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Black Students' Foregrounds: Evolutions, (De)formations, and Connections in Mathematical Identities

Foregrounds de estudantes negros: evoluções, (des)formações e conexões em identidades matemáticas

Foregrounds de los estudiantes negros: evoluciones, (de)formaciones y conexiones en identidades matemáticas

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Abstract: This paper is part of a doctoral thesis conducted by the author. The mathematics identities of Black students can be neglected at times. Moreover, the experiences that they have had and are having can influence the ways they come to understand and perceive the importance of mathematics in their present and future. Utilizing the concept of foregrounds, I attempt to learn about the ways Black student in Newark, New Jersey view their environments, their perceptions of mathematics and how this may connect to their thoughts and ambitions of

the future. To do so I interviewed several middle school students, their teacher, and researched the backgrounds and foregrounds of the participants and of the city of Newark.

Keywords: Mathematics identities. Foregrounds. Backgrounds.

Resumo: Este artigo é parte de uma tese de doutorado conduzida pelo autor. As identidades matemáticas de estudantes negros podem ser negligenciadas às vezes. Além disso, as experiências que eles tiveram e estão tendo podem influenciar as maneiras como eles passam a entender e perceber a importância da matemática em seu presente e futuro. Utilizando o conceito de foregrounds, procuro aprender sobre as maneiras como estudantes negros em Newark, Nova Jersey veem seus ambientes, suas percepções da matemática e como isso pode se conectar com seus pensamentos e ambições para o futuro. Para isso, entrevistei vários alunos do ensino fundamental, seus professores, e pesquisei os backgrounds e foregrounds dos participantes e da cidade de Newark.

Palavras-chave: Mathematics identities. Foregrounds. Backgrounds.

Resumen: Este artículo forma parte de una tesis doctoral realizada por el autor. Las identidades matemáticas de los estudiantes negros a veces pueden pasarse por alto. Además, las experiencias que han tenido y están teniendo pueden influir en la forma en que comprenden y perciben la importancia de las matemáticas en su presente y futuro. Utilizando el concepto de "perspectivas", busco comprender cómo los estudiantes negros de Newark, Nova Jersey perciben su entorno, sus percepciones de las matemáticas y cómo esto puede conectarse con sus pensamientos y ambiciones para el futuro. Para ello, entrevisté a varios estudiantes de primaria y a sus docentes, e investigué las perspectivas y los antecedentes de los participantes y de la ciudad de Newark.

Palabras clave: Mathematics identities. Foregrounds. Backgrounds.

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> "[I]dentity is always a question of producing in the future an account of the past, that is to say it is always about narrative, the stories which cultures tell themselves about who they are and where they came from." – (Hall, 1995)

The above quote from Hall applies to the formation of mathematical identities and foregrounds. The backgrounds that all learners have contribute to the constructions of their identities and foregrounds. To understand the foregrounds of African American learners, it is necessary to observe and acknowledge their past and their narratives.

Environments and experiences shape who we are and who we become. Of course, along the way we learn to make decisions, and we can come to make choices that will grant us beautiful opportunities and perspectives on the world; alternatively, we could be led to make determinations that are misleading or harmful. The experiences you have as a child and as a student stick with you, and they can stay with you for a very long time.

They come to make up our internal being and the way we identify with the world, thus the way we make meaning of our worlds (Poole, 2010). Experiences through our environments determine how we begin to perceive and engage with other people, and how we manage and resolve our problems. In this sense, these experiences also influence how we come to see our future possibilities.

Experiences occur in our present and in our backgrounds. Backgrounds influence mathematical identities and foregrounds. Mathematical identities contribute to foregrounds, and foregrounds are affected by backgrounds. These concepts are in a cycle with one another, and they can very well move in different directions at various moments of life and development, where one concept may begin to sway the other two with more vigor.

Growing evidence shows that African American children's mathematical identities are strong predictors of their mathematical success or failure and that teachers' classroom practices and beliefs can dramatically shape these identities - not just in the short term but also over the whole life span (Martin, 2009a).

Foregrounds consider ways of thinking that derive from environments that we live and learn in, which possibly influence our choices for the future (Skovsmose, 2012, 2014). It includes all possibilities, and "Of course, foregrounds include wishes,

necessities and desires."[1] (Filho, 2014). In a theoretical sense, foregrounds involve the level of importance placed on mathematics in their lives in relation to their present and future.

Foregrounds are complex constructs of our experiences, they are in no way simple and require our explorations to be conceptualized (Skovsmose, 2014). Within the foregrounds are thoughts, propensities of success, hopes, dreams, doubts, fears, importance of mathematics in their lives, imaginations about their futures, influences from their communities, and the relation of their interests to their realities. There is much that goes into one's foregrounds; in this paper I will remain focused on the interconnected relationships for Black students between mathematical identities, backgrounds, how they view their environments, how this may influence their mathematics experiences, and perspectives of their futures. I will also analyze the influences of their teachers' experiences and backgrounds on their foregrounds and mathematical identities.

