
RESEARCH ARTICLE

Niche-Making in Intersectional Spaces: Narratives of a Mathematics Teacher Union Activist

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ABSTRACT

In a world of rigid social norms that have shaped women's lives, there are those who have broken stereotypes and advanced the field. This qualitative research investigates the narratives of Kaisog, a mathematics teacher whose strategic and deliberate decisions created within intersectional spaces brought about a negotiation of a mathematics teacher's professional identity in the eventual creation of a new professional category: that of a mathematics teacher union activist. This paper explores the three categories of intersectionality namely structural, representational, and political, that were present in the life of Kaisog. Thematic analysis of the data revealed three themes of intersectionality: Neglecting the Vulnerable, Selective Mathematics, Women in the Workplace, and Being Queer in Society. It also argues how these intersectional spaces created niches for Kaisog: The Designated "Mother" Role, Decolonizing the Mathematics Curriculum, and Social Justice through Mathematics Education. Kaisog's empowering structures include quality basic education, brilliant teachers, a matriarchal Ilonggo culture, and supportive family. Kaisog used mathematics as a tool for liberation and for achieving social justice and thus, creating a new niche for herself, that of a mathematics teacher union activist.

KEYWORDS

Intersectionality, niche-making, mathematics teacher union activist.

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1. Introduction

Throughout history, women have faced injustices and intense discrimination – from a lack of legal rights to a lack of independence and a lack of access to education. In many societies, women have long been viewed as weak and less than fully human (Arizona State University, 2012). Social and cultural norms hold women back from pursuing their passions and reaching their fullest potential.

Women have continuously been underrepresented in the math and science professions (Asia-Pacific Economic Cooperation, 2010). According to the Philippine Space Agency (2021), women account for less than 30% of people in the science, technology, engineering, and mathematics (STEM) fields, with math-intensive fields having some of the worst gender imbalances (Cimpian, 2020). A report from the Department of Science and Technology-Science Education Institute (2021) shows that the fields of Mathematics and Statistics still have the lowest proportions of females in the science and technology fields, with only less than 1% among all female science and technology occupations. This supports the study of Ghasemi and Burley (2019) which emphasized that the underrepresentation of women in mathematics is the most consistent feature of the underrepresentation of women in the STEM fields.

In the Philippine context, women are not deprived to pursue opportunities in the field of mathematics. There are discrepancies between genders and opportunities, but mathematics education and careers are available to Filipino women as they are to men

(Tagupa, 2019). These equal opportunities, however, are not reflected in the data revealed by the Commission on Higher Education which revealed that just two in seven engineering students are female. While 43 percent of the enrollees in STEM courses are women, most are in the health sector (Baron, 2022; Philippine Space Agency, 2021). These statistics show not a lack of aptitude or a scarcity of opportunity but a shortage of interest in mathematics among Filipino women. Many possible factors are contributing to the discrepancy between women and men in mathematics jobs, including a lack of female role models, gender stereotyping, and less family-friendly flexibility in STEM (Beede et al., 2011).

Furthermore, owing to the history of the Philippines, which was once an American colony, most of the country's educational practices are drawn from strong American traditions (Low et al., 2021). The teaching traditions, which includes the teaching of science, technology, engineering, and mathematics are patterned from a white male perspective (Dancy et al., 2020). It is time that we get away from the shackles of a colonized curriculum and move towards a curriculum that reflect the lives of the Filipino people. A curriculum anchored on the culture and needs of students can empower them, promote critical thinking and encourage participation that could shaping a more just and equitable society (Vimbelo & Bayaga, 2023).

This study is anchored on subjectivism, the epistemology of the underprivileged and underrepresented sectors of society (Crotty, 2003). In addition, looking at the struggles of women only through the lens of feminism may not be enough to understand their struggles. Women coming from different groups of gender, class, religion, age, and education may have similar circumstances but have totally different experiences based on the groups where they belong. Law professor Kimberle Crenshaw (1991) used the term intersectionality to denote the many ways that race and gender shape the multiple dimensions of Black women's experiences. While originating from the struggles of Black women, intersectionality, today, is defined as a lens for seeing the ways in which various forms of inequality often operate together (Crenshaw in Steinmetz, 2020). When talking about race inequality, we often talk about it as separate from gender, class, or social status. However, some people belong to multiple disadvantaged groups at once and their experience is not just a sum of its parts. Intersectionality is considered both as an academic frame and a practical intervention in a world full of many inequalities (Cho, Crenshaw & McCall, 2013).

Intersectionality is often categorized into three forms: structural, representational, and political. Structural intersectionality talks about the ways in which the location of women of color at the intersection of race and gender makes the experience of black women on abuse significantly different from that of white women. Political intersectionality discusses how the feminist and antiracist politics have ironically helped in the marginalization of black women. Finally, representational intersectionality examines how controversies over the representation of women of color can yet be another source of disempowerment (Crenshaw, 1991).

The purpose of this research is to investigate how the different forms of intersectionality affected the life of a Filipino mathematics teacher, demonstrate how strategic and deliberate decisions created within intersectional spaces allowed her to create her niche in mathematics, and the structures that empowered her. All of which contributed to the eventual creation of a new professional category: that of a mathematics teacher union activist. While a myriad of challenges can inhibit one in maximizing their potential and contribute significantly to the community, there are those who thrive, can create spaces and new categories, and negotiate identities.

This paper will present a synthesis of key studies on the multiple roles of women, women in STEM, present the methods used, and analysis of data. Four themes emerged on the presence of intersectionality in the life of the participant and three themes were used to argue that intersectional spaces are not entirely spaces of absolute oppression, repression, and limitations. Rather, intersectional spaces can host individual moments – minor reverberations that can eventually lead to opening of spaces within such restrictive spaces for identity renegotiation and the promotion of a new, more nuanced category for professional teacher, especially mathematics teacher. Themes on her empowering structures also emerged.

