



**The Brookings Institution
Africa Growth Initiative
Foresight Africa Podcast**

**“Making the future of African STEM female”
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Episode Summary:

Education experts Adefunke Ekine and Ayotola Aremu discuss the systemic biases African girls face that discourage them from pursuing an education in STEM and share strategies for increasing female enrollment in those topics, including embedding STEM in games, and exposing young girls to female role models, mentors, and teachers.

ORDU: From the promise of new technologies to the innovative and youthful population shaping our continent's future, Africa is full of dynamism worth celebrating. Hi, I'm Aloysius Uche Ordu, director of the Africa Growth Initiative at the Brookings Institution and host of Foresight Africa podcast.

Since 2011, the Africa Growth Initiative has published a high-profile report on the key events and trends likely to shape affairs in Africa in the year ahead. Entitled "Foresight Africa," the goal of the publication is to bring attention to these burning issues and to support policy actions to address them. With this podcast, we intend to engage the report authors, as well as policymakers, captains of industry, Africa's youths, and other key figures.

Before I introduce today's guests, I want to let you know this is second to last episode of Season One of Foresight Africa podcast. Since launching in February, I have had the pleasure of interviewing leading voices from the African continent on a range of important issues. You can find all the episodes on our website, Brookings dot edu slash Foresight Africa podcast. After one more episode in August, we're going to take a break and to focus on preparing the next edition of our annual flagship report, *Foresight Africa*, which we expect to publish later in January 2023. Thank you for listening, and I look forward to being back with Season Two early next year.

My guests today are two eminent professors. We have Professor Adefunke Ekine. She's an associate professor of childhood education, Tai Solarin University of Education. She was also a 2013 Echidna Scholar at the Center for Universal Education at the Brookings Institution. Our second guest is Professor Ayotola Aremu. She's a professor of educational technology at the University of Ibadan, both in Nigeria. Sisters, welcome you both to our podcast.

EKINE: Thank you, Aloysius.

ORDU: I also would like to add that both professors authored a brilliant piece, "Making the Future of African STEM Female," which was one of the viewpoints we published in our 2022 *Foresight Africa* report. First of all, Professor Funke, can you share with our listeners briefly your professional journey to how you made it to your present position?

EKINE: I was raised by an illiterate mother. I like to start my story by saying that because she's a very big factor in my journey. Because of her background, we're just two girls for her. She made sure that we went to school and she will always tell me that if you do not go to school as a girl, you end up serving others. So she made sure she struggled to make sure that I went to school.

In Nigeria, when you finish your secondary school, which is high school in other places, they just ask what did you score in your subjects? So because I scored very well in math and sciences, my senior sister, who was a professor then, just decided to enroll me for science course in the university. So I studied food science and technology. And incidentally, Ayotola and myself, we were in the same class. So our journey began far back to 1980 when we are both undergraduates in the same department, though we parted ways.

So, after my first degree, I got into family, have a family and some other things. I was a little bit delayed. Then I decided to go back to school because we wanted to run a preschool and elementary school within our church. So when I went back to the university to take up a

diploma in education, I decided to further. And that was what led me into doing my master's and my PhD. And because of the science background that I had, my undergraduate classes, I focused my research on STEM education. And so since then, I've been learning more about how to get more girls into science and providing an environment that is enabling for them.

ORDU: Quite a brilliant journey indeed. Thank you very, very much. And Professor Ayotola Aremu, a bit about your journey. Thank you.

AREMU: Thank you so much. And I'm also glad to be here talking about the STEM journey. Well, I came from a privileged background. My parents were educated and they knew the value of education. So, that wasn't a big issue. But now with respect to STEM, just as Funke said, people at the age when we finished high school, they will just consider, okay, how many credits do you have? How many As do you have, in what subject areas? And then you are going in to whichever area is suited.

Actually, I must say that from my primary school I wanted to be a mathematics teacher, and that was because some of my teachers were very, very good. And by the time I was trying to choose what career I would go into and fill my forms, I mentioned that. Both my parents and the people around were like, Oh, you are very good in maths, you are very good in physics, you are very good in this and that. You should go in for engineering. So, actually I had a first degree in electrical and electronics engineering, although initially I entered the university to study food science and technology, just as Funke said. We met at that class. So, on that level I was in food science and tech.