CONNECTING BACKGROUNDS TO THE FOREGROUNDS

Do Black students see mathematics education as being essential to their survival or to their ability to thrive in their communities? Their daily activities may communicate the contrary, where worrying about one's safety may be of greater concern, for example, and mathematics may not be paramount in their lives (Martin, 2012). The importance of mathematics is present, but its level of pertinence in the present and future varies depending on the opportunities they have in relation to mathematics.

(Skovsmose et al., 2018) states that:

> "A decision about being involved in the mathematical tasks, or not, is not simply the result of a conscious individual choice, but rather a decision that is strongly associated with the intricate relationship between the student, the teacher, and the context for learning in the social-political-cultural environment." – (p. 98)

Relationships with mathematics are greatly interconnected with backgrounds and foregrounds and will affect the way one identifies with mathematics. The histories,

[1] Translated by the author.

circumstances, desires, or dreams that individuals have stem from their backgrounds and grow into their identities and foregrounds. For Black students, this has proven over time and through history to limit and strangle their relationship with mathematics, as they face racial and systemic obstacles that stifle their development (Davis, 2022; Martin, 2009b; Valoyes-Chávez & Martin, 2016).

In terms of foregrounds, the histories of Black students can greatly affect what they come to dream about or aspire to, as their possible experiences may be limited. African American histories are steeped in systemic racist conditions that often present obstacles to Black students' success in mathematics (Carter, 2022; Division of Health, 2023). It can then limit future opportunities in relation to mathematics, or one's relationship with mathematics.

A connection that Carter (2022) makes to the current systemic racist circumstances is a policy such as the Servicemen's Readjustment Act of 1944, also known as the GI Bill. The GI Bill provided millions of war veterans with advantages and benefits, such as access to low-interest mortgages, stipends covering tuition, and expenses paid for veterans attending college or trade schools. Unfortunately, for Black and Latino veterans, the rewards of GI Bill were unreachable during this period of racialization and discrimination.

This is an important example to consider because this occurrence prevented African American veterans from accessing universities due to segregation. So, the effects of poverty were seemingly two-fold, as they were refused by educational institutions (Thain, 2024) and were also victims of collusion through the federal government by means of housing discrimination (Roisman, 1995). Actions such as these have contributed to deformations of Black success, education, opportunity, and wealth. Thus, altering their foregrounds.

Below, I connect the ways in which experiences and environments can influence the foregrounds for Black students. To do this, I will discuss the foregrounds that may be imposed on them from their city environment, and the differences in foregrounds for students in different contexts that have been discussed over the years. Throughout, I will refer to statements from the interview participants. Following these discussions, I

will bring some of my own experiences, to further consider the connections between mathematical identities and foregrounds.

FOREGROUNDS IN NEWARK

To examine foregrounds, it is necessary to observe the backgrounds, and the present situations. Part of the present circumstances for Black students in Newark are their surroundings; therefore it is important to explore the history and context in which they live, and moreover, the differences that may exist for them in their neighborhoods.

The city of Newark, although not a very large city, is incredibly important. It is an interstate and international transportation hub, home to multiple universities and hospitals, has a rich history, and the demographic has grown more diverse in the passing years. It is very close to New York City. Though not as well known, it has various cultural locations and activities to participate in year-round. The city has grown over the past few decades and has become a recent site of gentrification due to its proximity to New York and the presence of convenience and necessities in a metropolitan city.

The gentrification has been slowed by the mayor, Ras Baraka, through the creation of the Equitable Growth Advisory Commission[2], to provide more equitable opportunities for ownership for the present citizens in Newark (Morel et al., 2021). While there is evidence that the city has not undergone gentrification as quickly as nearby cities such as Jersey City or Hoboken (other popular municipalities in the state of New Jersey), there have been new commercial and residential developments in Newark. Along with gentrification comes an increase in the cost of living.

There is a clear effort to provide equitable opportunities, but the percentage of people that own their homes is still low. In 2019, only 24% of Newark residents owned their homes, 39% lower than the average of the state of New Jersey, and 40% lower than the national average; at the time, Blacks and Latinos made up the majority of the

[2] See Morel et. al. (2021) for an in-depth explanation of the gentrification in Newark, NJ, the Equitable Growth Advisory Commission.

city population, 47% and 39% respectively (Neal et al., 2020), 86% of the city population collectively.

Inequity in home ownership is interconnected with inequity in income. Inopportunity to buy a home is related to how much one can earn, as one may not be able to access housing loans without proof of sufficient income, even if the process of gentrification is stalled. One is unable to conceive the possibility of owning or building wealth, even if granted the time, without the resources[3]. In the 2022 United States Census, the median income for Newark was $46,460, and the amount of people living at or below the poverty line was 24.4%; meanwhile the national average is $75,149 and 11.5%[4].

