From Studentship to Academia: The Academic Female STEM Trajectory in Ghana

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ABSTRACT

At all levels of education in the science, technology, engineering, and mathematics (STEM) disciplinary fields, there are disparities in participation according to gender. This study explores the educational and professional experiences of female faculty in STEM in universities in Ghana. In-depth semi-structured interviews were undertaken employing 20 participants from universities in Ghana. Findings indicate that despite their success fueled by the support system available to them, gender disparities, fostered by patriarchy, characterized these women's educational and professional experiences. Their gendered experiences were exacerbated in the higher education workplace as some sources of support turned to be sources of discrimination. This was because the women were perceived as threats to the patriarchal status quo as they surged in the academic STEM trajectory.

Keywords: gender, women, STEM, academia, discrimination

Education is vital to socioeconomic development globally. However, female marginalization in education is replete in most parts of the world. The United Nations' (UN) Universal Declaration for Human Rights anchors the freedoms of all peoples regardless of gender/sex, sexuality, race, creed, culture, and socioeconomic status (Bodnar, 2010). At the international level there have been commitments aimed at addressing gender gaps in education.

Goal 5 of the Education for All (EFA) anchored by Goal 3 of the Millennium Development Goals (MDGs) depicted the global commitment to gender equality and equity from 2000 to 2015. In contemporary times, gender equality and equity issues are pivotal in post-2015 discourses. The fifth goal of the Sustainable Development Goals (SDGs) focuses on gender equality and women empowerment.

Gender Disparities in Ghana's Education System

Enhancing women's education is both a sociocultural and economic development issue (King & Hill, 1995). The Ghanaian Constitution enshrines human rights.[1] Nonetheless gender disparities are prevalent in Ghana characterized by financial difficulties associated with women's education coupled with the forecast that boys will likely generate more investment returns (Appleton, Hoddinott, & Mackinnon, 1996; Avotri, Owusu-Darko, Eghan, & Ocansey, 2000; Herz, Subbrarao, Habi, & Raney, 1991), as well as sociocultural considerations, gendered social practices within households, lack of role models for girls in schools, and hostile school environments documented as sexual harassment from male students and inadequate institutional facilities (Atuahene & Owusu-Ansah, 2013; Morley, Leach, & Lugg, 2009, 2010; UNESCO, 2007). These factors fuel the perception that Ghanaian culture frowns upon the value of female education and women (Lambert, Perrino, & Barreras, 2012; Senadza, 2012).

The cultural ethos of the Ghanaian society impinges on the education of women. Stephens (1998, p. 1) put it, "The home domain is shaped by issues of kinship, descent, and the practice of fostering. Cultural values of elders, attitudes toward knowledge, women's role in society, and expectations of the economic value of schooling influenced girls' educational experiences." The kinship system in Ghana is based on patriarchy and gerontocracy where power structures are determined by age and gender—boys get more support to access and stay in formal schooling

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[1] Under Article 37(1) of the 1992 Constitution, the state resolves to ensure equality among others for all. Article 37(2) (b) of the 1992 Fourth Republican Constitution of Ghana states that the State shall enact appropriate laws to ensure the protection and promotion of all basic human rights and freedom. Article 17(4) provides that Parliament is entitled to enact laws that are reasonably necessary for the implementation of policies and programs aimed at redressing social, economic, or educational imbalance in the Ghanaian society. Article 16 prohibits the holding of persons in slavery or servitude among others.

longer than girls, who are consigned as informal citizens and workers (Laird, 2005).

Despite Ghana's free education for all history between 1957 and 1985, illiteracy levels are high and female students enrolled in primary, secondary, and tertiary levels of education are very low. Gender gaps favoring male students from primary, secondary, and tertiary levels are 8.4%, 22.2%, and 55.6%, respectively (Shabaya & Konadu-Agyeman, 2004). Nguyen and Wodon (2013) specifically highlighted the gender disparity in educational participation between boys and girls from primary school to senior high school in Ghana. They stated that with respect to the age cohort of 21 to 24 years, 84.1% of girls commenced primary school compared with 90.7% of boys. Their primary school completion rate was 86.5% and 92.7% for girls and boys, respectively. Concerning their transition from junior high to senior high school, the completion rates widened, favoring boys at 65.1% and 51.2% for girls. Between enrollment and completion, access is a constantly negotiated gendered process that is enacted on a daily basis (Dunne, Akyeampong, & Humphreys, 2007) among the schools and teachers, families and communities, as well as educational administrators (Humphreys, Moses, Kaibo, & Dunne, 2015), breeding identities of school dropouts in Ghana, incorporated the gender dimension.