I looked through the curriculum of food science and tech, and I felt that it didn't have much of physics, which was one of the subjects I enjoyed. So, I decided I wanted to change into something more interesting, without the chemistry. I preferred physics over chemistry anyway. So that's how I ended up reading electrical and electronics engineering, knowing nothing about it, knowing nobody in that field, but just because I wanted something that was physics and something that had maths.

But along the way, I knew by the time I was finishing that, Oh, this wasn't for me. I wasn't really enjoying it, but I still wanted to do things that related with maths and physics. Incidentally, my father studied in the U.S. and he had his PhD in educational technology, and he was doing some fantastic things very interesting to me using games, using things to teach people, developing instructional materials. In those days, there were charts, there were posters and things like that. And it was so interesting to me and I felt, oh, this is an area and I'd always wanted initially to be a mathematics teacher. So, my journey now took me back into education.

I went on the one year mandatory national service I taught in a school and I really enjoyed it. So, by the time I came back, I went for my postgraduate diploma in education while still teaching along the line. So I knew this was what I wanted. And that took me up to my PhD level. My teaching subjects were maths and physics.

And by the time I was writing my thesis, I got into the issue of girls in science and girls in tech, because one of my variables that I was studying was actually gender. And that led me to read quite a number of things in this area. And it related so much to my experiences in school that I felt, okay, this is an area I would work in. So even with my educational technology, I

was developing resources to teach maths and to also encourage girls in science and technology and in particular mathematics. So, that's where I landed, let me put it like that.

ORDU: Incredible. You both are exemplary role models for our girls and young women all across our continent. Thank you very much for those openers. Briefly, from your work, Funke, with the girls and STEM, what have you experienced as the barriers to girls education in STEM?

EKINE: Along the lines we just find out that basically girls face barriers that are systemic. And what do I mean systemic? I'll start from home. In raising children, especially in the African setting, they say we raise boys differently from girls. And if a girl tried to be inquisitive or tried to ask questions, they will tell you, you are just a girl. You end up in the kitchen. Why are you behaving like a boy? And they call you a tomboy. So, systemic biases, things starting from home, from the culture, from the setting, from the way we rear girls or we bring up girls and the way we bring up boys. Boys are always told to play with toys, to dismantle things, things that are like mechanical or things that have the form of or the shape of engineering. The boys will be allowed to do that. But girls would be told to just do things that pertain to cookery or family background and all those.

Then we have, one of the things I found out that the girls themselves do not believe in their own ability because of the things that they have been told. As you move along in the education ladder, when children are in primary school up to like grade four, results are shown about boys and girls they do well. Even at times, girls do excellently more than the boys at grade four, grade three, grade four. But the moment they get to higher classes, their self-efficacy goes down. They do not believe in themselves. Maybe a girl sees herself as the only one in a maths class or in an engineering class. And so she starts feeling I'm not a perfect fit, I'm not supposed to be here. So, we have biases within the classroom, biases within the system, biases within the home that the child is even coming from. Parents are even saying, why do you want to be a tomboy? Why are you always doing this?

So it's just now that things are changing and parents are encouraging their girl child. But even instill some culture, they will just tell you, are you going to marry if you are an engineer? Will you be climbing trees? Will you be doing this, will you be climbing poles? So there is that systemic barrier.

Then within the classroom, mostly in the primary school in Nigeria, the first teacher teaches all the subjects, which I think is a minus, because a class teacher who already has a bias for math, who does not like sciences, we easily transfer that a lack of interest and knowledge to the girls. And we not encourage any girl that wants to aspire to become a scientist or to know more. So there is that systemic barrier too, because the female, most of them at the primary school who are not interested in science. They find themselves in the teaching line not because they really wanted to be a teacher. And even if they want to be a teacher, they are more into the languages and the social sciences.

Then when you move up in secondary school, one of the things I found again is that the teachers there in the science classes are mostly male. So, when a girl does not see, they are not comfortable with the male teachers. So, to some extent it's put a barrier because they may not be free to ask questions. And we have issues of sexual harassment or gender based violence coming in there. So, we have that in the secondary school because mostly the teachers are male that teaches subjects like maths and physics. So, already the girls feel this is

a tough one. It's for men, I'm not here, I can't see my role models. So, we have a lack of role models for girls at that age, at the teenage years in the secondary school.