Inability to earn an above average wage stems from the level of education achieved, and the number of professional options available for career and employment. The data from the 2022 Census shows that 77.7% of Newark residents had graduated from high school, and only 17% had a bachelor's degree or better; both are below the national average, where the percentage of high school graduation and undergraduate completion or higher is 89.1% and 34.3% respectively (Census, 2022). Lack of education can possibly push individuals towards crime as a means to improve their financial status. A depleted financial status can result in social exclusion (Thain, 2024). The attainment of education not only affects the possible income or options available, but also the rights that may come along with these possibilities, and the awareness and knowledge of privileges in their current or available circumstances.

In this sense, foregrounds are not just the opportunities and knowledge afforded to them, but also the opportunities and knowledge they are able to attain themselves. This can possibly be prevented and altered dependent upon the external structures in place, some of which can be racist and obstructive to significant progress. The perceptions of these realities are what contribute to forming foregrounds within the environment of Newark. Hence, for Black students in Newark, they can come to observe poverty and inequities in housing (Newman, 2004), as well as low

[3] In 2022, the average cost of a house in the United States was $442,600. Data from https://fred.stlouisfed.org/series/MSPUS
[4] Data used from the 2022 United States Census Bureau, https://www.census.gov/quickfacts/fact/table/newarkcitynewjersey,US/PST045222

expectations of education and choice of career. Possibly being persuaded by violence, crime, and a multitude of external influences of what can be considered as a priority outside of education. Due to circumstances such as these, students' foregrounds could be ruined (Skovsmose et al., 2018).

The collective identities and foregrounds of Newark varies and depends on the neighborhood. The landscape of Newark has changed dramatically over the past decade, but some neighborhoods remain the same or have worsened due to continued poverty, crime, and violence; poverty and crime can become concentrated due to the process of gentrification (Newman, 2004). In a study by (Hahn, 2014)), the crime rate in Newark was found to be three times higher than the national average.

Considering the theory of foregrounds, I draw attention to the notion of foregrounds in a borderland position by Skovsmose et. al. (2018). The authors describe borderland positions as a relational situation where individuals meet their social environment and come to terms with choices that diversity makes available to them. Therefore, they define everyone to be from a borderland position. They research the foregrounds of Brazilian students located in favelas in the capital of São Paulo, living in vulnerable situations, apart from the greater metropolitan areas of the city. The authors are interested in learning more about the relationship between the students' foregrounds and if they may come to connect mathematics with their future possibilities.

Foregrounds can be defined as a person's interpretation of life opportunities in relation to what appears to be acceptable and available within the given socio-political context (Alrø et al., 2008; Skovsmose, 2018; Skovsmose et al., 2018; Valero, 2015). Looking at the environment of an 8th grade student, *Isabella* , she discusses her insight:

Jamaal: What area of Newark do you live in?

Isabella: The South Ward.

Jamaal: South Ward. Okay. Can you tell me a little bit about the South Ward? How is it over there?

Isabella: It kind of depends on the season really. Winter is kind of dull. And summer is kind of like the crime rate goes a little bit upward.

Isabella her own perspective of her community in Newark, and it reflects the data shared about the high rate of poverty translating to possible increased crime. Interested in the correlation between the environment and the affect it may have on learning and future opportunities (Varelas et al., 2012), I ask about the professional lives of others in her neighborhood. We go on to discuss the occupations of individuals in her neighborhood:

Jamaal: Okay. And the people in your neighborhood, what do people do in your neighborhood, like for work?

Isabella: I think most of them do like security jobs.

Jamaal: Okay. Do most people in your neighborhood go to college?

Isabella: I don't think so. No.

Isabella lives in a dangerous neighborhood, which is pretty calm during the winter but during the summer the crime rate goes up. Most people in her neighborhood work as security guards, and do not go to college. An environment such as this can lead one to aspirations of being a security guard, avoiding higher education, which can lead to satisfied lifestyle possibilities, depending on the individual and their desires. It can also lead to curiosity about the role mathematics may have in their future outlook, and its overall meaning or purpose.

One may also have motive to move away from environments such as these. They may not have the types of interactions which motivate them or observe others in their neighborhoods that pique their interest. They could in fact become demotivated by what they see. *Omar* shares a brief reflection about his community:

Jamaal: Can you describe your community?

Omar: Retarded.

Jamaal: Retarded. What do you mean by that?

Omar: Because it'd be a whole bunch of, you know, people who be wildin out there.

Jamaal: Okay. You wanna say any more about that or you wanna leave it as that?

Omar: Just wildin. I wanna leave it right there.

Jamaal: Okay, no problem. Coming from where you come from, what are your hopes and dreams?

Omar: To not be like those people outside.

Jamaal: Okay. Can you say more about that? What would be more unlike those people outside?

Omar: Like probably finishing college and not being outside selling drugs.