Women's access and achievement in Ghana's higher education is constrained (Daddieh, 2003). Recruitment, subject choice, and attrition in higher education are gendered. Students who had earlier preferences for subjects they enrolled in made gender-traditional choices often, with more girls than boys encouraged by their parents and friends in making such choices (Mastekaasa & Smeby, 2008). For example, the cultural belief that males are more proficient in mathematics than females often leads to their enrolling in that subject more than their female counterparts (Seymour & Hewitt, 1997; Wagner & Berger, 1997). Male students' attrition was less attributable to gender composition of educational programs than females (Mastekaasa & Smeby, 2008).

Gender Disparities in STEM Fields in Ghana's Education System

The education of females in science, technology, engineering, and mathematics (STEM)[2] is imperative from the three perspectives based on empirical studies on gender and STEM (European Commission, 2012; Lee & Pollitzer, 2016; Marginson, Tytler, Freeman, & Roberts, 2013). The first perspective is that of human rights—the need for all to be educated and be given equal opportunities. The second perspective is scientific—women boost scientific outcomes in terms of diversity, creativity, bias reduction, and promotion of robust knowledge and solutions. The third perspective is developmental—that is, the ability of men and women to acquire knowledge in and benefit from STEM opportunities. The STEM fields are prerequisites to societal and individual advancement. Traditionally, women have been underrepresented in STEM disciplinary fields (UNESCO, 2017).

According to UNESCO (2017), issues hampering progress for girls' participation in STEM in Ghana are gender stereotyping: sociocultural beliefs about girls' inability to study STEM, inadequate citizens' awareness of the importance of STEM, and unfriendly and gender insensitive teaching methodologies. Other issues are absence of clear policy guidelines on gender in the education sector, lack of capacity in terms of funding and competent staff by the gender and science units of the Ghana Education Service (GES) to play their mandated roles effectively, and limited intersectoral collaboration among the various government ministries and agencies in the promotion of girls' education. Relative to STEM enrolments in Ghanaian publicly funded universities,[3] a third of students enrolled in the 2007–2008 academic year were women, out of which less than 40% were enrolled in STEM majors (Ministry of Education, 2009).

Women's low participation and underrepresentation in STEM majors in higher education (as well as the lower levels) partly accounts for their slow integration into STEM occupations (Xie & Shauman, 2003). In comparing women in STEM research careers in Ghana, Kenya, and Karela, Campion and Shrum (2004) concluded that gender disparities stem from systemic deficits in the acquisition of social rather than material resources.

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[2] Gender disparities in STEM disciplines are not globally lopsided. In Malaysia, Iran, Uzbekistan, Azerbaijan, Saudi Arabia, and Oman, science majors are disproportionately female (Sassler, Glass, Levitte, & Michelmore, 2017).

[3] Almost all STEM majors in Ghana's higher education system are offered by these universities

The literature on gender and STEM focusing exclusively on Ghana features the experiences of senior women in academic STEM settings (Boateng, 2017) and a comparison of the experiences between female graduate students, faculty, and scientists in academic and professional STEM settings (Boateng, 2016). As a corollary, the objective of this article is to explore the experiences of women in STEM academia relative to the STEM pipeline in Ghana. The STEM pipeline is operationalized within this study's context as the trajectory from early education to a higher education academic career in STEM. Another impetus for this chapter is the general belief that there is a limited understanding of women's underrepresentation in STEM careers (Morgan, Gelbgiser, & Weeden, 2013). The research question guiding this chapter is: What do female faculty in STEM in Ghanaian universities experience in their educational and professional journeys?

LITERATURE REVIEW

Factors Inhibiting Female Interest in STEM Fields

Scholars explain the low presence of women and girls in STEM careers and fields, citing biological, social, and psychological factors (Erinosho, 1994) that hamper the efforts of women undertaking STEM fields in educational institutions.