2. Literature Review

2.1. *The Multiple Roles of Women*

A study done by Rosada and Nurliani (2016) identified that the difficult condition of the economy has pushed many women to take on jobs on top of their domestic responsibilities. Multiple domestic roles of women included cleaning the house, washing, cooking, assisting the children, attending to social activities and many others. Results showed that women who played multiple roles were still performing their roles as mothers and were devoting most of their time and activities to daily chores in the household. Aside from these, women are also expected to handle the external and internal interactions in the household, manage decisions, and handle the finances. Just like in other parts of the world, these multiple roles which are often unpaid, are largely done by Filipino women and girls and included in their daily routine with 76.2% of unpaid work done by women (Tongson, 2019).

Salihu et al. (2012) conducted a systematic literature review of the terms "pregnant women", "workplace", and "employment" for publications from 1990 to 2010. It was found in the results that discrimination against pregnant women is prevalent in the

workplace and represents a large portion of claims against employers by women. Furthermore, results showed that the standard working environment presented little hazard to infant health and that pregnancy could significantly affect a mother's psychosocial well-being. The following recommendations were made: shifting organizational culture to support women in pregnancy, conducting early screening of occupational risk during the preconception period, and monitoring manual labor conditions, including workplace environment and job duties.

Filipino women may be considered at par with women in other countries in terms of academic, professional, and political opportunities. However, Filipino women have suffered from domestic violence, economic disadvantage, discrimination at the workplace, exploitation, prostitution (Santiago, 2008). Even the Magna Carta for Women which, despite being celebrated as a groundbreaking law for the protection of women and girls fell short on many counts (Durano, 2014). While it has recognized that individual women carry several identities that enabled them to belong to any number of categories, it has failed to recognize the culturally ascribed roles of women as housewives and mother. There is no mention in the Magna Carta for Women about changing these patterns nor about any valuation attached to this role. Countries such as the Republic of Venezuela have recognized housework as an economic activity and housewives are entitled to social security. This lack of recognition of this significant role played by women prevents them from functioning in ways they value, even when our society tells us that they have the freedom to do so (Nussbaum, 2003). In addition, with the roles of housewife and mother not socially recognized and legally protected, work done by women in relation to these roles are still undervalued by society.

2.2 Women in STEM

Understanding the underrepresentation of women in the Science, Technology, Engineering and Mathematics (STEM) fields has been a constant puzzle, with the underrepresentation in Mathematics as being the most consistent feature (Ghasemi & Burley, 2019). The same study revealed that boys and girls are similar in their mathematics ability but women are still underrepresented in the STEM labor force with most of the imbalance existing in the fields of engineering, computer science, and the physical sciences.

This journey of women in Mathematics has not been a walk in the park. In a study conducted by Barton (1997), she talked about research in science education, suggesting that a large number of students feel alienated from science and develop low self-esteem and confidence in science beginning as early as elementary school. Feminist theorists have suggested that the absence of women in science cannot be completely solved by providing school girls with more exposure to science or even by simply acknowledging that science is socially constructed. Instead, such theorists argue that the history of women's participation in science, a participation marred by the silencing of women as scientific researchers, teachers, and learners, has resulted in a masculine construction of science.

Barton (1997) also shared some of her experiences and the lessons about feminism and science in these stories. For instance, she shared that one role of feminist liberatory efforts in science education is to create contexts where teachers and students can make explicit the ways in which they perceive dominant ideology as shaping science and scientific knowledge. In addition, she also emphasized the importance for science educators to develop an awareness of how, when, and why the works of women and minorities have been excluded from science and the impact these exclusions have had on the culture, content, and processes of science. Furthermore, she also mentioned the role of positionality in the classroom discourse and the connections it has to issues of voice and authority. Another theme woven throughout feminist liberatory education is the need for "new language", new language based on the experiences of those who have been marginalized from the science endeavor, new language that captures the experiences, feelings, and beliefs of women and minorities by speaking from their hearts and souls, their definition, their effort, their places on the margin.

The issue of gender gap in mathematics stems back as far as the primary grades. In a study conducted by Rodriguez, et al. (2020), girls in the 5th and 6th years of primary education tended to exhibit less positive attitudes about mathematics than their male classmates. Specifically, they have lower motivation, worse perception of competence, and higher rates of anxiety although there is no significant difference in academic performance between girls and boys. Moreover, in a study made by Morales et al. (2016), results showed that the majority of students experienced gender inequality in their K to 12 basic education. However, they still pursued a career in mathematics because of factors such as teacher-student interaction, teaching strategy, verbal teacher response and instructional materials.

3. Methodology

3.1 Narrative Inquiry

This research aims to showcase the stories of Ilonggo women as leaders in the field of mathematics and use these as the basis for the liberatory curriculum framework. This is qualitative research; specifically, it utilized the narrative inquiry approach. Narrative Research studies the lives of one or more individuals and provides stories about their lives. These stories or narratives are then

retold by the researcher in a narrative chronology. They are then combined with the narratives of the researcher's life in a collaborative manner (Creswell & Creswell, 2023). It is a powerful tool for understanding the experiences of individuals and gaining insights into their perspectives. Narrative Inquiry provides means to enhance not only the quality of education but also the quality of experience of our students.

Narrative Inquiry is used in studying educational experience and has a long history in and out of education. It is the study of the ways humans experience the world. Narrative researchers describe the lives of people and collect and tell their stories. It is a collaborative research which means that it constitutes a relationship between the researcher and the participant. This empowering relationship takes time to develop and involves a feeling of connectedness between the researcher and the participants. There are three important issues in a narrative inquiry: the equality between the participants, the caring situation, and the feeling of connectedness (Connelly & Clandinin, 1990).

Furthermore, Connelly and Clandinin (1990) emphasized that in making a narrative inquiry, it is essential that the researcher listen first to the stories of the participants. This does not mean that the researcher is silenced in the research process, but it means that the participant is given the space and time to tell their story. The researcher needs to be deliberate in creating a relationship in which the participants feel cared for and has a voice to tell their stories.

Doing narrative research does not come without challenges. The researcher needs to collect extensive information about the participants and understand their individual contexts. Active collaboration is a must and the researcher needs to be reflective as well of their own personal and political background which affects how they restory the accounts (Creswell, 2007). In this study, I will look into the influences of culture, politics, language, education, and other structures to each Ilonggo woman in mathematics to gain a better perspective into their lives. The stories that will emerge in this research study will be based on the personal knowledge and subjectivity of the Ilonggo women in mathematics. Furthermore, my background as a mathematics teacher also affected how the narratives were restoried.