Omar refers to his environment as “retarded,” and the people as “wildin out”. He is not motivated by the foregrounds of his socio-political context, as he is not inspired to be like the people he sees. During his interview he displayed emotions of frustration, fatigue, and a possible sense of shame of this environment, as he declined to go into further detail. I interpret his response of “retarded” as referring to the methods for decision making in his neighborhood being illogical, where “wildin out” types of actions may follow; “wildin out” can refer to many different things in which the person committing these actions is doing so irrationally or without care (potentially signaling criminal behavior).

The foregrounds of his community, however, provides him with motivation to do the opposite of what is environment is showing him. Rather than give into the possible surrounding future aspirations that he is noticing, he prefers to be different and pursue other goals. *Omar* may not be completely committed to the idea of college yet, but he desires more than what is modeled for him right now.

Through observations such as these, one can see how social and environmental interactions may alter the ways in which students come to identify with academics and mathematics (Gonzalez et al., 2020) or construct their foregrounds (Skovsmose, 2014). If students have insignificant opportunities to engage with mathematics

outside of school and the communicated expectations within school are low, the precedence of mathematics may be lower as well. Academics appears to be a means to improve their circumstances. Other external influences, such as the crime this student witnesses, can distract from success in academics.

Restrictions and low expectations of success in academic spaces can repel Black students from mathematics or sway them into resenting mathematics. However, through perspectives such as the example shared by *Omar*, we can see that the conditions of social environments can persuade students into aspiring for higher education. Therefore, it is necessary to view these multiple directions of coming to form foregrounds and mathematical identities to provide avenues for students who may or may not recognize the visual and embedded functions of mathematics.

Omar, for example, is motivated to go to college. In other analyses, he also displayed a mindset for doing mathematics quickly. In his thinking, this is what makes a good mathematician. One may interpret that he is persuaded to do mathematics quickly because he wants to move away from his current situation, or it could be a result of the manner in which mathematics is presented and assessed in academic spaces. There are different interactions that students have that may determine their purposes of learning and goals they stride for.

In the following section, I will discuss the varying foreground perspectives and ideals to compare to the different ways in which foregrounds come to be, and how they may differ or reflect from foregrounds of Black students.

MULTITUDE OF FOREGROUNDS AND MATHEMATICAL IDENTITIES

The futures of many Black students are restricted because of their perceived mathematical aptitude, which is typically measured on results of assessments that are unjust. Based on test scores and track records of mathematical ability which often display deficit narratives for Black students (Davis & Martin, 2018; Martin, 2009b; Sonnenschein & Galindo, 2015), students can be rejected from certain academic spaces and institutions, unless they are able to prove that they are capable on assessments.

Aside from this restriction, a cause of poor performance can be the inadequate experiences that students receive in their learning environments, which can result in a depleted foreground. There are various scenarios that can leave students fulfilled or emptied of deep connections with mathematics and connections to future opportunities, potentially those involving mathematics.

Much of an individual's foreground is influenced by one's background, and all of us have at least a slightly different background. In a study by Alrø, Skovsmose, and Valero (2008), they conducted interviews to learn about foregrounds in a multicultural context. They used a conceptual framework to outline a learning landscape based on nine dimensions[5]. These dimensions are students': 1) foregrounds, 2) constructions of identity, 3) teacher's perspectives, opinions and priorities of teaching, 4) content of learning, 5) tools or resources for learning, 6) classroom interaction, 7) parents, 8) friends, 9) public discourses (in relation to politics). All these dimensions are interconnected; they are also self-standing dimensions that allow for perceptions of students' learning experiences.

The intent of their study was to gain insight into the experiences of an Iraqi student, Razia, and her learning experiences. Although their aim was to learn more about the experiences of a student who was foreign to her new learning environment, I see the correlation between this study and the study of students in borderland positions, as Razia is perceiving what her future opportunities may present in her current life condition. Although the backgrounds of the students differ, there are many similarities to how one constructs their foreground.

Even if we come from a similar cultural background, the same community, or have resembling beliefs, the construction of our background can be minimally or extremely different from someone else's; the foreground construction remains highly similar in regard to the interactions that may provide motive. The context and contents of one's foreground can come to have many differences. In any of these cases, there are

[5] For in-depth details of their learning landscape framework and definitions of the nine dimensions, see Alrø, H., Skovsmose, O., & Valero, P. (2008). Inter-Viewing Foregrounds: Students' Motives for Learning in a Multicultural Setting. In *Social Interactions in Multicultural Settings* (pp. 13-37). https://doi.org/10.1163/9789087907174_003

possible similarities but most certainly differences in these constructs and therefore there are multiple ways in which foregrounds and identities can (de)form.

These infinite variations can determine the ways in which people prefer to learn, and their motives to learn (Skovsmose, 2023). These preferences and motives have the ability to invigorate students' foregrounds and mathematics learning. Attending to all these differences is not an action that is constantly occurring but can be an actual reality. Within every community and every mathematics classroom there can exist alternative ways in which students bring knowledge, bring their culture, backgrounds, identities, and perceptions into their learning spaces (Gholson & Wilkes, 2017). In this way, many different foregrounds can be possible for a student, depending on economic, political, culture, religious, and discursive factors.