The biological factors cited have to do with the phenotypical constitution of women with regards to their "analytical and visual spatial skills which are required for abstract reasoning in science" (Erinosho, 1994, p. 1). Those who hold this view premise their conviction on gene factors (Gray, 1981); hormonal factors (Rosenkrantz, Vogel, Bee, Broverman, & Broverman, 1968); and brain lateralization (Sherman, 1979). This conviction has been challenged on the grounds that women's biological make-up has no direct correlation to their capabilities. Innate differences vary more in individuals than across sexes (Erinosho, 1994).

This social dimension is based on the influential roles the home, school, and society play in aligning females to feminine ideals (Erinosho, 1994; Witt & Wood, 2010). STEM fields have been attributed with characteristics such as "remoteness, abstractness, impersonality, detachment, and objectivity" (Birke, 1986; Hills & Shallis, 1975). These characteristics are associated with males while "passivity, coyness, and subjectivity" are attributed to females (Birke, 1986). The social dimension is further elaborated by two theories. The first, *the cognitive-developmental theory* attributes the social processes that produce gender identity as the

source of problems women face, upon which the school context becomes the quintessence of masculine science. The general dearth of science teachers/faculty in school denies female students appropriate role models (Erinosho, 1994). School curriculum and materials are illustrative of socially held female passivity (Erinosho, 1994). These facts are consonant with the findings of Murray, Meinholdt, and Bergmann (1999) that the STEM classroom environment, manifested in the course and curriculum structure, faculty, and male students' beliefs and behavior hamper persistence and success of females at the post-secondary level of education. The second, *the social learning theory*, traces the problems of women relative to STEM fields to externally oriented gender-role socialization, which right from infancy assigns roles to children (Erinosho, 1994). Differentiated sex roles are sanctioned by the home, the school, and the society. At home, girls play with dolls and domestic appliances and develop verbal and nurturing skills while boys play with mechanical toys.

The growth of some personality variables such as interest, attitude, and self-concept is spurred by a lot of activities (Brooks & Vernon, 1956), which gives boys a head start relative to interest in science (Meyer & Penfold, 1961). Girls are brought up to develop emotions, concern, and feelings for nature more so than for mechanistic relationships with physical objects (Erinosho, 1994). Moreover, girls are believed based on past studies to have low self-concepts about their abilities in science and mathematics (Erinosho, 1994).

The biological, social, and psychological factors underscore the dire statistics pertaining to female participation in STEM in Ghana, as outlined previously. At various levels of education in STEM, women encounter conscious and unconscious teacher/faculty bias on the basis of gender (Moss-Racusin, Dovidio, Brescoll, Graham, & Handelsman, 2012) as males are given the upper hand in the education process because they are engaged more by faculty/teachers (Johnson, 2007). For instance, males are asked analytical and critical thought high order questions while females are asked to recall facts based on lower order questions (Hall & Sandler, 1982).

Complementing the aforementioned factors at home and in school, Savigny (2014) and UNESCO (2007, 2017) further listed factors that breed gender inequalities and inequities in STEM career settings:

- Women's and men's career paths diverge as the former are promoted more slowly as they leave STEM careers into other fields. Suitable girls are not privy to information on STEM courses and careers and may turn to other fields.

- Many girls and their advisers are stereotyped into thinking that STEM jobs are for men.

- Many talents are lost as women leave the STEM fields.

- Cultural norms militate the mingling of men and women, and as a result, women do not have social networks at work.

- Achievements of women are underrated, as women have to garner high scores in order to get promoted.

Work and Family

Three concepts describe potential conflicts for women who attempt to balance work and family: role conflict, the demand for "ideal" workers, and tenure clock (Wolf-Wendel & Ward, 2006). Role conflict results from a combination of limited time and energy with additional roles and responsibilities that necessarily create tensions between conflicting demands and cause a sense of overload (Barnett & Marshall, 1992, 1993). This ultimately leads to physical and mental disequilibria (Fowlkes, 1987; Savigny, 2014). While the role conflict theory applies to women in all professions, the ideal worker and the tenure clock pertain uniquely to the academic environment (Wolf-Wendel & Ward, 2006; Wolf-Wendel, Ward, & Kulp, 2016). The "ideal" worker is glued to their work interminably to satiate tenure demands, a role that leaves little time for childbearing or raising and/or even marriage (Williams, 2000). The conflict between work and home demands may make female faculty, who may be a wife and/or a mother, not an "ideal" academic worker (Ward & Bensimon, 2002). The tenure clock of academic work is structured on male normative paths that insulate them from family responsibilities, disadvantaging women with families (Grant, Kennelly, & Ward, 2000; UNESCO, 2017).

