

## Parental Antecedents and Academic Performance Drive of high School Students of Central Nigeria

<sup>1</sup>O. Mowaiye Fagbemi; <sup>2</sup>Badamas, Omoshalewa; <sup>3</sup>Uyanne, Ifeoma

<sup>1</sup>University of Ilorin, Nigeria

<sup>2,3</sup>Social Sciences Education, University of Ilorin

### Abstract

Academic performance is central to all students' activities in school. It is the end goal. It defines achievement orientation and drive. It can be life definitive. More so, in a society that places premium on school certification. In Nigeria, two important and compulsory subjects at the high school level and which must be passed at credit level is the English Language and Mathematics. It defines moving into tertiary level or dropping out. For a good academic performance outputs, there can be intervening variables which could be influential and affect the school achievement drive and performance amongst which are the home and parental factors and antecedents. The present study aimed to find out how parental antecedents in composite form relates to high school students academic drive and performance within the central part of Nigeria. The findings revealed that parental educational levels among other variables does affect school performance. Recommendations made include the need for higher literacy level in Nigeria and greater development of rural areas and their school facilities to bridge the apparent gaps between the urban and rural settings as well as between the social classes in Nigerian society.

**Key Words:** Antecedents, performance, gender, socio- economic class, school environment.

### Introduction

A large percentage of Nigerians engage themselves in semi- skilled and unskilled jobs, which does not provide for economic stability. Coupled with this, is the increasing rise in standard of living. Majority of Nigerians are not economically viable, and students from the economically weak homes face the problems of keeping and maintaining themselves in school and succeeding as well as performing and achieving highly. For example, a student who cannot afford to eat three meals a day cannot think of buying his required textbooks and needs. His case can therefore be likened to that of a farmer going to his farm without his hoe and cutlass; the necessary tools and equipment with which to

work. These problems pose as barriers to students' academic drive, achievement and performance, which may not allow them to perform maximally (Mowaiye, 2009).

An economically weak student, who is so for no fault of his but for his parents background and antecedents can become dispirited and may not be motivated enough to achieve high. A dispirited student is sure not going to be keen on serious academic work, which may result in low academic achievement and performance. That may account for the yearly high rate of school drop outs especially at high school level. When the school necessities become burdensome on parents especially the compulsory final high school certification fees, the parents may have no option but to let their Ward drop out. More so, in a society where there is no form of welfare and accessing loans are herculean.

The rate of school drop outs is alarming in Nigeria especially in northern Nigerian where the almajiris; teenagers and youths seems to be synonymous with that part of the country with non of the state governments in that part seemingly able to make any ingenious solution(s) to the problems arising from such forms (Mowaiye Fagbemi, 1994, 1995).

An un-alert mind is not difficult to identify, it is unaware of the goings on in his surroundings, and so, a student may be in class physically but his mind would be somewhere else. An un-alert mind lacks concentration, and, concentration is the secret of strength and power for a student to succeed in his academic studies and drive. The impetus to high school drive and performance are the school needs met and the students needs met. When and where there is a disjoint, it will reflect in students performance drive and levels of performance (Arcker, 2017; Morley, 2013).

The importance of a students socio-economic background cannot but be emphasized, especially because of its effects on academic performance. (Carlson, 2006; Esas & Esas, 2020). A student from the upper and middle class has the advantage that the lower social class student does not have at most levels. Schools items such as textbooks, paid extra tutorials by teachers within or outside the school for enhanced performance, balanced diet, non anxiety of where the school fees can be accessible and paid; leading to better concentration in class and readings, access to the internet and the possibility of owning a computer, laptop or any tablet and gadgets and the advantageous edge these can give cannot be under-estimated (Mowaiye Fagbemi, 2009).

## Literature Review

### Social Class and Academic Performance Drives

In the upper and middle social classes, the home environment could be conducive to learning with the possibility of children having rooms to themselves in the house unlike those from the lower social rung who may find themselves jam packed and all in a room as children or even with the parents and relatives or visiting people all in single rooms in

the Nigerian parlance of " face me I face you " models of buildings. . Essential household facilities and amenities such as televisions may be readily available to the upper and middle social classes and the children could be more exposed to the internet, social and mass- media which has a great educational value. The home could be quiet and comfortable for the students to study and concentrate. Furthermore, students from such backgrounds usually attend the nursery and privately owned primary institutions where there are enough and qualified teachers to teach, better school facilities and engaging learning tools and toys to enhance the mental stimulations of the children and that aids them to think and learn fast. (Mowaiye Fagbemi, 1997). These are options that translates to early and better edge in academic and performance drive from get go cumulatively. Such edges cannot be quantified (Faze & Duncan, 2011) .