3.2 Participant

The participant of the study was identified through purposive sampling. Purposive sampling was used to select the participant who can best contribute to the results of the research. She possesses the following characteristics: a woman with a Filipino heritage, specifically an Ilonggo heritage. Ilonggo is a specific set of people concentrated in the Western Visayas region, particularly in the Panay island (Iloilo, Capiz, Aklan, and Antique) and Negros Occidental (Ethnic Groups of the Philippines, n.d.). The participant was raised and earned her basic education in Iloilo, Philippines, she pursued a mathematics-related degree, and made a significant impact in the field of mathematics as evidenced by her awards and/or accomplishments. She was willing to participate in in-depth interviews.

The participant was given the pseudonym Kaisog. Kaisog is a multitalented Ilonggo woman. She is a mathematics teacher, a union activist, a writer, a researcher, and a member of multiple people's organizations. She studied in a private Catholic elementary school and state university laboratory high school. She then earned a degree in Applied Mathematics from a top university in Iloilo. Initially, she did not want to become a teacher but fate had a different plan for her. After being exposed to outstanding women in education, her passion to teach was ignited. With a turn of events in her life, she pursued a master's degree in mathematics education. Her life work in the field of education is focused on merging literature, culture, and mathematics to provide a holistic and meaningful learning experience. She has also made a niche not only inside the classroom but in so many other areas as well. She has received numerous awards locally and internationally in the fields of creative writing, research, and public service. Her activities, despite cutting through different fields of discipline, all boils down to protecting the vulnerable. With her strong persona, Kaisog which means bravery is just fitting for her.

3.3 Data Sources

In narrative inquiry, it is important that the participants have a voice in the relationship. It is important that the researcher first listen to the participant's story. However, this does not mean that the researcher is silenced but it means that the participant is given the time and space to tell her story. Narrative inquiry is a process of collaboration involving storying and restorying. It is a relationship in which both the researcher and the participants feel cared for and have a voice in the relationship (Connelly & Clandinin, 1990).

In gathering the stories of the participant, in-depth feminist interview, the exemplar feminist method was used. Feminist interviewing seeks out a rapport with participants and a two-way dialogue between researcher and the participants. When building rapport with research participants, making them feel at ease, while also sharing stories about one's life and thoughts, I and the participant create a sense of togetherness and closeness in the research setting (Oakley in Thwaites, 2017).

Feminist interviewing seeks out a rapport with participants and a two-way dialogue between researcher and participants. The researcher creates a sense of togetherness and closeness through building rapport with research participants and making them feel at ease, while also sharing stories about one's life and thoughts (Oakley in Thwaites, 2017). The interview was flexible and the conversation between the researcher and the participant was spontaneous. The Life Story Interview adopted from McAdams (2008) (see Appendix 1) and a developed semi structured interview guide with questions grounded on Critical Theory (see Appendix 2) were used for the feminist interview. The questions were given in English but the conversation between the researcher and the participant was a mixture of English, Philippines' national language Filipino, and the researcher and participants native tongue Hiligaynon. I am proficient in these three languages. The participant was interviewed four times from July 2023 to November 2023 with each interview lasting for one to two hours each. A registered psychometrician attended all the interviews to ensure that the participant was not emotionally disturbed throughout the duration of the interviews and to process any emotions after. Aside from in-depth interviews, there are several other data collection methods possible in a narrative inquiry. Other sources of data included observation, printed media, and digital documents.

3.4 Procedures

Clandinin and Connelley in Creswell (2007) suggested a five-step approach as a general guideline in doing a narrative inquiry. The methods for a narrative inquiry represent an informal collection of topics and do not follow a strict approach.

1. The first step was to determine whether the research problem best fits a narrative inquiry. At the onset of this research, the purpose of collecting the narratives of an Ilonggo Woman in Mathematics and to bring her stories from the margin to the center was already clear. After determining that the research process indeed suits a narrative inquiry, I prepared the data gathering instruments and had them validated by experts in guidance, research, social science, and mathematics. The two instruments underwent validation by the experts. The Life Story Interview (McAdams, 2008) and a semi structured interview guide with questions grounded on Critical Theory were used for the feminist interview. These two instruments were deemed acceptable for use in the data gathering.

2. The second step was to select one or more individuals who have stories to tell and have the availability to participate in in-depth interviews. I reached out to probable participant through emails, and in-person conversations. Her consent was secured, and her rights were explained to them. The data gathering then commenced and the participant participated in four in-depth interviews in-person. During the interviews, a registered psychometrician was present to debrief the participant after. I also kept a journal of my interviews with her. Journaling served as an audit trail to keep the themes and choices transparent, coherent, and simple: a crucial role in the qualitative data analysis process.

3. The third step was the collection of information about the context of the stories. I investigated the participant's personal experiences, her culture, and her historical contexts during the interviews. Though there is already a prepared questionnaire, I made sure to follow up with questions which are relevant to the context of the participant. I also observed the participant during the interviews and gave follow up questions on stories she highlighted in her narratives. In addition, other information about her such as her major accomplishments in the field and involvement in various causes were gathered through online and printed sources. These data allowed me to give a better understanding of the participant. These sources are not included in the references section of this paper to uphold confidentiality of the identity of the participant. In addition, I also practiced reflexivity throughout the data collection and analysis stage. This is done by being mindful to not fully allow my own biases and preconception might affect the result of the study. I am a feminist and I am aware that I have experienced my own share of challenges as a woman who grew up not interested in stereotypical feminine activities and of marrying age who have not fulfilled the socially ascribed role of mother and caretaker. I understand that such experiences may contribute to the results. Thus, validation of results to lessen the effect of such will be discussed in the next steps.