THOUGHTS OF MATHEMATICS AND FOREGROUNDS

Let us look at *Isabella*, for example, she discusses her opinion and relationship with mathematics:

Jamaal: What do you think about mathematics? What's your opinion of it?

Isabella: It's kind of like mixed emotions, you know? Sometimes it's like fun cause I know what I'm doing and then other times it's just like, why do I need to learn this? It's like, okay. Kind of confuses me.

For *Isabella*, mathematics is fun when she understands what is going on. This is when the mathematics can be communicated in her own way, as I interpret. *Isabella* is also describing a possible lack of utility for mathematics in her perception (Matthews, 2018), as she is not exactly sure about the purpose for learning mathematics. She goes on to share her opinion of mathematics and how it may apply to her future; I inquire more about her previous statement:

Jamaal: And when you say that it's easy for you, like you know what you're doing, what area of math is that for you?

Isabella: Multiplication, working with variables, I'm good with variables. I think that's [it], like multiplication, division, and like variables.

Jamaal: Okay. And when you're saying that you don't really see the point of it, tell me a little bit more.

Isabella: Like right now we're doing geometry. This is like the most confusing subject I've done in math. There's like so many rules and like all these like terminologies that you gotta remember. It's kind of difficult.

Jamaal: Okay. And when you said that you don't really know what the purpose of it is, what do you want to do with your life? Like what do you want to do in the future?

Isabella: I want to do acting or future in fashion design. And mathematics doesn't really relate to that. I guess like when it comes to like percentages and stuff like that. That's probably good to know since I have to do like management sometimes and like money and like contracts. But other than that, I don't think so.

In the previous statements, there is evidence that *Isabella* observes the importance of mathematics but not the necessity for it in her future prospects. However, there may be opportunities for her to bring more of her interests into her academic spaces, as there is most certainly a relationship that exists between her interest in fashion design and geometry, and her understanding of area and the different designs that exist within the world of geometry. The experiences that she describes in doing geometry are only based on procedural learning, focusing on memory of terms, with no real connection to her interests.

A possible oversight is the interrelationship between the culture of personal and academic in this scenario, or lack thereof, and the language of the two worlds does not match or overlap (Iseke-Barnes, 2000; Lerman, 2001). In other words, a place where the interest of the student is personal, yet valuable, and the necessary memorization of geometric terms and formalities to demonstrate mastery do not overlap. There are differences, but opportunities to link and coexist.

As Alrø, Skovsmose, and Valero (2008) suggest, these cultural differences are constructed through individual and collective groupings, through identities and interactions. The ways in which these individual and collective interactions are embraced is dependent on the current activity and conditions of the environment. The current activity is what students experience in and outside of mathematics classrooms,

which includes what they experience in their neighborhoods. Conditions of the environment involve these same spaces, mathematics classrooms and communities, as well as what activities are carried out, how these activities are facilitated, and ensuing interest based on individual and collective identities and foregrounds.

Thoughts and feelings around mathematics can also determine how students may come to perceive connections between mathematics and their futures. *Isabella,* not being an enthused mathematics learner, may have dissuaded her from connecting many of her future goals or possibilities with mathematics. Another student, *Robert*, is presented with the same question in his thoughts about mathematics and he describes them below:

Robert: Nervous.

Jamaal: Nervous?

Robert: Yeah.

Jamaal: Okay. What else?

Robert: Hmm. Pretty much mixed feelings. Sometimes it be a little hard, easy, but I always find a way to get through it.

Jamaal: Okay. So, using, determination or persistence?

Robert: Yes.

Jamaal: Okay. And then when you say mixed, can you throw some of these mixed feelings at me. What would you say some of these mixed feelings are?

Robert: Um, happy, sad, mad, um, nervous. Courageous, curious, and a lot of determination towards fixing the problems.

Jamaal: Okay, so, Hmm. I'm gonna stick with these emotions of curious, happy, and mad. What makes you curious about mathematics?

Robert: A lot of new stuff. Multiplying decimals, dividing, wondering when was this ever possible?

Jamaal: Okay. When was this ever possible? Like what do you mean?

Robert: Hmm. It's like when we start the lesson, it's like impossible to do, but as the teacher explains, more understanding comes into play.

Jamaal: Okay. And you said happy. What, what makes you happy about mathematics?

Robert: Okay, um, when. I get the answer correct or able to help somebody that doesn't understand. Just brings joy.

Jamaal: Okay, I understand that one. I can identify with that. And mad. What makes you mad about mathematics?

Robert: How do I say this If I get something wrong, like wondering how I got it incorrect? I did everything correct, but probably messed one thing up.

Jamaal: Like if you mess a set of steps up or if you misunderstand something. Okay. I like the honesty. So, do you like mathematics?

Robert: Yes, sure. One of my favorite subjects.