Students from the upper and middle social classes are familiar with books aside school texts because they may have libraries at home or just bought by parents or guardians for their wards to expand their knowledge base.

They also may interact with intellectuals from the same background where ideas and knowledge are gained and exchanged. They are therefore at home in the intellectual and academic world of the school when they are enrolled just as the stable boy is at home among horses. For the wards from the lower socio- economic strata, the opposite scenario may be the case especially in rural Nigeria. For one thing, the school may be his first contact and place to learn the nation's official language, the English language which is in use in the schools for teaching with no room for vernacular translations to his language which may not even be part of the major tribal languages in Nigeria. A

nations with hundreds of ethnic languages and language variations. Getting teachers to teach in one's own ethnic language even if translations are allowed could be difficult. The Yoruba ethnic language for example is one of the major tribal languages in the country and the language has dozens of its variations so much so that, some Yorubas when speaking their own language variations, peoples of other variations may be lost absolutely in the sea of words and not understanding a single sentience of what they are hearing. That basically explains the complexities of the varied Nigerian languages and how difficult it can be for many children to even comprehend what a teacher attempting a vernacular translations of his teaching can be. With such situations, many children on school enrollment face the difficulties of learning the new school official language the English language and the school curricula and teachings which may in itself be difficult for the children from the elitist class who would have been familiar with the English language from home and its contacts especially with some elitist parents choosing to adopt the English language as mode of communication at home more so if the couples are not from same ethnic and language backgrounds.

As noted , English language is the official language of communication in Nigeria and since students from the upper and middle social strata have a good grip of the language, probably because, there are people they communicate with at home in the language, and would therefore write and speak the English language better than their counterparts from the lower social strata ( Mowaiye Fagbemi 2009 ) .

A student from the lower socio - economic background may not have a firm grip of the English language which is the official language in Nigeria. This can hinder students rate of understanding and assimilation in the school, leading to low academic achievement. Students from this class generally do not know the importance nor see the usefulness of the academically oriented school programs to their plans, so they are left unimpressed ( Miller 2018 ). The parents know little or nothing on the importance of good education and show slight or no interest in their children's school work. Students from this class also cannot afford to buy the required textbooks which they need in their academic pursuits, these factors does not allow for high performance for the low social class children/( Mowaiye Fagbemi , 2009 ).

Parents from the upper and middle social class most often than not would know the importance of education, as they may therefore leave no stone unturned in educating their children and ensuring success for them. Those in these two social classes go to the extent of getting teachers for their children for coaching at home and ensure that they receive sound education in selective, reputable institutions. The elites in the two social strata and parents from the upper and middle classes sometimes discharge the duty of teaching their children at home which consolidates what the child might have learnt in school ( Mowaiye Fagbemi , 1997 ).

For those in the upper and middle social strata, mobility is not usually a problem, they therefore create enough time to visit their children in school, and also give enough money for their maintenance. They can afford to buy for their children the required textbooks which are now quite expensive ( Portes ,2000; Sirin , 2005 ). It must be noted that elitist children are to be found more in the urban areas while the lower class children are to be found more in the rural areas and such children attend schools where they reside and in Nigeria, better equipped schools are to be found more in the urban areas than in the rural areas. Most rural areas in Nigeria do not til date have basic amenities such as pipe borne drinking water or energy which presupposes that the schools in the areas would not have amenities and the students may miss out on trainigs they may well have been able to carry out such as laboratory experiments . it also means that most of the students would be unable to study late into the nights and at long hours coupled with the health risks associated with the use of such items as lanterns and smoke from the rural lanterns. So for a student with high achievement drive in the rural area who may

want to burn the midnight oil also is the health risks he may encounter ( Mowaiye Fagbemi , 2009 ).

The upper cum middle social class parents usually have great interest in the scholastic records of their children. There is therefore great emphasis on achievement to the children ( Benschop & Doorewaard ,2010 ; Ryu & McCauley , 2018 ). They usually attend the schools parents and teachers association meetings regularly and are interested in how their children are faring generally in school. When there is any occasion in the school like annual sports competition, they may attend punctually to give moral support to their children. These, coupled with the love, affection and encouragement given by the parents could motivate their kids to work and strive hard and succeed with high grades in school.