4. The fourth step is the analysis stage of the study. I analyzed the participants' stories and to restory them into a framework that makes sense. This framework consists of gathering stories, analyzing them for key elements, and then rewriting the stories. I manually transcribed the narratives of the participants using Microsoft Word as well as nonverbal cues. This is the longest part of the data analysis. After the interviews were transcribed, codes were given to the narratives. The common events were then grouped together. After grouping together common events, I arranged the events and restoried the narratives. Often, individuals do not tell their stories in a chronological order. In narrative inquiry, it is the researcher's task to retell the story such that it has a beginning, a middle and an end. Aside from the chronology, researchers might include themes that arise from the research. Thus, the data analysis is both a description of the stories and the themes.

5. The final step was collaborating with the participant by involving her in the study. Both the researcher and the participants created meaning from the stories. In the interviews, after the participant answer a question or a series of interconnected questions,

I would summarize what she said and would give my interpretation to her stories. Sometimes she would agree on this interpretation and sometimes she would elaborate further. I also sent her copies of the transcripts of the interviews for validation.

4. Results and Discussion

4.1 Neglecting the Vulnerable: Political Intersectionality

Kaisog, with all her activities crossing across multiple disciplines and her multiple advocacies, always returns to the societal issue of neglecting the vulnerable. She lamented on how women belonging to multiple disadvantaged groups are marginalized. *"Kung imol ka nga babayi nga disabled, imagine kung queer ka pa gid, gasalalampaw ang imu pagka-marginalized. Ngaa indi sila ang gina-ulikdan sang atun society nga sila ang mas nagakinahanglan bulig?"* [If you are a poor woman, disabled, and queer at the same time, you become marginalized in many overlapping ways. Why isn't our society looking after them since they need it the most?] She further emphasized that the vulnerable are not being well taken care of and even people belonging to the middle class have sided with people in power, the elites, rather than helping the marginalized. The laws of our society prioritize the welfare of those in power rather than the marginalized. She gave an example on how our roads were built for cars and not for pedestrians. Elevated walkways were built for pedestrians but a person with a disability may not be able to access such. It leads us to the question, who are roads really for? Is it for the minority of people who own cars or for the majority who are pedestrians? Why are sidewalks not a priority when it is beneficial for our health and economical as well?

Kaisog further elaborated how certain structures in our society have contributed to the everyday sexism in women's lives. She shared her experience with a bike lane in the city which was recently painted with an icon of a biker. Many male bikers complained that the icon used for the bike lane was that of a woman. They claimed that with that icon, only female bikers are allowed to use the bike lane. Female bikers including Kaisog argued that when the icon before was that of a man, they never complained that the bike lane was only for men. This showed that there are still those who are prejudiced against women, who see man as the first sex and woman as the second sex.

Kaisog also shared her experience in the health care system. She rushed her friend to a public hospital because of appendicitis.

"We've been there for more than an hour. Dayun wala may nagasapak sa iya. Nagastruggle na siya sa sakit so we decided to bring her to a private hospital. Pag-abot pa lang, ginsweruhan na sa dayun, etc, gintagaan kwarto". [We've been there for more than an hour but we were not accommodated. She was really struggling that time so we decided to bring her to a private hospital. When we arrived, she was immediately accommodated by the hospital staff.] *So, mlearn ka gid mag-endure... mlearn ka gid mag-endure. So may consciously, dapat ginaremind mo self mo nga may right ka to be comfortable kag may mga bagay nga dapat wala ka gina-endure. Kag just because kaya mo siya i-endure, doesn't mean you have to endure it kag it also doesn't mean nga kaya siya i-endure sang iban nga tawu also. So mga... so mga amu sina.* [You learn to endure. Consciously, you must remind yourself that you have the right to be uncomfortable and that there are things that you should not endure. Just because you can endure it, doesn't mean you should. And just because you can endure it, others can also do the same.]

"A huge majority... a huge majority really naga hikahos, ginagutom, indi OK ang gina-istaran, etc. So, always gid nakon ginapatihan nga amu gid ni dapat ang atun nga number one concern nga ma-ulikdan ang masses, ang vulnerable kay kun ma-ulikdan sila, domino effect na siya." [A huge majority of us are struggling and hungry. I always believe that the masses should be our number 1 concern, that we should always take care of the vulnerable. If the vulnerable are taken care of, there will be a domino effect in society.] *"Everybody else sa society will really do better also. Everybody else really, I think will be in a better position socio economically if we uhhh consider and prioritize the welfare of the masses."* [Everybody else in society will really do better. Everybody else really, I think will be in a better position socio economically if we consider and prioritize the welfare of the masses.]

4.2 Selective Mathematics: Representational Intersectionality

Her advocacy of taking care of the vulnerable extends to her classroom. Kaisog shared that we were made to believe that math is only for those who are smart and gifted and that if you do not fit into this category, you have no business learning math. However, she firmly believes that math is a skill more than it is a talent. If it is a skill and you practice more and devote your time into it, you eventually would learn it. Maybe there are really people who are anatomically gifted in mathematics that is why it is easier for them to learn it.

Furthermore, we have this notion that boys are generally better in math than girls. Mathematics competitions such as the Mathematics Teachers Association of the Philippines - Department of Education (MTAP-DepEd) Math Challenge and the Philippine Math Olympiad are dominated by boys. In the 2024 results of the PMO, no female qualified as a national finalist. All 20 national finalists were boys. These types of competitions put a premium on solving the answer as fast as possible. This is where boys would naturally succeed.

4.3 Women in the Workplace: Structural and Political Intersectionality

"Ang mga laude laude sa amun nga time, isa, duha, lima lang guro kabilog, mga babayi. Indi man siguro babayi sila tanan pero mostly women gid ya. Ang class valedictorian namun ya, babae." [During our time, there were only one or two students with Latin honors and most were women. Our class valedictorian was a woman.] Kaisog fondly recalled how women were the top students in class during her time in the university. She narrated how difficult their mathematics courses were and how she and her classmates were barely surviving. Just being able to get a passing grade was already worthy of celebration and so someone graduating with Latin honors earned a huge respect from people. Looking into her own experience, Kaisog believes that she was also given the same opportunities as her male classmates in the university.