In the larger context in Ghana, public universities do not have a gender policy and the policy frameworks are in dissonance with gender concerns. A seeming exception is the University of Cape Coast's Strategic Plan which, like the National Council Tertiary Education's (NCTE) goal of increasing female enrollments, mentions gender but does not include modalities for addressing gender inequities (Manuh, Gariba, & Budu, 2007). In Ghana, there have been few efforts geared toward ensuring the parity between men and women in tertiary education or in the Ghanaian society at large (Britwum, Oduro, & Prah, 2014).

The trajectory of the faculty career from graduate school to full professor rank seems not encompass the career expected of an academic woman (Wolf-Wendel & Ward, 2006). To gain legitimacy, however, many

female scientists have focused on scientific identity based on research and career achievement ignoring marriage and child-caring responsibilities (Etzkowitz, Kemelgor, Neuschatz, Uzzi, & Alonzo, 1994). The disregard for the reproductive rights of women in academia is denotative of academic freedom being gendered. Opportunities necessarily for both men and women to undertake their academic functions are unequal. For example, women who return from maternity leave are negatively assessed by their students and senior colleagues, and thereon, frosty relationships develop between them and their senior colleagues (Lundgren & Prah, 2009; Britwum et al., 2014).

METHODOLOGY

Research Design

Crotty (1998) stated the research process includes ontology/epistemology, theoretical perspective, and methodology. The ontological and epistemological bases for the data collection of the study was subjectivism, which heralds individual sensemaking of the social world in which they belong. Interpretivism, the theory underpinning the methodology of this study, holds that reality and knowledge are multiple and relative so humans construct them rather than being objectively imposed on them (Ritchie, Lewis, Nicholls, & Ormston, 2014). The specific methodology guiding the study was narrative analysis. This methodology deals with individual life accounts within their sociocultural contexts as conferring with objects in the world (Ruissman, 2008; Stephens & Breheny, 2013). Semi-structured interviews were utilized as the method to elicit responses from participants.

Research Settings, Participants, and Sampling

Criterion/purposive sampling was adopted to sample participants based on gender, discipline, and faculty rank. Ethical clearance was received to undertake the research study from the Institutional Review Board of a public American university. Participants were recruited from three publicly funded universities in Ghana, namely the University of Cape Coast (UCC), a predominantly non-STEM institution; the University of Education, Winneba (UEW), a predominantly non-STEM institution mainly focusing on education; and the Kwame Nkrumah University of Science and Technology

(KNUST),[4] a predominantly STEM university. A list of female faculty in STEM was obtained with assistance from the universities. These women were contacted via email to request study participation. From this sampling method, 14 participants were identified. Six further participants were identified based on the recommendations of the 14 participants.

Data Collection Method: Semi-Structured Interviews

In-depth semi-structured interviews were conducted to explore respondents' perceptions and opinions. Eighteen participants allowed their interviews to be audiotaped. Two participants did not consent to audiotaping, so their interviews have not been included in the data. Verbatim notes were taken when interviewing. Each of the interviews lasted for about an hour. The audiotaped interviews were transcribed and the notes were organized. The identities of the participants were protected during the transcriptions by assigning each participant a set of initials unrelated to their actual names. The interview data was returned to the respective participants to check for accuracy, thus, confirming the validity of interview content.

Data Analysis

Congruent with the methodology for the study, the thematic approach to the analysis of narrative data was employed because the topics and themes generated by the interviews are what is of interest.