Jamaal: Oh, okay. Nice. Why?

Robert: You find out a lot of interesting things with math that involve the real world. Same thing with science in but math, it's an everyday thing. Money. Mm. Buying something. You're in debt. Anything that involves math could be used.

Robert shares a flowing river of different emotions when he engages with mathematics, from feeling nervous, happy, sad, determined, curious, to courageous. Ultimately this leads to the point that he is interested in mathematics, and that it is one of his favorite subjects. *Robert's* awareness of all of these emotions in relation to his mathematics learning may allow him to understand the flexibility of interactions he may encounter. That is, by having the space to feel all of these emotions, he can make a more informed decision of whether he likes mathematics, if mathematics has a purpose, and if it is indeed important for his future possibilities.

Below, *Robert* shares how mathematics may connect to his future goals:

Jamaal: Can mathematics help you accomplish your goals in the future?

Robert: Yes, it very much can.

Jamaal: Okay. How so?

Robert: Like I said, you use it in real world. Um, you can make it far in life knowing a lot of things about math. Because in some states in life, if you don't, if you're not good at math, you won't make it as far and you don't wanna just give up cause your life could go downhill pretty quick.

Robert displays an understanding of the consequences of not doing well in mathematics. Assessments are heavily prioritized in schools, and although *Robert* does not explicitly mention testing, students are consistently reminded about the importance of doing well on standardized tests. However, even if it is a shallow or deep understanding, he recognizes that mathematics is used in real life, and that one has the opportunity to make it far if they know mathematics. These recognitions can allow one to understand their sociopolitical environments if explored more deeply.

CONNECTING RELATIONSHIPS AND FOREGROUNDS

Embracing the culture of the environment and developing an appreciation for it can positively influence the mathematical identities for students and possibly enrich their foregrounds, as it demonstrates validity of ability and potential. *Barbara* shares her love for her own environment and for her students, and how it influences her teaching practice:

Barbara: I went to an urban school district and I excelled just fine. And I feel like if students just have that consistency with all educators that they will excel just as well. And they have as much opportunity as any other student in any other district. When I worked at St Benedict's, I would always tell the students, it doesn't matter, cause we were right in the center of Newark, Martin Luther King Boulevard. I just, I fell in love with the city. I fell in love with the culture.

The teacher is connecting her background and identity with her current experiences and activities. She understands the importance of consistency and her

role in valuing the conditions and circumstances of the current environment. She continues to share a story of the importance of validating students' potential as she observes students doubting their own ability:

Barbara: I bump into students that I had, and I'm like, I'm sorry, I don't remember your name, but they're like, oh, I'm, I'm a physical therapist. You know, because they doubt themselves, you know, when they're in the city of Newark and they're, you know, walking to go to school, you know, they doubt themselves. Well, you know, 'I'm not in this district, so I can't do anything.' Well, you can. And I always tell students, 'I'm like, you always have to remind yourself that education is the most powerful weapon that you can have against the world.'

Barbara reminds her students of the importance of their education and acknowledges their doubts, what they are, and where they are coming from. During the moment she shares "You know, because they doubt themselves, you know, when they're in the city of Newark and they're, you know, walking to go to school, you know, they doubt themselves", she gives a gesture as if to imply that I know why they would doubt themselves walking around in the city of Newark because of the level of poverty that is evident, and there is such a low level of representation of individuals who are highly educated who have cultural or racial identities similar to their own.

The environment around the school where I coached can give students reason for doubt: surrounding streets littered with trash, impoverished and abandoned homes, alcohol and drug users on the sidewalks outside of the school after dismissal, and consistent actions of crime in the community. These are all common sights for students attending the school and may lead to depressed identities when it comes to academics, possibly depleting its importance for their respective foregrounds.

In this way, identities and foregrounds for community members can be influenced and changed, or they can be malnourished. In either scenario a change is occurring, and it can either be motivating to grow or become a hindrance to transformative change and new possibilities, resisting and blocking alternative ways of being. This depends upon the individual and their motives to learn based on their identity and their foreground.

The influences of the community on cultural identities can affect the motives and dispositions for the importance of learning mathematics. In a study conducted by Filho (2014), students are interviewed to understand how their purpose and motives are formed withing their foregrounds and learning of mathematics. Filho interviewed students from socially excluded backgrounds and asked them questions in regard to their reasons for learning mathematics. He determines that there is both an internalist and externalist nature for learning mathematics.

An internalist, meaning learning mathematics for the purposes of doing mathematics, such as in a strict academic way, and an externalist, meaning learning mathematics for the purposes of social context (such as political or cultural purposes), for example, in an ethnomathematical way. He also determines that it is possible to have thoughts of learning mathematics which are not pulled strongly toward either an internalist or externalist nature for learning mathematics.