That even the curriculum and the textbooks that they use. mostly examples of engineers or people working in the space or people working in ICT are mostly males. So, girls read about scientists and all the picture you see is a picture of a man. So, naturally you just will know this is not for me. So, those are the things I mean when I say systemic barriers. Within the home, right from when the child is born, when the girl child is growing up, she's been told you cannot go to this site because engineering's for boys. You don't have the same ability as the boy child. So, these are things that to some extent affect the girl. But if they are able to see people that looks like them, who can encourage them, and they find a safe space, then they're encouraged to pursue science even at that stage.

ORDU: Let's turn now to you, Professor Ayotola. Very briefly, any what are your own experiences as the barriers to girls' education in STEM?

AREMU: Well, Funke has mentioned everything. And those are those are the main things right from the family. But I'll just give the my own examples, because I said I didn't want to continue with engineering after some time. And that was basically because of this issue of mentors. Anywhere I went to do what we call an internship, I met with males in the class. There were three females out of a class of like 50, and there are times you have to do some things using tools and the boys are protective—you won't be able to do this, let me help you out on this thing, let me help you do this and all that stuff. So, all those things were there.

Then there were issues of not seeing relationship with myself as a girl, as a female, what I'm doing, the relevance in what I would want to see myself doing in the future. Maybe that's because I didn't see many girls, many females in the area I was in. I'm sure that if during all those internship programs that went to the industry and so on, if I met more females, I would have been encouraged to go on.

And the other thing that I had issues with, now talking from my own background, was the fact that we didn't have so much of hands-on. I remember growing up with different kinds of packages that my father would put things together, would break it down. And it wasn't maybe for boys or girls, we were doing those things all together. There wasn't any discrimination there. So, I expected that things like, even experiments, he would show us issues of pressure and size, I can remember him using different kinds of things to explain to us, and we saw it hands on.

But I wasn't seeing that when I got into school. So, it became more theoretical. I wasn't seeing the relevance. And I'm more of a very creative person, I want to put things together. So, that could be in terms of curriculum, the delivery of the curriculum could be actually a barrier. Because for me, I wanted to do fun things with what I was doing and I think most girls wants fun also. They just don't want the serious stuff. So when they go to the social science classes, they tell stories, they express themselves freely and all that. So it's easier there than in science where you have to face with all sorts of theoretical things at that time. But I must say that many things are changing now. Quite a number of children are privileged to work with different scientific packages and different tools and things like that. So it makes them see how these things work. So that's just my addition.

ORDU: These are excellent. Thank you very, very much to you both. Funke, for the benefit of our listeners, could you share with us one or two insightful research you've done in this area, please?

EKINE: Okay. I want to talk about the one I did at Brookings, which was improving learning outcomes for girls. And it was basically on using stories and games to teach science. Like Ayotola said, most times when you talk about stories, you use it in language classes. So it was something innovative for me to learn that you can use games and you can use stories to actually bring science concepts to the classroom. And because girls mostly are verbal learners, they like stories, they like to relate things that they're learning to their lives. So, bringing science concepts into formal storylines with it made them to feel at home. You'll see that most times when girls even go into science, they want to become doctors because it's the life sciences it's something that they can relate to, they show empathy and things. So my work at the Brookings is something that I'm so proud of because it made me to see the things that I could do.

And so when I came back, we decided to start writing stories. And there was one particular one that I did on degradation, which is called the Lost Soil. And now schools have adopted it and they're using it in their classes. It's just talking about the erosion, which is one of the topics in the science curriculum at the primary school and how girls were able to walk through it. And they had a basic understanding of that. So it's using stories and games to teach science at the primary school level. That's one thing that I've done, and I'm still working on it to get better.

ORDU: And Professor Ayotola, any insightful thing you want to share with us you're currently working on now or you did before in the area of STEM?

AREMU: Well, I think my whole life I've been in how to get STEM more interesting and engaging, especially for children and in particular mathematics. And let me just share something quickly. I remember the time I was in a teaching practice in one of the secondary schools, that's high school, in town, and I was teaching mathematics. And there was this day I had designed some board and card games. I remember the topic was on indices, and I took it to a class and the class was rowdy, the class was noisy, everybody was enjoying themselves and everything. But I didn't know that the principal of the school had noted, she had actually come down to the class and was watching. I never knew.