FINDINGS

The Nascent STEM Years

The participants' evolution of their interest in the STEM subject began in their early schooling and continued throughout their education. The participants enjoyed massive support from their parents, especially their fathers, relative to their STEM interest. It did not mean that their mothers and other relatives did not help them in their STEM journeys, but their fathers were preponderantly active. Their fathers not only encouraged their daughters and took a keen interest in their daughters' studies but also extended their pride to their daughters' decision to undertake STEM subjects by informing their friends in the community about their daughters' aspirations. The actions of their fathers may seem to have been at variance

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[4] The only STEM university in Ghana

with the general patriarchal notions of disinterest or non-commitment to female education, in STEM specifically. The fathers were adamant that the successes of their daughters in their disciplinary endeavors and STEM was very relevant and a source of pride to them. One participant flashed back to her pre-high school years and talked about her father's exhibition of pride for her choosing engineering:

> *My dad was proud, very proud that I chose engineering. I mean he encouraged me from the word go. I would ask him questions, listening to the news and even before I applied to secondary school, he will say, this my daughter will be an engineer…He was just proud, sometimes you could hear him talk amongst his peers and that he has a daughter who is into an area that has few females that made him really, really proud…and up till today he says it every time to people, to his friends. He wouldn't finish a conversation without making you know that he has a daughter who has read engineering not just engineering but mechanical. (ML)*

Ironically for the participants, their fathers who were very supportive and proud of their decisions to pursue courses in STEM areas overwhelmingly dominated by men, underscored the society's cultural norm that places the preeminence of their domestic roles over their career roles in their daughters' working years. Thus their fathers played contradictory roles in their STEM journeys. It shows the resoluteness of culture. Although people try to absolve themselves from the discriminatory influence of culture concerning gender relations, they somewhat inadvertently end up being perpetrators of the same injustice they resolve not to mete out. It partly explains why the participants in this trajectory had surging experiences relative to gender discrimination. The engineering faculty further shed more light of her father's contradictory roles in her experiences:

> *I will attribute a lot of the things to culture. You see my dad, the one who encouraged me would still tell me look, you can go to all the universities in the world if you come and you sleep under my roof you will still go to the kitchen...I mean and he wasn't only saying that when he was happy. He was saying that when he was really upset…he had felt that because I think I had gone to school I could stop doing some things. (ML)*

Irrespective of the peak of educational pursuit females aspire to or attain, culturally in Ghana they are below the males, whether educated or not.

The Higher Learning Phase in STEM

The participants pursued their STEM interests when they got to the universities, which served as the bridge between pre-higher education and career stages. The structural composition of the classes they were in was initially intimidating to them because most of them were admitted to the university from exclusive girls' senior high schools. This structural composition was compounded by the physical structures of their male mates. This vividly illustrates non-verbal communication as a subliminal way of communicating gender discrimination. The participants could read the meaning of such body structures contextually and movements thereof. The tacit narrative is that men are physically strong and that they wield power and authority. Women, according to this narrative, are supposed to be beneficiaries of men's patronages. The women felt the guys wanted them to follow their directions. They were not scathed, however, because the intimidation they felt was transient. They became focused on the purpose for which they went to the universities, apparently due to the high socialization and supports they had and benefited from in their pre-higher education stages. Socialization in STEM and supports were key to nipping intimidation emanating from gender discrimination in the bud:

> *I think it was a class of – I don't remember – but around twenty-two or thirty and we were only four ladies. Well, initially I felt intimidated for the very first time in my life; because here you are with – and I was very – I was smallish in size. And then the guys were all – the males were huge and tall and all of that; yeah…they felt like you're a lady – you know – that's the typical African. You don't have to – um – take any responsibility in the class, you have to listen to the gentlemen and all of that. And I am not like that, I'm so outspoken. When I quickly directed my attention to my studies, I was intimidated no more. (NT)*

Their academic relationships with their male mates were very cordial in spite of the fact that they were numerically outclassed by their male classmates. The women relished the benefit of team work in groups as their inputs were accepted and respected. They were recognized as worthy people by their classmates. They were not treated as second class people. What their male classmates did in their higher education years was an extension of what their parents and other relatives had done in their pre-higher education:

> *I was the only female in the class, we were seven and I was the only female in the class. In fact they really encouraged me I must say. They were very supportive to the extent that they wanted me to do my masters in that area, okay. They were very, very supportive. In the university I liked working in teams. The teams I was part of were mixed in terms of gender. Definitely, our ideas were welcomed. There were no gender biases. Both the males and females in the various groups complemented each other, accepting each other's ideas, and amicably coming to a consensus when there was a stalemate in terms of which direction the team should go (YM)*

The Transition to and Life in the World of Academic STEM Work

The female participants grappled with excessive gender discrimination in their workplace environments and at home while navigating between their professional and family obligations. The reverse reality of their higher education experiences occurred in their career years. Some of their male colleagues in the universities who treated them well, studied with them, and encouraged them ironically became perpetrators of gender discrimination in their workplaces. The discrimination extended to the extent of attempts made by ex-mates to close down departments that some of the participants were heading. Their male colleagues preferred the departments closing down to successful departments led by the women. There were other atrocities meted out to women on this experiential path. One biology participant narrated how her former male classmate in the university, who later became her workplace colleague and senior, sabotaged her to the effect that she lost her scholarship to a Welsh university:

> *The men who tried to impede my efforts in academia were my friends in university and in academia until I was offered a position. When I was a student in [university name withheld], I studied with them. Some of them accompanied me to [hall name withheld] after studying late in the night. These friends turned into enemies when I was elevated. You know the opposition persisted even to the point that a British Council Commonwealth scholarship to [institution's name withheld] was awarded to me but one of my colleagues who was a Head of Department and his clique told me that the VC had written a letter revoking the scholarship. (RK)*

Gender discrimination for the respondents in the academic STEM workplace was so pervasive that it was present even in the undertaking of service roles. Apart from having the conviction that their teaching and research duties as members of the academy were not fairly shared, they even mentioned that there was unfairness even in choice of service roles. One major service duty for faculty member is serving on committees. There was gender discrimination in one participant's department in terms of committee membership as those committees with pecuniary benefits were solely composed of men. All the arduous non-pecuniary duties were intentionally given to the women. The labor of female STEM women and their sacrifices were not rewarded:

> *When I came, I felt oh, a lot of the lecturers had taught and so I gave them that respect and I was being pushed around…here you have your teaching responsibilities and then you have other responsibilities, sometimes sitting on a committee to do some work, developing a program…or call it service…Some also came with money and the situation was that I did a lot of service work that did not come with money. They selected the men to be on committees whose work involved financial benefits. (DY)*

Female heads of departments were ignored by male subordinates even in the presence of other male subordinates. One head of department participant flashed back to an incident where she was ignored by a male janitor in the presence of her junior colleague in the workplace because she was strict in ensuring work was done well in her institution. This was a corollary to what happens in the larger society. It happened that the male janitor showed more respect to another male worker but ignored a woman who was the male worker's superior. She did not expect the janitor to revere her but it was significant that he showed respect to her subordinate but ignored her in the same instance. Women in leadership positions try as much as possible to be strict and harsh in order to get things done because of such perceptions:

> *When I was the head of department, I noticed because I was a woman, they [the men] fear and respect the men more than women. Men's voice carry more weight and authority. That is why we [the women] become harsh and as a result, things get done. When I get to work and get out of my car holding my bag and laptop, I walk with my male subordinate and the janitor man will come toward us and carry my colleague's bags and ignore me. (BE)*

The participants believed their husbands' non-supportive roles were due not to their busy schedules but also from the cultures of the tribes they hail from. These tribal cultures enjoin or expect women to venerate their husbands. The patriarchal ethos of venerating males begins when they are young. They are socialized into having the thought that they are superior beings, so they grow up with that thought when they become husbands. The insidious cultural expectations influence the behavior of their husbands. They based their conviction on other men, apparently from other tribes, in the same profession as their husbands who assist their wives in their housekeeping duties:

> *He is also an Ashanti man, he has grown up in the environment where women are supposed to worship and serve their men. So he is also having that thing, it's a deep seated thing in him, I don't think it's about his job but he feels that like this is a woman job, that's what I feel. He feels like this is a woman job, otherwise I don't see why he shouldn't be able to help. I am sure that other medical doctors who are helping their spouses very well, and they are given and all the necessary support at home. I think it's because of his background has also actually influenced him. But I am an Ashanti and we are also worshipping our male boys in the house, doing everything for them (DI).*

