiences. Myers’ team claims that this approach assists in STEM fields to ensure that diversity and inclusion processes are not only monopodial, but appreciate the complexities and realities of everyone rather than following a simplistic approach which neglects the intricacies of people’s lived experiences. [37].

Intersectionality also highlights the significance of centering the voices and administration of people from marginalized communities in STEM activism. By opening up the viewpoints and ability of those who have been verifiably underrepresented and marginalized in STEM areas, activists can challenge overwhelming accounts and control structures that sustain disparity and prohibition. The argument of Glass’ teams is, this emphasis on intersectional administration not as it were cultivating a more comprehensive and agent STEM community but moreover makes a difference to form spaces where people from differing foundations feel enabled to advocate for alter and thrust for greater value and equity within the field [38]. Moreover, activism in STEM fields through an intersectional perspective motivates a holistic, multidisciplinary approach to addressing inequality and discrimination in STEM fields. This perspective understands that social boundaries and systems which govern a person's opportunities and experiences within STEM are interrelated and thus does not see diversity and inclusion challenges as isolated or independent problems. This approach calls for tending to not as it were personal occurrences of inclination or segregation but also the basic organization and systemic components that propagate disparity and restrain get to assets and openings for marginalized bunches. Conforming to Feeney and Bernal’s point as mentioned, by taking a comprehensive and intersectional view of the challenges confronting underrepresented people in STEM, activists can work towards making a more feasible and transformative altar inside the field [39]. Intersectionality too underscores the significance of solidarity and collaboration over diverse marginalized bunches in STEM activism. Casad’s group also adds that recognizing that people with meeting characters frequently share common encounters of marginalization and separation, intersectional activism in STEM looks to construct collusions and coalitions that bridge over race, sex, sexuality, capacity, and other social categories [40]. STEM activists can organize multi-group movements focused on intersectional control and advocacy in STEM education by fostering solidarity and support within various groups. Efforts focused on intersectional solidarity not only enhances the overall impact of activism but also encourages a more inclusive and united STEM community that celebrates and accepts all forms of diversity.

**E. STEMinism and Promising Careers**

AI (Artificial Intelligence) is one of the emerging areas with potential prospects for women in STEM. AI is already infiltrating and evolving nearly every field from healthcare, finance, and ultimately transportation. The rise of AI sees not merely the emergence of new technologies but the increasing demand for professionals able to build, deploy, and manage AI systems. Women should look forward to making their voices heard in this long-term development of AI by producing a plethora of ideas, views, and thoughts to the field. Biotechnology is another field which promises to attract fierce women to the growing fields of STEM. Biotechnology is a developing field that is rapidly changing with advances in gene-editing, personalized medicine, and bioinformatics. It enjoined women to step forward and wield the boon of groundbreaking research and development that were specifically focused on the fields of genetic engineering, drug discovery, and agricultural biotechnology. The biotechnology field offers women great opportunitiesto impact human health, food security and sustainability. Women can take advantage of the rapid growth in the STEM fields, particularly in Cyber Security. Increased risk of cyber-attacks and data breaches create high demand for specialists able to protect sensitive information and digital systems. With her soft skills, a woman can work in cybersecurity and help businesses protect their infrastructures from attacks and use her skills to defend critical cyber infrastructures. Women in cybersecurity can utilize their communication skills, attention to detail, and problem-solving skills to help businesses defend against cyber threats and safeguard critical infrastructures. Another domain which is appropriate for women in STEM is computer science and technology. In today’s digital world, the amount of available data is growing, creating a need for professionals’ adept at analysing data and providing insights for smarter business decisions. Women in information science can use their quantitative skills, basic thinking capacities, and imagination to extricate experiences from information and illuminate complex issues over an assortment of businesses. In expansion to these developing areas, there are too many openings for women in STEM to seek careers in renewable vitality, natural science, space investigation, and mechanical technology.

**Fig. 2:** Growth of Women in STEM domains compared to Men according to a 2023 survey is represented.

**Source:** Authors’ elaboration

Renewable energy developments, such as wind, solar, and hydropower, are becoming increasingly more important in this climate as we move toward accumulation-oriented sustainable energy. Women are able to contribute enormously within the renewable energy field by growing and using clean energy to battle a change in climate and to help in the reduction of dependency on fossil fuels. It is another field in physical sciences that harbours opportunities for women to foster a positive impact on the Earth. By examining the environment, conducting investigations on biological systems, and creating procedures for preservation and maintainability, women in natural science can offer assistance to secure natural resources and advance natural stewardship. Etzkowitz’s set argues that, Space investigation is another energizing field inside STEM that gives openings for women to thrust the boundaries of human information and investigation [41]. These advances in space technology have opened increasing opportunities for women in astronomy, planetary science, and aerospace engineering. Female professionals with a space research background can help with missions to Mars and the Moon and exoplanet research and even the origins of the universe. Mechanical engineering is another field that skews right for women in STEM and finds applicability in many industries: manufacturing, healthcare, and agribusiness. Women in mechanical engineering can design and build robots that will perform tasks that could relieve humans of dangerous or tedious jobs and thereby improve productivity and efficiency across a range of fields. According to Farrell, women pursuing the mechanical engineering degree can contribute to the development of inventions that will enhance life and dramatically accelerate economic growth. There are many bright places blossoming under the hands of women in STEM posing opportunities for professional success, internal fulfilment, and social betterment [42]. From careers in artificial intelligence, biotechnology, cybersecurity, data science, renewable energy, environmental science, space exploration, and robotics, women can make a major mark in promoting the fields of science, technology, and development. For optimal results, the onus of support and nurturing in favour of women in STEM must be pressed to equilibrate gender disparity and lure diverse inclusion in the industry for progressive times and prosperity.