And so, by the time I had finished my teaching practice program in the school and we were being commended and sent off, that she said that she never knew that mathematics could be handled in a fun way. That was when I knew that she was coming to my class to see what we were doing and things.

So, that reinforced my understanding that when we do fun things with mathematics, children enjoy them. And because while I was writing my PhD thesis, I said one of my variables was gender. And I saw that there was marked improvement, and, you know, girls did well when we used that games at that level. I used the card games, I used board games at that level. And I saw that, remarkably, boys and girls they did quite well. So, those were the things that pushed me into designing different kinds of games for mathematics teaching, especially. And so that's my story. And that's where some of the insights came that when you use games, when you use stories, it was later on that I got into writing stories on geometry and so on, and some interventions that we had handled—I had coordinated a girl's science camp. And all

these things were put into the camp for 20 children, or 20 girls in their junior secondary school. And a year after we went after them looking for how they were doing, and we had some fantastic results. It's just that we couldn't continue our research to follow after them.

ORDU: From both of you, it's quite clear, it sounds that the teachers who inspire, the teachers who inspire and make learning fun, whether boys or girls, success is the outcome. So that inspiration comes across in what you're saying and also the practical aspects of making learning fun. Thank you both for that. Let me now turn to the brilliant piece you both coauthored for us, making the future of African STEM for girls, right. You emphasized the key role of mentors in that piece. Could you share with us your own personal experience with mentors, please?

EKINE: Well, Ayotola has been one of my mentors, even though she's my friend. So, I told you that we were together during the undergraduate days and then we went our separate ways. Then by the time I came back, she was already a senior lecturer there in the university, and though she was not directly teaching me, she took me one or two courses, but every time she was always there to encourage me. And even my coming to Brookings, she was the one that shared the information with me.

So, mentors are very vital in the lives of any young person, especially a girl child. As I told you, my mother was not literate, so I couldn't get that aspect from her. Then I have some teachers, like one of them happens to be a man who was my supervisor at the university, but he was so amiable and so friendly that he allowed Ayotola to co-supervise me, because I was writing on science. He was a professor of early childhood, but he didn't have background in science. So even though Ayotola was in another unit, the university said, Can you please co-supervise this lady since she's writing on STEM, girls interested in STEM? So, mentors are very, very vital to a girl child.

I've had the teacher, I've had Ayotola, and now in my adult life in the university where I have of directors that have been very passionate about me, my vice-chancellor, both the male and the female since I came back from Brookings, and they are supporting anything or any research or any work that I want to do because they see the effect it has had since I came back to the university.

Primarily, when I came back from Brookings, I was made the deputy director for research. And so everything that we do in the university now, they view it with a gender lens. When forming a committee, they will tell me we want to hear the female voice. A female must be on the board. We are looking at planning any training you must have, if not almost the same number of female, you must have at least a sizable number.

Before then, females were not really encouraged to come up with leadership and things. But, with a leader and some other that I have, like one of the vice chancellor who happened to be the first female in my university, she encouraged me. She will call me aside, she will send me texts, she will send me things concerning conferences. She will be asking me, Have you done this? Have you done that?

So, I've had mentors as part of my life. Those are my teachers. I've had my friend, and she's still my mentor. And that is why when you told me to write that piece, I said, Please, can I bring my mentor on board? Because she's actually been there for me. And when I'm tired and I feel like giving up, all I need to do is just call Tola, and she just talks to me. So, I'm

happy that I'm sharing this platform with her. She doesn't know how much she means to me, but I'm happy to say it. She's been a very good driving force for all my achievements.

So, I want mentors in my friends, and in my teachers, and lastly, one of my mentors that I must not fail to mention is my husband. My husband has been very, very, very supportive. He believes in me. He believes in whatever I want to do. And, you know, when I was going to write that piece for the Brookings studies in 2013, I wanted to write on another topic. I wrote on child's rights. He now said, but you are science-based, why are you writing on child's rights? Why don't you write something concerning science, that you have been doing all this work?