However, despite admitting that education and work opportunities were made available to her as they were to her male classmates and colleagues, Kaisog disclosed about witnessing discrimination. In the academe, faculty members are given only a specific number of years to finish a postgraduate degree to be given a tenure. After that time has lapsed and the faculty member still has not been able to finish their degree, they get removed from the faculty roster. Kaisog shared how this rule discriminates against female faculty members. One of her colleagues before lost her place in the university because she got pregnant during her study leave resulting in her not being able to finish the degree. To make matters worse, she was criticized by a fellow colleague who also happens to be a woman for getting pregnant while on study leave. The experience of a male teacher is totally different from that of a female teacher. Presently, there are no existing rules within the academe that would protect women from this type of discrimination. Kaisog lamented that even up to this day, this kind of bullying happens to women in the workplace. In addition, if a woman gets pregnant, especially single women, she gets criticized for getting together with a man and doing the act. Kaisog shared how some of the women she has worked with struggled with their places in the workforce because employers would still prefer to hire men instead of women because men cannot get pregnant and would not need maternity leave.

4.4 Being Queer in Society: Structural and Representational Intersectionality.

"Ti queer ako nga daan, bisan ano pa kahambal sang tawu nga immoral ako or makadtu ako sa impiyerno or I'm doing a very very very bad thing, wala gid ako labot... wala gid ako labot because nagapati ako ya ya sa Ginoo nga gapalangga sa akon. So grabe ina siya ang pagstrengthen sang sang amu ko sina nga nga pagpati when I became an adult nuh? So, mas nangin kumportable na ako sa akon nga identity eh with identifying as a queer woman". [Because I am queer, even if people would tell me I am immoral or I'll go to hell or I'm doing a very very bad thing, I do not care. I do not care because I believe in God who loves me. That thought helped me a lot when I became an adult. I became more comfortable with my identity... in identifying as a queer woman.]

Currently, Kaisog is a strong advocate of the LGBTQ community but reaching such a level of confidence was not easy. She shared how challenging it is for someone to be queer in the society that we live in. What she considers as the lowest point in her life is the time when her relationship with her first girlfriend ended.

"Twenty years ago... ummm... being a lesbian was not as easy as... relatively as how it is now. Ummm. Her family found out about our relationship. We were both in Iloilo during that time and her family found out about our relationship. She lost her job. Uhh Hmm. She went home for her ummm birthday. She went home for her birthday and her family wouldn't allow her to be with me anymore. So they wanted her to work in Manila instead. So we decided that... OK... she is going to work in Manila, I'm going to follow after. That was also going to be the time also for me to do my Masters. So technically, she was one of the major reasons why I pursued my Masters also. So we were both there. We were there for I think a month, two months, three months. That was when being the getting dumped happened nuh?"

Kaisog also shared that coming out to her family, especially to her mom was something she did later in life. One night she and her family came home from dinner with friends including her girlfriend at that time. She had not come out to her mother yet at that time so she decided to do it once and for all.

She told her mother, *"Nay, ang upod natun tu kagina miga ko tu. And nasurprise siya nuh? I mean... Well, of course indi kami friends sa Facebook. Siguro mga katatlo, kaapat ya na ko gin-add as friend. Gina delete delete delete. Wala ko gid sa gina-accept as a friend sa Facebook (laughs). So basi sala ko man. But yeah"*. [Nay, the one we met earlier, she is my girlfriend. She was surprised. I mean... Well, of course we are not friends on Facebook. She added me as a friend probably three or four times already but I'd always delete it. I don't accept her Facebook friend request. So maybe it was also my fault. But yeah.] Kaisog continued, *"This happened four years ago and during that time, I was already a gender advocate. I was already very very very open about being queer. Uhhh. Apparently, not open enough, nuh? Because when I told this to my mother, nasurprise siya. Kag her exact words were, Day, tomboy ka? So nasurprise siya, nasurprise man ako nga nasurprise siya. Hambal ko, huo something like that nuh? So ummm. And then she.. she said, Ahh. So tsakto gali si Toto mo. And then I said, Huo eh kay bal-an ya na muh. Then she said, Bal-an na sang mga manghod mo? I was the eldest... I am the eldest. Hambal ko huo. Then amu man lang then wala naman dayun"*. [Her exact words were, Day, are you a lesbian? She was surprised. I was also surprised that she was surprised. I told her yes. And she said, so your brother was

right. And I said yes because he knows. Then she said, do your siblings know about this? I was the eldest... I am the eldest. I said yes. And that was it.]

4.5 Making a Niche: The Designated "Mother" Role

Kaisog shared how her students and even her colleagues would call her "mother" or "mom". She joked that she does not understand why people would call her "mother" or "mom" when nobody is calling her male colleagues "daddy" or "father". While she does not like being called a "mother", she takes this as a compliment and considers it as a big responsibility. She considers the situation as a privilege because she could influence people and have the power to convince them. She joked "*Ngaa bakulon ko gid sila kung indi sila magpati haw?*" [Would I spank them if they would not obey?] She shared that she takes this designated "mother" role to her students and colleagues as a responsibility. She is very careful with how she interacts with them and what she says to them because they might take it at face value. She believes that being a woman and a teacher gave her the power to touch other's lives. She used this power to convince them of the advocacies for nation building. Being a teacher was not something Kaisog wanted to do at first. Her decision to pursue mathematics education was credited to her mathematics teachers who were women.

"Ang math teacher ko bal-an ko gid ya nga daw kasagad gid ya. Ang pagtulok ko gid sa iya ya, alam gid sila ya. Sa college, sa college, amu man. Sagad ang mga teachers ko, mga maestra ko. Mga teachers ko nga babayi, sagad sila, sagad pa gid sila magtudlo." [My math teachers were experts in teaching and they were smart. When I entered college, it was the same thing. My women math teachers were experts in math and were experts in teaching as well.] When she was asked why she prefer to have women as teacher in math classes, Kaisog explained, "*Organized sila. Organized sila magtudlo. Amu gid na ginapangita ko sa teacher... Ang mga teachers ko ya, organized sila, gatulok sila sa amun, gatulok sila. Mga teachers ko ya nga babayi, gatulok gid ya sa amun. Kabalo gid ya ya. Basta gatulok sila ya. So big deal gid na siya sa akon nga humans kami tanan... humans kami tanan."* [My teachers were very organized. That's something I look for in a teacher. My teachers who were women made eye contact with us. Eye contact is a big deal for me since we are all humans]. Kaisog added, "*Gacommand gid sila ya respect. Gacommand gid sila ya sang respect. Amu na ya ang ga-appeal sa akon sang una as a... as a student. Uhhh. Alam ka... alam ang teacher mo, wala ya ginaflaunt ang pagka-alam ya, it just flows... it just flows naturally. Wala ya man nahambal nga amu ni ang nabal-an ya. Kag macommunicate ya ni sa imu ang mga amu ni... without demanding for your attention, mahold nila ya ang imu attention. Amu sina.* [They command respect and that's what appeals to me. They are smart but they do not flaunt it. It just flows naturally. They can communicate and hold your attention without demanding for it.]