From some of the responses and the conclusion of the study by Filho (2014), it appears that the purposes for one to learn mathematics are influenced by the environments in which they learn, and the backgrounds that contribute to the formation of their foregrounds and mathematics identities. Similar to the students in this study, they view learning mathematics as useful for varying purposes, which can be framed as internalist, externalist, or passivist. In this sense, I do not refer to a passivist as unable to respond or act; there is a full ability to act, and they recognize that there is a purpose to learning, but it may not be necessarily strong for them. This motive to learn may only be in relation to the science of mathematics and the ways in which is presented.

In the case of *Isabella*, she does not see the purpose in learning mathematics for her future. Based on the framework raised by Filho, one could view *Isabella* to have an internalist view of mathematics, and one can perceive that she has a type of passivist view of mathematics. In contrast, one may view a student like *Robert* to lean more toward an externalist type of student who connects their emotions and understanding of the real-world application of mathematics. He may not be fully aware of how just yet but recognizes that there are connections.

MY EXPERIENCES AND FOREGROUNDS

From the time I was in 5th grade, I realized that I had a talent for teaching; in particular, I enjoyed guiding others through mathematics. One reason I became a teacher was to aid other students who looked like me to master mathematics and avoid the fear and evasion that is often associated with learning and doing mathematics.

I was often viewed as being “smart” because I knew the steps, procedures, rules, and concepts of how operations and relationships worked between numbers. I always wondered to myself why others didn’t feel that same confidence in themselves to do well in mathematics. Through my journey in this research, I now notice that many, if not all, have a mastery of mathematics in their own way. Perhaps it does not always align with the mathematics that is communicated in a typical school curriculum.

Academic materials have a great influence on how students come to engage with mathematics and develop their own meanings for its purpose. During the analysis of the study, conversations with the participants and other researchers, I have also noticed that learning must be safe to take place in all spaces. The connections that are possible between formal academic and sociocultural environments allows for profound opportunities for thought, and greater chances that students will discover valuable meaning in mathematics and other subject areas.

Developing an awareness of students’ surroundings and their remarks about these surroundings allows educators and community members to understand the learning motives and possible future aspirations that students formulate.

The experiences I had in my learning differed from others in my schools. Although I attended the same school as many in my community, my experiences also contrasted from others in my community. My education stemmed from my experiences at home, my mother prioritized education. She would preach it, have me practice at home and in libraries, enroll in summer programs, and supplemental academic activities. She encouraged activities after school and over the weekend. This allowed me to learn different perspectives. I spent time outside with people from various backgrounds. Similar to *Omar*, there were many in my neighborhood who were also “wildin out”. And, like *Omar*, I learned from those experiences that I had dreams of doing more.

Although, during my youth, I learned my community culture and developed relationships in my environment, this helped me in my success as well. There are countless lessons that I learned in my community which helped me relate to mathematics - for example, thinking about statistics or angles through the perspective of playing football, or percentages considering the amount of weight for exercises at the gym. Experiences such as connecting my interests to my mathematics learning led to mastery of mathematics in academic spaces and a comfort with the formal language and practice of mathematics, because I could connect to my outside world. This was not intentionally done by my teachers (at least not many of them). But these are actions that can be taken for future Black students. However, one limitation is that it did not necessarily open my mind to the deep interconnected workings of mathematics in everyday possibilities, such as algorithms used for automated devices or programs, particularly in ways where mathematics could be applied to my daily activities and learning to contribute to my collective identities (Lave, 2019), or my foreground construction.

Mathematics has a sole purpose in schools and formal locations: it continues to be this entity that appears to be separated from many people and can only be accessed by few. The connections that learners and educators make with mathematics culturally, socio-politically, and personally may allow us to create better learning opportunities for Black students and many others, if we allow these connections to exist.

REFERÊNCIAS

Alrø, H., Skovsmose, O., & Valero, P. (2008). Inter-Viewing Foregrounds: Students' Motives for Learning in a Multicultural Setting. In *Social Interactions in Multicultural Settings* (pp. 13-37). https://doi.org/10.1163/9789087907174_003

Carter, P. L. (2022). Systemic Racism in Education Requires Multidimensional Solutions. In *Systemic Racism in America: Sociological Theory, Education Inequality, and Social Change*. Routledge. https://doi.org/10.4324/9781003225324-8

Census, U. (2022). *QuickFacts Newark city, New Jersey; United States*. https://www.census.gov/quickfacts/fact/table/newarkcitynewjersey,US/PST045222

Davis, J. (2022). Centering Race, Racism, and Black Learners in Mathematics Education: A Critical Race Theory Perspective. In *The Palgrave Handbook on Critical Theories of Education* (pp. 481-496). Springer International Publishing. https://doi.org/10.1007/978-3-030-86343-2_27

Davis, J., & Martin, D. B. (2018). Racism, Assessment, and Instructional Practices: Implications for Mathematics Teachers of African American Students. *Journal of Urban Mathematics Education*. http://education.gsu.edu/JUME

Division of Health, M. P., and Global Affairs, and Engineering Roundtable on Black Men and Black Women in Science. (2023). *Pscychological Factors that Contribute to the Dearth of Black Students in Science, Engineering, and Medicine*. National Academies Press.