And that was why I changed my concept note that I submitted and because I wrote how to use stories, I wrote on how to use stories and games to get more girls into science at the elementary level. And that was what got me into Brookings at that time. So he's been my mentor even though he's not in education, but he does believe that as a girl you can do as well as the boys, whatever it is you want to do, you can go for it, and you have my support. So, these are the people that have been there for me in my little time and my little sojourn in this academic world.

ORDU: Ayotola, we heard very clearly the excellent role you have played for Funke as a mentor.

AREMU: Don't mind her too much, she has sweet words and I think the mentor was another.

ORDU: And on that on that excellent note, I was just wondering whether you can do two things. One specific instance of particular mentor that influenced you. And then, of course, on the other side as well, the role you have been playing as a mentor to many others.

AREMU: I think I mentioned initially that I had the teachers that I just loved. And one I remember her name very well. She was my primary five class teacher. Her name was Mrs. Coca. And the way she carried herself and the way she taught us mathematics was so wonderful. I really used to enjoy, I think that was the first time I really felt, Oh, I want to be a mathematics teacher.

And then by the time I got to the secondary school, I initially had some rough things. I actually had another female teacher that wasn't that good. But somehow I was so fortunate that the love that I carried from Mrs. Coca did not rub off by the effect of this other teacher.

But then when I was in from three in the secondary school, I had another teacher, Mrs. Charcot, and in fact, she was just a wonderful mathematics teacher. I think I've been fortunate through my life to have fantastic teachers. By the time I got to form four, form five, too, although they were males, I had some good mathematics teacher that would encourage the girl child. I attended girls-only school and they really encouraged us very well. Towards the end of our five year program in the secondary school, which is the high school, we even had the principal bring a former principal and student of that school—who was also a mathematics teacher, a female. And seeing all that made me really wanted to do mathematics. but I discussed my journey, how I was advised to go to engineering and all that stuff and so on. So, but I think those teachers were really fantastic.

So in talking about mentoring others, let me talk about my first daughter actually, because as I started noticing when she was in primary school, getting to grade three-four, just as Funke said, she started finding mathematics difficult. But because of my background and because I was working in that area, I was able to bring in resources, bring in materials to encourage her to be able to keep her interest in maths. Because what usually happens is at that stage, when maths begins to get tougher, they lose interest. They go to other classes and they enjoy it and they get their tick, tick, tick, tick, and they pass it. And then they come to maths class, they are getting three out of ten, all those terrible things. And they are like, wow, it's just reinforces what everybody has been saying, that boys can get all the resilience to go and do maths. Why must I push myself in to do this? But, because I knew this, somehow I was really helped and thank god for that, to be able to put her through so many things, so many games. And at the end, by the time she was writing in her final exam, which we call the school certificate examination, she did very well. She had an excellent grade.

Although she is not in STEM, but she would always say that it was because I did not allow her to lose interest in mathematics that she isn't doing what she is doing currently. Actually, she is working in a corporation now and she is a procurement manager, and she deals with figures and numbers. She would say it's because of what I did. I didn't make her to be afraid of facing numbers. She went into the social sciences, and funnily enough when she was in college also, she was teaching her mates that were in the social sciences, she was teaching them maths. And I would laugh and say, You? She'd say yes, I'm even better than many of them and that kind of thing. So from my experience with her, I see that if we are able to ensure that they don't lose interest when mathematics gets tough and somebody is there for them, and I will tell them, if your mommy can do maths, you also can do maths.

ORDU: Fascinating indeed. Let's now turn to the matter of COVID, COVID-19, which, as you both know, magnified the digital divide that already separates girls from boys in terms of educational attainments. How has the pandemic set girls and young women back in our communities? Funke, you first.

EKINE: The situation in Nigeria happened that even when they went online—most schools went online—the government was trying to reach children or students, especially students during the exam class, to reach them through online platforms, television, and things. But, one of the things we need to know is the access to digital platforms is not easy for girls. In the family, even when we have, even when family have access to it, it's mostly the boys that will be comfortable with it because during COVID, girls will have to cook, they have to do the household things. And so they don't have even enough time to go and sit by the laptop or sit by the mobile device. And very few houses had access to that in Nigeria. So, it's probably heightened the separation or the gap between the boys and girls accessing digital devices. So, that's one major thing that happened during COVID.