In the lower social strata, almost everything may be lacking. The home environment may be not conducive to study and learning nor to intellectual growth. Household amenities are not readily available or not properly utilized, an example of this is the television, which is seen as being merely for entertainment. For many, walking home after school hours is a daily routine . They may also be required to help in selling some commodities to help sustain the family income and to also help in household chores; all these takes time and toll which may be tiring, so the child goes straight to sleep, rather than address his mind to scholastic and academic work by practicing what has been taught in class or even have his homework done. He may even be absent from school for days to help sustain the family. It is all these that prove to be the stumbling block to lower social strata children in their academic drives and pursuits.

From the early period of nations of Africa's independence, has been an interest in studies relating to family and environmental impacts on school performance. More so because of the low literacy levels and poverty in many of the nations. Unfortunately, many nations still grapple with these problems that seems to be herculeans to most African leaders.

Ogunlade (1973) in the early period of Nigeria's independence ,had in a similar study on “family environment and educational attainment of some children in western Nigeria” found that children from literate parental environment had a mean score of 52.48 on educational attainment tests, while those from illiterate environment had a mean score of 42.9, this made him to conclude that children from literate environment had better academic achievement than those from illiterate homes. He noted also that boys from both the literate and iliterate homes perform better than girls from the same environment.

Similarly, Obameata (1976) in his study on “the effects of urban-rural environment on intelligence test performance” confirmed also that socio - economic background

influences academic achievement, with those from the high social group performing better than others.

Cooksey (1981) in his own study of “social class and academic achievement, A Cameroun case study” reported that elite children perform better than others in the secondary school entry examinations. He noted that many elite children learnt French as their first language, and this might help them in their school work. Cooksey also noted that parental education influenced performance and young candidates for the entrance examination and that the younger ones performed better than the older ones. Generally, boys performed better than girls, yet, girls from the elite and large trading background had higher pass rates than boys from almost all other occupational backgrounds. Children from lower occupational background repeated classes more when compared to other children. There was also more self - elimination among children from occupational class and were found to enter technical or commercial secondary schools rather than private academic schools, while for all other boys, the academic secondary school was their preferred option .

Antonio, Lanzas and Kingston (1981) in their work on “English achievement in Zaire: the effects of family status and residential disruptions” reported that socio-economic background is important when students achievement in the English language is to be considered. He reported that those whose education were not interrupted, and, were mainly from the elitist class performed better than others academically. Those whose education were interrupted performed poorly academically . The above trends are however not peculiar to Nigeria. It has been noted that in some low- income and middle-income countries, cultural norms, economic barriers, and lack of infrastructure still hinder many having access to education. Such similar studies ( Harding , Morris & Hughes , 2015 ; Jasson , 2010 , Lee , 2014 ; Ravis , 2013 ) have been reported in other parts of the world.

### **Gendered Patterns of Academic Drive and Achievement**

Historically, gender inequality in education was overt , with women often excluded from formal education altogether or relegated to specific fields such as nursing, teaching, and the arts. In the 21st century, while significant strides have been made in many countries including Nigeria towards gender parity in educational enrollment and access , disparities persist in certain regions and fields of study. For example, in rural areas, traditional gender roles may limit women’s educational opportunities, or women may face familial pressure to prioritize domestic responsibilities over academic pursuits (Miller, 2018). Furthermore, gendered patterns of educational attainment may reflect broader socio- economic inequalities,

In Nigeria, just as social class inequalities persist, so does gender inequality in access to education and remains a critical area of the nations disparities, reflecting broader societal disparities. Though significant progress has been made over the past few decades, gender disparities in access, performance, graduation and career outcomes still differ significantly between the males and females. And this is poignantly so in the Northern part of the country where till date in the twenty first century, the female child may be dropped out of school to be married off as early as the age of thirteen ( Mowaiye Fagbemi 2009 ).

Gender inequality in academic achievement is a complex issue, shaped by both societal factors, family dynamics and individual experiences. Research has shown that women, particularly in the humanities, social sciences, and health sciences, often outperform men in terms of grades, completion rates, and overall academic success. According to a study by Gorman & Gorman (2019), women tend to have higher graduation rates and academic performance in general. However, these academic achievements do not always translate into professional success, with girls often facing barriers in terms of career progression within academia.