4.6 Making a Niche: Decolonizing the Mathematics Curriculum

While Kaisog believes that some are anatomically gifted in mathematics, it is still a skill that can be learned. She explained this using an analogy. She compared learning mathematics to learning music. Kaisog jokingly admitted to being tone deaf. She believes, however, that if she practices every day, she might not be able to reach an advanced level, but she might learn to sign up to an average level. Mathematics in some way, is like music. There might be people who can put two and two together quickly but learning math is not about who can do it the fastest. In the words of Kaisog, "*Indi man padasig dasig ang kabuhi.*" [Life is not about who can do it the fastest.] If life is not about who can do it the fastest, then why should math give a premium on who can solve a problem the fastest? Kaisog firmly believes that mathematics classrooms could also be created in a way that it gives a premium to those who are eager and willing to learn, those who are dedicated to learning skills that may be hard for them to learn, and those who can work well in a group. She added that putting only a premium on those who can solve the quickest fosters an individualistic culture in the classroom which the students will carry in their lives in society. Meanwhile, putting a premium on values such as dedication, perseverance, and cooperation fosters a collaborative mindset and makes students understand that they are part of a larger community. "*Tani, kay siya ang pinakadasig magsolve, medyo balik siya anay kag ulikdan ya anay ang mga nagastruggle para ulupdanay sila tani magmove forward. Tani makaprovide kita sa mathematics classroom sang opportunities for working collaboratively.*" [Those who can solve the fastest should look back to those who struggle so that they can move forward together. I hope that we can provide opportunities for working together in the mathematics classroom.]

Furthermore, Kaisog is a strong advocate of contextualizing the mathematics classroom.

"I just recently realized how uhhh distant classroom mathematics is or the teaching of mathematics is in our classroom compared to other disciplines. Come to think about it now, when I think of the things that my Home Technology teacher taught me, she never said, or they never told me that we'll be using this in real life. They just taught them to us, and we really had to do them because these were things we needed in life. So, sewing our clothes, folding our clothes, cooking, etc, ahh. In Science, ahh, they also did not need to tell us that we had to learn these things because the practical applications were always there. In Social Studies, we were talking about things that happened before or were happening presently, nuh? So all the disciplines... it seems provided us with enough context to make us realize that we need these things. Mathematics is not taught that way. We've always been taught to... uhh... have problems that are not really going to matter in real life. But... but later on when I got to understand how... how learners learn, when I got to understand how important it was to uhhh put things into context uhhh that's when it really struck me and I hope to do something like that... put everything into context, get away from the shackles of a colonized educational

system. And, uhhh, finally make our learners realize that they are... can be competent in mathematics given the right kind of environment, given the right kind of resources".

4.7 Making a Niche: Social Justice through Mathematics Education

When asked about how we can protect the vulnerable, Kaisog replied "For the longest time, we were made to believe that math is neutral... that math is not political". Kaisog strongly believes that this could not be further from the truth. Mathematics teachers have a great opportunity to teach social justice through mathematics and teach students to learn to prioritize the vulnerable. For example, a Grade 9 Statistics lesson on data presentation and data collection could trigger the awareness of learners on fair and livable wages. During her class, she tasked the students to gather data on how a family of five can live off PhP 10 200 which was the poverty threshold at that time. That activity ignited a conversation among students that a lot of people who live within the poverty threshold do not even have enough for food. People had to be creative and had no choice but to sacrifice some essentials such as giving a child a bald haircut so that less shampoo is needed in the family.

Another example that Kaisog discussed is how students can differentiate symbols of greater than and less than. It is common practice in schools to teach this by making them imagine that the opening of the greater than and less than symbols represents the mouth of a crocodile. This crocodile would always open its mouth to the number with the greater value. This kind of representation sends a message to the students to always choose the bigger piece.

"These are not part of the Filipino culture, huh? Filipino culture does not work that way. We do not go for the larger piece of whatever. In fact, we wait until everybody gets their piece before we... before we get ours. We reserve the largest piece, as per Jose Rizal, to the prayle or the guest of honor or etc. Westerners will say that that's a bad trait but that is our culture. But that does not figure in our curriculum."

Kaisog, with strong conviction said that mathematics topics have a very huge potential to orient students early on of their responsibilities in society and she encouraged mathematics teachers to use the great power that they have in making sure that students understand their roles in society.

Furthermore, when asked why she chose to pursue a career in mathematics, Kaisog shared how it was a practical decision and how she saw an economic opportunity in mathematics.

She narrated, "Certainly one of the highest points is receiving that 200 pesos nga payment for my first [math] tutorial session. Uhhmm. The... the... the whole thing started with my first time drinking iced tea also and my first time eating sandwich nga gin sandwich press. When the session ended, I was surprised because I was only expecting around 50 pesos and then they gave me this piece of envelope which contained 200 pesos. So, I guess that was the first time that I realized that I could actually make a living doing something that I thought I did not want to do. And I thought I can earn a living even just by being average in Mathematics."

4.8 Kaisog's Empowering Structures

Kaisog's journey is a testament of how certain structures can empower women. She finished her basic education in a private Catholic elementary school and university laboratory high school. Aside from her natural ability in mathematics, she was provided with one of the best mathematics education a child could probably receive. Also, being exposed to brilliant math teachers from elementary until graduate school empowered Kaisog to succeed in her career.