Most schools were not able to continue learning and those that continued learning through those platforms, the first set of people to access it will be the boys. And even in some families, maybe they have only one machine or one laptop or one phone and they have three or four children. So, you see it's a matter of who gets it first, or who can access it, or who understands it.

ORDU: And you, Tola, how in your experience has the pandemic set our girls and young women back in our various communities?

AREMU: Just continuing from what Funke was talking about in terms of during that pandemic, quite a number of families had challenges in terms of resources coming into the family because many businesses had to close down. And we have families that rely on like what they get on a daily basis, and it really affected them. And when that happens, they forced people to be told to help around in the house and so on. In front of the house in many of our communities, we have the small shops that the girls manage and so on, because they feel that they are better at money management in terms of all those sales and things like that. So, at that time, quite a number of families did not even have the time or the wherewithal, just as she was saying, to be able to afford for everybody to continue to learn. So, who would go first? Because of the kind of society that we are, it's the male child that is given the preference. So, that was what was happening during that time.

But let me also say that with many elite families, which is just a small percentage, we find out that, well, they still try to manage that the boys and the girls, they would have equal time. But for most families, the girls will be the one at the losing end when it comes to we don't have enough. So, who goes first? It will be the boys. Who helps at home? It will be the girls. And so on.

ORDU: Despite the enormous challenges, Tola, could you share with our listeners some of the success stories or good practices that you've noted with respect to STEM for our girls?

AREMU: We talk about what we call girl-friendly or gender-friendly strategies. We actually don't want to leave the boys out because they are very, very important in STEM also. The male and female gender, to me, they carry different attributes and different characteristics that are needed in STEM. But just as Funke was saying sometime when we look at the curriculum, when we look at the practices, they are tilted more towards the male.

But I'm saying that if we look at fun-based strategies, like some of the things that we have mentioned, we've mentioned about the use of games, we've mentioned about the use of stories, those things carry some fun with them. They encourage or they help girls to learn. And in quite a number of my researches, I've proved that that there is actually no gap in achievement when we use these girl-friendly strategies to help.

The second thing, it's about finding relevance. As females, you still want to be female, you still want to, in our society having a home, having children it's really prioritized for girls and all that. So, you still want to be female, you still want to be tender, you still want to be this. But then we've seen that even with all that girls can get into science-based courses. It's just a little bit of let them see the relevance of where these things fit in.

Let me say this at this point, that when we're talking about getting children as early as possible into STEM, it's very, very vital in that even if they don't go into STEM again, we have what we call science process skills like observation, communication, problem solving. Those are the kinds of things that they should learn doing science. So if they are able to acquire those skills and what we also call scientific attitudes, being open minded, being critical of data and all that, if they're able to imbibe it doing early years science, even if they're now going into all fields of arts or humanities, it's going to be applicable there.

So we've seen that it's not just about, okay, the girl child will now begin to do engineering, will now begin to do space science, will now begin—it's not only that, even if they're able to be impressed at that early stage with those scientific skills, with those scientific attitudes, it's

going to help them in other areas. So, just in brief, these girl-friendly strategies and most of the girl-friendly strategies are fun strategies. Secondly, helping them to see the relevance in day-to-day life. And thirdly, encouraging science process skills and scientific attitude development.

ORDU: Let's turn to you, Funke. In our societies, what you've just both been discussing, this myth that maths is for boys, remains very, very pervasive across our communities. In your view, what is being done to really change this narrative or what can be done to change the narrative?

EKINE: One of the things that can be done to change the narrative is to bring females that have been successful to come and share their experiences. So that the other girls, we know that, look, they can aspire to do maths as well as any other science courses. As we mentioned, this thing starts from the early years. It starts from as low as age five, age six, age seven. And it has to do at times with the teachers that they meet in the classroom. It has to do with the things that they engage with on a daily basis. So, research has shown that there is no difference between the boy's and the girl's brain. There's not nothing like a boy's brain or a girl's brain. In as much as it is not every girl that will love science, as Tola has said, but it doesn't mean that girls cannot excel in science courses or maths course.

So, I think the first thing is to change the narrative in the classroom. When teachers, female teachers, female scientists, engineers are brought as role models to come and engage with girls as early as possible. In places where we have science camps, these days now children go for camps, after school activities, summer camps, and things. So, when they engage them early, they will understand that they can do well in maths.