The gender gap in subject choice is a significant contributor to disparities in academic outcomes. While women may excel in traditionally 'feminine' fields, they are underrepresented in STEM (Science, Technology, Engineering, and Mathematics) disciplines. In these fields, girls often face both explicit and implicit biases that affect their academic experiences. (Smith & Howell, 2020). (Wilkins, 2017).

Gender inequality remains a persistent issue in education worldwide, despite rising female enrollment rates. In particular, women from low-income and rural backgrounds face significant educational barriers that are deeply rooted in cultural and economic factors. These challenges are often linked to traditional gender roles that limit opportunities for girls to access and thrive in education. ( Sirin, 2005\_ UNESCO, 2020).

It has also been reported that girls tend to perform well academically, especially in fields such as the humanities. They may however encounter substantial obstacles when attempting to advance their careers, particularly in STEM disciplines, where they are both underrepresented and often subject to biases. Societal expectations further constrain women's career options, making it more difficult for the feminine gender advancement. Gendered experiences in classrooms, along with widespread harassment, continue to undermine girls academic success. A key driver of disparity is the cultural norms in many countries especially the low income nations. (Perkins, 2016).

### **Gendered Factors within the School Environment.**

The academic experience for students can also be shaped by gendered dynamics in classroom interactions, mentorship relationships, and school environments. Gender

stereotypes can influence how students are treated by teachers and peers, with female students sometimes encountering biases in how their ideas are received or evaluated. For example, female students may be less likely to be called upon in class, or their contributions may be undervalued compared to those of male students (Sadker & Sadker, 1994).

Gender-based violence and harassment also remain pervasive issues in many educational institutions. Many females also encounter sexual harassments that institutions may not adequately address. Harassment creates an unsafe and inequitable learning environment, leading to both academic and personal harm for students (Krebs et al., 2016).

In response to these persistent gender inequalities, many nations have implemented policies and programs aimed at promoting gender equality. These include affirmative action initiatives, gender sensitivity training (Ryu & McCauley, 2018)

Scholars such as Morley (2013) have argued that gender equality policies often fail to address the deep-rooted cultural and structural factors that contribute to gender disparities in education. Few countries and educational systems have fully embraced gender-sensitive curriculum reforms, which could challenge entrenched biases in teaching and learning, especially in school texts that may continue to propagate gender bias and traditional gender fixations. To effectively address these deeply rooted inequalities, substantial and comprehensive reforms are required.

Furthermore, just as social class inequalities persist in Nigeria, so does gender inequality in access to education and remains a critical area of the nation's disparities, reflecting broader societal disparities. Though significant progress has been made over the past few decades, gender disparities in access, performance, graduation and career outcomes still differ significantly between the males and females. And this is poignantly so in the Northern part of the country where till date in the twenty first century, the female child may be dropped out of school to be married off as early as the age of thirteen.

In Nigeria, there are thousands of out of school children not to mention those who do not complete the high school but cannot move forward due to their inability to obtain a pass at credit level and above in English language and mathematics. The two compulsory subjects that must be passed at credit level or above to move into any course of desire in any tertiary level. This policy has had great negative effects on many aspiring youths. And has forced many to abandon academic pursuits. And each year thousands fall by the way side with no policy in place either by state or the federal governments on positive engagements for these sets of youths. And unengaged hands in thousands is a recipe for disaster. The central states of Nigeria, which are Kwara and Kogi; often referred to as the gateway states, between the north and south have a mixture of the



north and south ethnic dynamics where many from both sides have settled and lived for decades. A cursory look at these states students performance in the year 2018 West African Council Examination in this wise is revealing. Especially. when compared to the students performance of the southern state of Abia , the state that came first in the examination and the northern Zamfara state ,the state that took the last position . Tables 1 and 2 summarises these results.

Table 1  
2018 West African Examination Performance Data in Mathematics and ( ii) English Lanuage.