Kaisog also observed that the Ilonggo culture is more matriarchal compared to other cultures in the Philippines. She saw how Ilonggos are more open to having a woman leader in the community. In a world and country that is predominantly patriarchal, being part of a small community who can perceive having a woman as a leader in the field is empowering and enabling. For Kaisog, growing up in a household full of strong women molded her to be a strong woman as well. She compared the women in her family to sugar canes.

"Cause people would think when they talk about sugar cane, what would... what would come to mind sa people would be... matig-a ang sugarcane. Sakit siya, may tunok tunok siya huh? Yeah. So, my mother, her mother, and her grandmother before her are really these tough... uhh.. strong-headed women huh? Uhhmm. And she was also like that... she is also like that present tense huh? Ahhh. Until now, uhhh, until now we are still scared to go home late in the evening. Huo, we are still scared to ask permission to spend overnight somewhere because yeah. Uhhmm. She was... she is very very strict and it was really tough for me growing up". [Cause people would think when they talk about sugar cane, what would come to the mind's of people would be that sugarcane is hard. It's painful to hold because of its spikes. Yeah. So, my mother, her mother, and her grandmother before her are really these tough... uhhh.. strong-headed women, huh? And she was also like that... she is also like that present tense huh? Ahhh. Until now, uhhh,

until now we are still scared to go home late in the evening. Yes, we are still scared to ask permission to spend overnight somewhere because she was... she is very very strict and it was really tough for me growing up.]

Despite her mother's strong persona, she made sure that she makes Kaisog feel valued and loved. Kaisog shared that one of her fondest memories of her childhood was when her mother attended her declamation contest. Her mother, being a single mother and a policewoman, used to miss a lot of meetings and activities in school but when Kaisog joined the declamation contest, she took a leave from work and made sure to support Kaisog.

The media also was a key factor in Kaisog's bravery in embracing her identity as a queer woman. She shared about her previous relationship,

"And then, amu na gani, wala kami label. We were watching this TV series called Queer as Folk. Sa TV series nga ina, the characters are group of men and then may token nga lesbian couple. So we've been watching that series for quite some time. And then I just asked her, so kita ba, parehas kita sa couple nga dira sa series nga na. Tapos daw dito na lang siya namun na realize, nadedican, nafigure out nga ti siguro eh, couple sila, couple man kami". [We had no label. We were watching this TV series called Queer as Folk. It was a TV series about a group of men with a token lesbian couple. So we've been watching that series for a while. Then we realized, we decided, we figured out that maybe because they were a couple, we were also a couple.]

In a time where coming out as a lesbian is not as relatively easy as it is today, the media plays a great role in ensuring that people get the representation and validation they need.

Of all the experiences Kaisog had in her professional career, she recognized that her exposure to the people's union greatly impacted her advocacy of protecting the vulnerable.

"My exposure sa Union, really uhmm made me aware nga akon nga skills, indi lang akon. Ang akon capabilities, indi lang siya akon. Kung may ka sang nahibalan, kag may ara ka sang kaya nga ubrahon, ngaa indi mo siya pag-ubrahon? Disservice siya kung indi mo siya paggamiton bala. So yeah. Sa union gid sa nga training nga you have to step up. Uhmm. Because again sa Union indi ikaw isa lang. Ginarepresent mo ang... like for... for our end ang Academic Staff, faculty. So, kung may ara ka supposedly sang ulubrahon nga indi mo maubra, indi lang siya... wala mo lang ginfail ang self mo, nafail mo ang bilog nga members sang organization nga gina represent mo. So, indi na option ang maging responsible. Obligation na siya". [My exposure in the Union really made me aware that my skills are not just mine. My capabilities are not just mine. If you know and can do something, why won't you do it? It is a disservice not to use those. In the union, you must step up. Because again, in the union, it is not just you. Like on our end, we represent the academic staff, the faculty. So, if there is something that you are supposed to do but have failed to do, you do not just fail yourself, but you fail all the members of the organization that you represent. Being responsible is not just an option. It is an obligation.]

5. Conclusion

Instead of head on facing the challenges of intersectionality, Kaisog ventured into creating a new agenda within her context. Instead of focusing on the challenges of being a woman or of being a teacher, she created a new set of questions in her context. This new set of agenda created a new set of activities that she must do. Instead of answering questions, she fashioned a new area within her context where she is freer to pursue questions she wants to pursue. Instead of looking at the image of socially ascribed role of "mother" as a challenge, she transformed the role of "mother" as a niche where she can influence more people. Instead of pushing girls in her mathematics class to solve as fast as the boys, she designed an environment where girls can also flourish. With that, she not only established a new niche for herself but she initiated a new field where she and only a few women are the only ones there. Kaisog challenged the notion of intersectionality.

In a world where rigid social norms for teachers and women have shaped their personalities and have limited their expression, in a world where teachers and women have been prevented from fully expressing themselves, Kaisog used mathematics as a tool for liberation and for achieving social justice and thus, creating a new niche for herself, that of a mathematics teacher union activist.

This study has two main limitations. First is the small number of participants with only one participant involved. Second, results of this study are not generalizable owing to the nature of a narrative inquiry. Notwithstanding these limitations, this research provided insights on stories behind the statistics of women in the male-dominated field of mathematics.

For future research, it is recommended that more stories from other women in Mathematics from other cultures and also from minority groups be studied and eventually be integrated into the basic mathematics education curriculum. This move will hopefully help in the contextualization of mathematics and make its image more inclusive to different groups of people. Furthermore, it may also provide a platform to women and minority groups to share their stories and hopefully, inspire more people.

“So this is the grandness of my hopes and dreams. I really hope to be able to contribute something to the education system that will allow our Filipino children to appreciate Mathematics more and to see how their knowledge and skills in Mathematics can help them be better in life... be better citizens of this country. I wish to really affect teachers in a way that they also realize the responsibility that they have as teachers, especially for young children. I hope to contribute something positive to the educational system of this country.”