DISCUSSION

Educating women in STEM areas is beneficial to the society and economy. Despite the justification of female education in STEM in terms of human rights, scientific support, and developmental standpoints (UNESCO, 2007), women are marginalized in its participation. In the academic trajectory of women in STEM, the discrimination they experience varies but at the root of the discrimination is the pervasiveness of society's patriarchal clout on education and STEM (Wachege, 1992). Even when they are supported and encouraged to pursue their interests in STEM, the patrifocal beliefs continue (even by the people who support them) regarding the inferiority of women (Erinosho, 1994). Due to such beliefs, women experience less feelings of belonging and interest, and may also feel less able to succeed in STEM fields (Cheryan, Plaut, Davies, & Steele, 2009).

The structural/physical composition of males in lecture halls in many STEM disciplines is a source of gender discrimination (Boateng, 2017), especially for females who had attended exclusive girls' senior high

schools. However, many participants found that their male mates were supportive to them. This is incongruous to the finding that at the university level women experience a greater loss of confidence in their intelligence (Farrell & McHugh, 2017) and men underestimate the women's ability to do well in STEM subjects (e.g., Farrell & McHugh, 2017).

Patriarchy is ubiquitous as it extends to the STEM career milieu. The belief that STEM careers are only for the "brainiest" students, especially middle class males (ASPIRES, 2013), plausibly accounts for the disrespect and disdain shown to female STEM faculty by their former male mates in the university. The ubiquitous patriarchy not only extends to the academic STEM ambience in terms of teaching and research, but also to the service roles of faculty as well. Female leaders of the academic STEM are grossly disrespected even by their male juniors. Gender and other sociocultural (ethnic and tribal) factors are interlocked in the ingrained patriarchy fostered by the Ghanaian society. Societal expectation or requirement of women as primary caregivers encourage them to adopt career paths that are congruent with raising a family (Hakim, 2002) and places them below men regardless of their status in the academic STEM workplace. The cultural division of labor stereotyping certain careers compels women, at least wives and mothers, to take careers with flexible work schedules and workloads because of their child caring and home management roles or reduced work time if they choose STEM careers (Erinosho, 1994; UNESCO, 2007, 2017). Paradoxically, these women fail to become ideal workers who must satisfy the tenure demands of the male-driven academy (Ward & Bensimon, 2002; Wolf-Wendel & Ward, 2006). The patriarchal nature of the academy constrains women in academia from maximizing their potential (Lundgren & Prah, 2009). Considering the bigger picture, there are no gender frameworks in Ghanaian public universities (Manuh et al., 2007). This is coupled with the fact that tertiary educational institutions are replete with gender contradictions partly because their leaders do not have gender equity issues as priority concerns (Acker, 2000), which is evident in the passive response relative to Ghanaian universities (Manuh et al., 2007).

CONCLUSION

Gender inequalities and inequities in education are replete in most parts of the world. Such a situation is not different in Ghana. From the gamut of all educational levels, gender gaps characterize Ghana' education system. Although there is ample literature on gender disparities concerning Ghana's

education, there are few that touch on the experiences of females in the STEM fields (Campion & Shrum, 2004; Boateng, 2017), which are deemed to be male-dominated disciplinary domains. As a consequence, the objective of this study was to elicit narrative accounts of the educational and professional experiences of female STEM faculty in Ghanaian universities through in-depth semi-structured interviews.

It was found that the participants throughout their schooling and career (thus far) relied on their support systems to succeed. However, the silver lining of support was smothered by gender discrimination underpinned by ingrained patriarchy in the Ghanaian society. Regardless of the feat they have accomplished, they are perceived and actually treated as second fiddle to men. The participants' parents, especially their fathers, supported them in their education; however, their support was punctuated by their patriarchal beliefs that their daughters should relegate themselves to their male counterparts. During their STEM school years, women benefited from the support, cooperation, and collaboration of their male mates. Such support, cooperation, and collaboration plummeted as they proceeded to the STEM workplace where their former male mates became perpetrators of gender discrimination. Such patriarchal realities must be addressed by the various stakeholders in Ghana to nip gender inequalities and inequities in the bud.

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