**F. Collaborative initiatives in/through STEMinism**

One of the major collaborative initiatives to address the problem of gender equality in STEM is mentoring. Mentorship programs are provided to women in the STEM fields properly, with adequate support and necessary advice from professionals of experience. Such programs help in building a supportive network among women in STEM and take them through opportunities that are there for professional development, further helping tackle challenges they encounter in their careers. Organisations which include Association for Women in Science (AWIS) and the National Centre for Women & Information Technology (NCWIT) have developed mentorship initiatives that have been very successful in helping women STEM professionals. Training programs on inclusion along with diversity inclusion have been successful in increasing gender equality in STEM fields in general. The above programs focus on increasing understanding of gender biases and stereotypes, fostering an environment of inclusivity and mutual respect, and offering tools to establish a large amount of support and welcoming atmosphere for women in STEM. Many organizations and institutions have implemented diversity and inclusion training programs to talk about the systemic hurdles that women undergo in this particular fields and in promoting an equitable and diverse force of work. In expansion to mentorship programs and differences preparing, collaborative activities for gender orientation uniformity in STEM too incorporate outreach and engagement programs pointed at rousing and empowering youthful young women to seek after careers in STEM. These programs include organizations between schools, colleges, industry, and community organizations to supply young girls with openings to investigate STEM areas, take an interest in hands-on exercises, and connect with female part models in STEM.

Pointing to extending the idea of women entering STEM areas, it is by uncovering young girls to STEM at an early age and giving them positive encounters and support. Moreover, collaborative efforts toward gender orientation equalization in STEM often comprise support and planning initiatives intended to dismantle institutional barriers while promoting gender-balanced homes in the field of STEM. Organizations like AAUW and NSF advocate policies that are identical to gender orientation in STEM, such as policy areas on pay equity, family-friendly policy, and policies against discrimination. Such promotion efforts help in establishing an increasingly stable and more level playing field for female in the STEM and promote change of structure within the discipline. Research and data collection activities to monitor progress, identify challenges, and shed light on evidence-based approaches to gender balance are components of collaborative efforts for gender orientation harmonization in STEM. Companies such as UNESCO Organized for Insights and the World Financial Gathering compile information regarding imbalances in gender across different fields of STEM study, conduct studies on the factors that attribute to these deviations, and draft resolutions to address them. Leverage data and inquiry, and collaborative activities can do this quite compellingly in interrogating the underpinnings of gender orientation disparity within STEM fields and craft targeted mediations to balance gender representations.

Here is a pie chart representing the collaborative initiatives for gender equality in STEM. The chart divides the initiatives into six key areas: Mentorship Programs, Training on Inclusion & Diversity, Outreach & Engagement Programs, Support and Planning Initiatives, Policy Advocacy, and Research & Data Collection. Each sector represents an estimated contribution of these initiatives towards promoting gender equality in STEM.

**Fig. 3:** Percentage of initiatives promoting gender equality

**Source:** Authors’ elaboration

**G. Gender Stereotyping, Discrimination, and Bias**

Gender segregation in the STEM field acts as a hindrance for many women aspiring to become leaders, hindering their progress and limiting their opportunities for advancement in accordance with Griffith and Dasgupta, Denend and team. [43] [44]. Mostly, women face discrimination in the aspect of both advancement and enrolment, while men enjoy greater opportunities for selection and promotion to higher positions [45] [46] [43] [44]. It is a general happening for most of the women to experience minimal guidance from their superiors upon returning to work following a break, leading to slow career progression. Moreover, Griffith and Dasgupta include, female employees often perceive that their decision-making power in the workplace is limited due to being in the low level within a group [43]. Women in STEM sector frequently encounter challenges related to sexual harassment, which can manifest in various forms such as verbal, physical, or other behaviours, posing a threat to their professional advancement. It has been identified and stated that 24 percent of women workers have experienced harassment sexually, argued by Fathima and group [47]. To deter such incidents from recurring again, strict policies should be formulated and strict penalties imposed with the staff consisting of a gender-balanced workforce [48]. Women, who have experienced gender bias in male-dominated STEM sectors, will normally narrate their experiences to deter other females from entering this particular line of work [49] [50]. To overcome such masculine fields and companies dominated by men, women employees have to appear more masculine, feel more masculine, and talk as masculine as possible to conquer the male-dominated companies because they spend most of their working time with men who make them acquire some of the characters of men, such as assertiveness and complexity.

**V. CONCLUSION**

Men in the STEM sector are primarily driven by logic rather than emotions and are ready to take up the style of a leader and his skills, that is more individualized and personalized according to Amon [50]. Conversely, women in non-STEM industries are accustomed to greater interaction and are well known with participating and democratic style of leadership skills. Hand and his group argue that gender variations begin in an early stage in school, where subjects like science, physics, mathematics are often dominated by male who imprint their male characteristics and traits in STEM fields. Therefore, this kind of stereotyping is then perpetuated in the workplace. [51]. Nevertheless, the problem of stereotyping diminishes when women are viewed as minor competitors and are incapable of assuming the position of a leader, reflecting authentic gender roles where women are compelled to be at home and serve as a caretaker of household responsibilities agreed by Eagly and Wood [52]. In such environments, women often find their career progression challenging in a male-dominated workplaces as they have less scope for advancement to higher positions because of gender discrimination states Chau and Quire [46]. Being in different situations, every woman could behave in a passive manner in dominated industries to avoid jeopardizing men’s employment chances [37]. The segregation between the sexes also forms a barrier to women aspiring to become leaders in the scientific field of STEM. To address such a situation and safeguard male domination of the STEM field, there should be measurements taken to allow greater participation and career progression into leadership positions by women. There must be a minimum effort to rectify the imbalance based on gender.

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