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References

- [1] Arizona State University. (2012). *What are the roots of gender inequality? Women's rights, race and reproduction*. <https://www.newswise.com/articles/what-are-the-roots-of-gender-inequality-women-s-rights-race-and-reproduction>
- [2] Asia-Pacific Economic Corporation. (2010). *Gender Equity in Mathematics Education*. https://www.apec.org/docs/default-source/Publications/2010/9/Gender-Equity-in-Mathematics-Education-Summary-September-2010/210_hrd_GenderMathsSummary.pdf
- [3] Baron, G. (2022). *Why we need more women in STEM*. <https://mb.com.ph/2022/03/23/why-we-need-more-women-in-stem/>
- [4] Barton, A. (1997). Liberatory science education: Weaving connections between feminist theory and science education. *Curriculum Inquiry*, 27(2), 141-163.
- [5] Beede, D., Julian, T., Langdon, D., McKittrick, G., Khan, B., & Doms, M. (2011). *Women in STEM: A Gender Gap to Innovation*. U.S. Department of Commerce: Economics and Statistics Administration.
- [6] Cho, S., Crenshaw, K. W., & McCall, L. (2013). Toward a field of intersectionality studies: Theory, applications, and praxis. *Signs: Journal of women in culture and society*, 38(4), 785-810.
- [7] Cimpian, J. (2020). *Math-intensive fields have a gender problem: The men are worse at math*. <https://www.brookings.edu/blog/brown-center-chalkboard/2020/09/18/math-intensive-fields-have-a-gender-problem-the-men-are-worse-at-math/>
- [8] Connelly, F. M., & Clandinin, D. J. (1990, June-July). Stories of Experience and Narrative Inquiry. *Educational Researcher*, 19(5), 2-14.
- [9] Crenshaw, K. (1991). Mapping the Margins: Intersectionality, Identity Politics, and Violence against Women of Color. *Stanford Law Review*, 43(6), 1241-1299.
- [10] Creswell, J. (2007). Five Qualitative Approaches to Inquiry. In J. Creswell, *Qualitative Inquiry in Research Design: Choosing Among Five Approaches* (pp. 53-84). Thousand Oaks: Sage Publications.
- [11] Creswell, J. W., & Creswell, J. D. (2023). *Research Design Qualitative, Quantitative, and Mixed Methods Approach* (Vol. VI). Thousand Oaks, California: Sage Publications, Inc.
- [12] Crotty, M. (2003). *The foundations of social research: Meaning and perspective in the research process*. Thousand Oaks, CA: Sage.
- [13] Dancy, M., Rainey, K., Stearns, E., Mickelson, R., & Moller, S. (2020). Undergraduates' awareness of White and male privilege in STEM. *International Journal of STEM Education*, 7, 1-17.
- [14] Department of Science and Technology - Science Education Institute. (2021). *Women in Science*. Taguig City, Metro Manila: DOST-SEI.
- [15] Durano, M. (2014). *Rights and Capabilities: Reading the Philippines Magna Carta of Women from the Perspective of the Capabilities Approach*. <https://econ.upd.edu.ph/dp/index.php/dp/article/view/1457/926>
- [16] Ethnic Groups of the Philippines. (n.d.). *People: Ilonggo*. <http://www.ethnicgroupsphilippines.com/people/ethnic-groups-in-the-philippines/longgo/>
- [17] Ghasemi, E., & Burley, H. (2019). Gender, affect, and math: a cross-national meta-analysis of Trends in International Mathematics and Science Study 2015 outcomes. *Large-scale Assessments in Education*.
- [18] Low, M. T. E., Maghanoy, V. S., Velasco, V. S., Christy, D. R. A., & Bihasa, R. K. S. (2021). Significant Influence and Legacy of the Development of Educational System in the Philippines. *International Journal of Advanced Multidisciplinary Studies*, 1(3), 310-320.
- [19] McAdams, D. P. (2008). *The life story interview*.
- [20] Morales, M. P., Avilla, R. A., & Espinosa, A. A. (2016). Does gender inequality influence interest in pursuing a career in science or mathematics teaching? *Issues in Educational Research*, 65-81.
- [21] Nussbaum, M. (2003). Capabilities as Fundamental Entitlements: Sen and Social Justice. *Feminist Economics*, 9(2-3), 33-59.
- [22] Philippine Space Agency. (2021). *Making space for women: helping women reach for the stars*. <https://philsa.gov.ph/news/making-space-for-women-helping-women-reach-for-the-stars/>
- [23] Rodriguez, S., Regueiro, B., Piñeiro, I., Estevez, I., & Valle, A. (2020). Gender Differences in Mathematics Motivation: Differential Effects on Performance in Primary Education. *Frontiers in Psychology*, <https://doi.org/10.3389/fpsyg.2019.03050>.
- [24] Rosada, I., & Nurliani. (2016). A Review on Multi-Roles of Women and Their Influence on the Change of Functional Structure in the Farmer's Household. *Agriculture and Agricultural Science Procedia*, 9, 47-53.
- [25] Salihi, H. M., Myers, J., & August, E. M. (2012). Pregnancy in the workplace. *Occupational medicine*, 62(2), 88-97.
- [26] Santiago, C. (2008). *Philippines: Country Gender Profile*. Japan International Cooperation Agency: https://www.jica.go.jp/Resource/english/our_work/thematic_issues/gender/background/pdf/e08phi.pdf
- [27] Steinmetz, K. (2020). *She Coined the Term 'Intersectionality' Over 30 Years Ago. Here's What It Means to Her Today*. <https://time.com/5786710/kimberle-crenshaw-intersectionality/>
- [28] Tagupa, H. (2019). *Are women just not that into STEM?* Inquirer.Net.
- [29] Thwaites, R. (2017). (Re)examining the feminist interview: rapport, gender"matching," and emotional labour. *Frontiers in Sociology*.
- [30] Tongson, E. C. (2019). Examining unpaid care work of women in the sandwich generation: Pathways towards social protection and wellbeing. *Philippine Journal of Social Development*, 12, 46-70.
- [31] Vimbelo, S., & Bayaga, A. (2023). Humanising pedagogy in mathematics education at south African technical and vocational education and training (TVET) colleges: Influence on TVET teaching and learning. *International Journal of Learning, Teaching and Educational Research*, 22(9), 633-655.