These exams that we are, that is done, internationally, PISA, shows that girls even in some Arab countries are doing better than boys in maths and science. So, there is no basis for that discrimination. The brains are the same. It just depends on how you stimulate it and what you stimulate it with. So early stimulation for the girls, now we should remove all forms of stereotypes, all forms of gender stereotypes, all forms of cultural biases against the girl child, and, you know, still thinking you cannot do this because it's a feat for men. Well, in today's world, we'll see a lot of girls that are doing so much in ICT, so much in engineering, so much in robotics. So if they come and they showcase their talent, I believe it could go a long way to encourage the young girls to know that they have the ability to do well in maths and science.

ORDU: So, to both of you and Professor Tola, first, if we had a room, let's say I was with you in Ibadan right now and we had a room full of our policymakers from the federal, from the state, and the local governments of Nigeria, what two or three advice would you give to them about the need for policy focus on STEM for our girls and young women. Tola?

AREMU: Just one main theme that if it's just given me the opportunity to speak, is to increase what we call the science capital of children, especially from the primary school. And what do I mean by that? When we talk about science capital, we are talking about the different kinds of resources, we're talking about attitudes, we're talking about experiences that help children to enjoy science and to get engaged in science in such a way that it coaxes them and they don't go. So, I would tell them that we need to increase those kinds of things, especially at the early childhood level. And what we would be doing to increase the science capital of these children, especially girls, create some things about science fairs, science retreats, developing resources that are girl friendly. Science laboratories where children could

experiment and carry on hands-on activities, packages that they can dismantle and put on. Going to science centers for girls, it's amazing, you see science live and so on.

And it has been shown that when the science capital, that is the experiences that children have to develop their science skills and attitudes and knowledge, well it increases. In research it has been seen that for such children they are the ones that remain and gather that resilience, even when science becomes tough, they still remain in science. So I would just give that one suggestion, that we need to write new policies around how do we get the experiences. The curriculum is full. There are so many things there, how do we train our teachers to use this curriculum to develop the scientific attitude, the scientific skills, the scientific knowledge of our children using various things. So, it would involve training of the teachers, it would involve developing curriculum and materials that would engage the children. That's just one thing.

ORDU: Funke, same question.

EKINE: I just want to say that the policymakers in our government should spend more money on training teachers, especially female teachers, who are in the science field. Teachers are not actually given the kind of attention they're supposed to be given. And so, most people are discouraged being teachers. And I think teachers are the foundational level. They are very critical into getting girls more interested. So, intentionally, the policymakers should see how can they increase the number of female teachers at that level, give them scholarships to improve themselves, to develop themselves professionally, provide facilities so that their teaching would move from being theoretical to practical hands on, just like Tola has mentioned. Having science fairs, science activities, club activities at that level where the children can actually have hands on practices, not just theories.

Then maybe pay some extra allowances for female science teachers, especially those that are going to the remote schools to teach. So that when you're a science teacher, you're a female science teacher, there's something additional that makes you want to go the extra mile.

And then let there be a network of those in the industries coming into the classroom. Females in the STEM industries coming into the classrooms as mentors to help, not to teach, but to just come in and to serve as role models and as mentors for the girl child.

I think if the government will spend more funding, put more money to encourage female teachers, grant them allowances to develop professionally, increase their facilities in the schools so that they want to conduct an experiment, they can get it. They can have everything they need. They don't need to improvise. They can have the real thing. And the girls can experience it, as Ayotola's mentioned. And it would give an extra scholarship or extra allowances or just a little stipend for being a female teacher that is going to the rural community to teach. These things will encourage more female to be in the classroom and to serve as role models to the girls at this level. And lastly, connecting the STEM professionals, the females, outside in the industry to come into the classroom as role models. I think this will go a long way in encouraging the girl child.

ORDU: I have been speaking with to eminent professors, Professor Ayotola Aremu and Professor Adefunke Ekine. My sisters, thank you all very, very much for choosing to spend his time with us. I am very grateful indeed. Thank you and have a good day.

EKINE: Thank you for having us.

AREMU: Thank you for having us. It's been a great time talking about this.

ORDU: I'm Aloysius Uche Ordu, and this has been Foresight Africa. To learn more about what you heard today, find this episode online at Brookings dot edu slash Foresight Africa podcast.

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Thank you very much.