States	T-N	C Above	Remarks
Kwara	35 , 380	25 ,568	Poor
Kogi	35 ,170	16, 829	Very Poor
(Ii). English			
Kwara	35, 380.	19 , 806	Very Poor
Kogi	35,17 o	12, 703	Very Poor

Source- Nigerian Bureau of National Statistics

Table 2

	T-N	C-Above	
Abia	47,4 68	42,665	Fair
Zamfara	28,4 81	13,457	Very Poor
(Ii). English			
Abia	47,4 68.	41,,767	Fair
Zamfara	28,4 81	3,934	Very Poor

Source- Nigerian Bureau of National Statistics

Keys -

T-N = Total Number

C- Above = Paases at credit level and above

## Methods

High school students in central states of Nigeria, were the target population. The stratified random sampling procedure was used to select the sample population from the urban and rural areas. The total no of sample (N) was 400 hundred, though some had to be left out in the final analysis for lack of school results.

A questionnaire was designed to elicit needed information such as parental educational qualifications and the home background and school location. Those parents; either the mother or father with at least, an OND or NCE ( the ordinary national diploma ; first tier of the polytechnic or national certificate of education ; N.C E ) were considered literate.

Academic performance level was measured by the results of the students at the last term of high school before the final West African Council Examination. The results were first converted to their Z-scores for each of the students for the purpose of standardization. Thereafter, the one - way analysis of variance was applied on the results in order to find out if the variables in the study, that is, the school location and home background/ ; parental educational qualifications and their interactions had any effect on the academic performance of the students under study.

## Results

*Table 3*

Anova of students performance in mathematics.

Source	Df	Ss	Ms	F-Value	Pr.>F	
Loc	1	2420.4	2420.4	16.38	0.001	H/S
Edu	3	1964.2	654.7	4.43	0.0056	M/S
Loc & Edu	18	3057.2	169,8	1.15	0.3168	N/S
Error	108	15966.7	147.78	-	-	
Total	132	23482.91	-	-	-	

Note : HS = Highly significant

MS = Moderately significantly

N/S = Not significant

LOC = Location of school

EDU = Educational level of parents

As observed from Table 3

i - the  $F(1,108) = 16,38$ ,  $P < 0.0001$  for location (urban and rural) is highly significant

ii- The observed (f) for parental educational levels and academic performance in mathematics show a moderate significance

*Table 4*

## Anova of students performance in English Language

Source	Df	Ss	Ms	F-Value	Pr.>F	
Loc	1	1351.11	1351.1	16.00	0.0001	H/S
Edu	3	1758.4	589.4	6.98	0.002	M/S
Loc & Edu	18	892.02	49.5	0.59	0.9022	N/S
Error	108	9117.74	84.4	-	-	
Total	132	13147	7067669	-	-	

- i. As observed from table 4 , the  $F(1,108) = 16,00$ ,  $P < 0.0001$  for location (urban and rural) is highly significant
- ii. The table also revealed that the interactions between parental education and academic performance show a moderate significance.

### Discussion and Conclusion

The study revealed that location of school and parental level of education does have an impact on student's school performance. There was a significant difference in the academic performance of the students from schools in urban settings and rural settings with those from urban settings performing better both in English language and mathematics

There was a significant difference in the performance of students with literate parents as compared to those without literate parents in mathematics and English language, with students with literate parents performing better.

With most literate parents residing in the urban areas ,its not surprising that the performance of those in the urban settings was better than those from rural settings where few literate parents could be found.. For school performance in mathematics and English language, children of literate parents performed consistently better.

In view of the findings, it becomes necessary for governments ,both at state and federal levels to put in place policy formulas that can push citizens more into the schools ,to train as many citizens as possible. Moreso in an age where digital literacy is the new recognized literacy.

### Recommendations

There is the need for higher literacy level in Nigeria and greater development of rural areas and their school facilities to bridge the gaps apparent in Nigerian society.

Development don't just happen. It must be planned for. The development the nation strives for will not come till its is planned for. Having a literate society is the foundation.

. It is also necessary to make the school and living conditions of the rural areas better to make for better living conditions which will encourage students to have better achievement orientation which influences academic performance.

Citizens educational level and literacy is still poor in Nigeria. For developmental purposes. These must be rectified and training of the citizens can be a path to social, political and technological advancement. Education of the citizens must be taken seriously and rural areas must be developed to improve living and learning conditions

## References

1. Acker, S. (2017). *Gendered education: Sociological reflections on women, teaching, and feminism*. Routledge.
2. Antonio, Lanzas, A., & Kingston, P. (1981). English achievement in Zaire: The effects of family status and residential disruption. *Comparative Education Review*, 25(4), 478-487. University Press.
3. Benschop, Y., & Doorewaard, H. (2012). Gender and leadership: The case of higher education. *Gender, Work & Organization*, 19(6), 640-658.
4. Carlson, M. (2006). Family structure , teacher involvement and adolescents behavioral outcomes. *Journal of Marriage and Family*, 68 (1) 137-154.
5. Cooksey, O. (1981). Social class and academic performance: A Cameroon case study. *Education Comparative Review*, 22(2), 199-206. University Press.
6. Esas , A . & Esas , A. (2023 ) . Relationship between mother's educational level and their children's academic performance. *Journal of education and instruction*, 13, (3) 36-40.
7. Faze, F. & Duncan, M. (2011). Effects of mothers level of education and school graduation. *Research journal of international studies*, 19, 13-17.
8. Gorman, M., & Gorman, M. (2019). Gender and academic achievement in higher education. *Journal of Higher Education*, 90(3), 303-319.
9. Horner, M. S. (1972). Toward an understanding of achievement-related conflict in women. *Journal of Social Issues*, 28(2), 137-175.
10. Harding, J. Morris, P. & Hughes, D. (2015). The relationship between maternal education and children's outcomes. *Journal of marriage and family*, 77 (1), 60-76.
11. Jansson, J. (2010). Child well being and inter- generational inequality. *Child indicators research*, 3 (1) , 1-10.
12. Krebs, C. P., Lindquist, C. H., Warner, T. D., Fisher, B. S., & Martin, S. L. (2016). The campus sexual assault study. National Institute of Justice.
13. Lee, D. (2014). Age trajectories of poverty during childhood and high school graduation. *Sociological Sciences*, 1, 344- 365.
14. Miller, M. (2018). Gender, education, and development: A global perspective. *International Journal of Educational Development*, 59, 63-70.

15. Morley, L. (2013). Women and higher education: Global inequalities. *Gender and Education*, 25(6), 741-755.
16. Mowaiye, O. (1994). Academic performance of secondary school girls and their perception of the roles of women. *Ilorin Journal of Education*, 14,52-57.
17. Mowaiye, O. (1995). Gender behavioral flexibility, a social psychological dimension to the socialization of African females. *Ife Psychological: An International Journal*, 3(2), 173-185.
18. Mowaiye Fagbemi, O. (1997). Sex role orientation and career model amongst females: A conceptual framework. *Nigeria Journal of Counseling Education*, 1(1), 1-6.
19. Mowaiye Fagbemi, O. (2009). Gender inequalities and access to education in Nigeria. A need for transformation. Open University Distance Educators Summit Presentation. Open University of Nigeria. Lagos. Nigeria.
20. Obemeata , J. O. (1976). The effects of urban -rural environment on intelligence test performance. *West African Journal of Education*, 20(3) 475- 482.
21. Ogunlade, J. O. (1973). Family environment and educational attainment of some children in Western Nigeria. *West African Journal of Education*, 18(3), 429-432.
22. Perkins, R. (2016). Work-life balance in academia: Challenges and solutions for female scholars. *Journal of Higher Education Policy and Management*, 38(2), 207-222.
23. Portes , A. ( 2006). Two meanings of social capital. *Sociological Forum*, 15, 12- 19.
24. Ravis, M. (2013). The relationship between mother's level of education and parental involvement. Unpublished masters thesis. Virginia University.
25. Ryu, S., & McCauley, C. (2018). Affirmative action in higher education: Women's progress and institutional response. *Journal of Diversity in Higher Education*, 11(4), 335-347.
26. Sadker, M., & Sadker, D. (1994). *Failing at fairness: How America's schools cheat girls*. Scribner.
27. Sirin, R. (2005)/ Socio- economic status and academic achievement. *Review of Educational Research*, 75, 417-453.
28. Smith, T. L., & Howell, S. (2020). Women in STEM: Educational experiences and professional outcomes. *Journal of Science Education and Technology*, 29(4), 437-451.
29. UNESCO. (2020). *Global education monitoring report: Gender and education*. United Nations Educational, Scientific and Cultural Organization. Unpublished doctoral dissertation, University of Michigan.
30. Wilkins, A. (2017). Barriers to gender equality in STEM fields. *Technology and Society*, 12(3), 45-58.