Filho, D. B. (2014). Foregroundse Matemática: você tem fome de quê? *Perspectivas da Educação Matemática*, *7*.

Gholson, M. L., & Wilkes, C. E. (2017). (Mis)Taken Identities: Reclaiming Identities of the "Collective Black" in MathematicsEducation Research Through an Exercise in Black Specificity. *Review of Research in Education*, *41*(Disrupting Inequality Through Education). https://www.jstor.org/stable/44668694

Gonzalez, L., Chapman, S., & Battle, J. (2020). Mathematics identity and achievement among Black students. *School Science and Mathematics Association*, *120*, 456-466. https://doi.org/10.1111/ssm.12436

Hahn, J. W. (2014). *Community Perceptions of Newark: Neighborhood Quality of Life, Safety, and the Justice System*.

Hall, S. (1995). Negotiating Caribbean Identities. *New Left Review*, *209*, 3-14.

Iseke-Barnes, J. M. (2000). Ethnomathematics and Language in Decolonizing Mathematics. *Race, Gender & Class*, *7*(Race, Gender & Class in Education). https://www.jstor.org/stable/41674951

Lave, J. (2019). *Learning and Everyday Life: Access, Participation, and Changing Practice* (1st ed.). Cambridge University Press.

Lerman, S. (2001). A Cultural/Discursive Psychology for Mathematics Teaching and Learning. In *Sociocultural Research on Mathematics Education* (pp. 31-46). Routledge. https://doi.org/10.4324/9781410600042-7

Martin, D. B. (2009a). Does Race Matter? *Teaching Children Mathematics*, *16*(3), 134-139. http://www.jstor.org/stable/41199394

Martin, D. B. (2009b). Liberating the Production of Knowledge About African American Children and Mathematics. In D. B. Martin (Ed.), *Mathematics Teaching Learning*

and Liberation in the Lives of Black Children (pp. 3-36). https://doi.org/10.4324/9780203877708

Martin, D. B. (2012). Learning mathematics while Black. *Educational Foundations 26*, 47-66.

Matthews, J. S. (2018). When Am I Ever Going to Use This in the Real World? Cognitive Flexibility and Urban Adolescents' Negotiation of theValue of Mathematics. *Journal of Education Psychology*, *110*(5), 726-746. https://doi.org/https://doi.org/10.1037/edu0000242

Morel, D., Rodriguez, A. D., Sidney, M., Garay, N. B., & Straub, A. (2021). Measuring and Explaining Stalled Gentrification in Newark, New Jersey: The Role of Racial Politics. *Urban Affairs Review*, *58*, 1585-1621. https://doi.org/https://doi.org/10.1177/10780874211046340

Neal, M., Goodman, L., & Young, C. (2020). Why It's So Hard to Own a Home in Newark, New Jersey. *Urban Wire*. https://www.urban.org/urban-wire/why-its-so-hard-own-home-newark-new-jersey#:~:text=Newark's%2024%20percent%20homeownership%20rate,the%20majority%20of%20Newark's%20population.

Newman, K. (2004). Newark, Decline and Avoidance, Renaissance and Desire: From Disinvestment to Reinvestment. *The ANNALS of the American Academy of Political and Social Science*, *594*(4).

Poole, A. (2010). Identity of meaning. In G. L.-G. Walker, E. S. (Ed.), *Identity*. Cambridge University Press.

Roisman, F. W. (1995). Intentional Racial Discrimination and Segregation by the Federal Government as a Principal Cause of Concentrated Poverty: A Response to Schill and Wachter. *University of Pennsylvania Law Review*, *143*, 1351-1378. https://doi.org/10.2307/3312479

Skovsmose, O. (2012). Students' Foregrounds: Hope, Despair, Uncertainty. *Pythagoras*, *33*(2), 8. https://doi.org/10.4102/pythagoras.v33i2.162

Skovsmose, O. (2014). *Foregrounds: Opaque Stories About Learning* (1st ed.). Sense Publishers. https://doi.org/10.1007/978-94-6209-653-0

Skovsmose, O. (2018). Students' Foregrounds and Politics of Meaning in Mathematics Education. In P. Ernest (Ed.), *The Philosophy of Mathematics Education Today*. Springer International Publishing. https://doi.org/https://doi.org/10.1007/978-3-319-77760-3

Skovsmose, O. (2023). *Critical Mathematics Education* (First edition ed.). Springer. https://doi.org/https://doi.org/10.1007/978-3-031-26242-5

Skovsmose, O., Scandiuzzi, P. P., Valero, P., & Alrø, H. (2018). Learning Mathematics in a Borderland Position: Students' Foregrounds and Intentionality in a Brazilian Favela. *Journal of Urban Mathematics Education*, *11*(1), 78-102.

Sonnenschein, S., & Galindo, C. (2015). Race/Ethnicity and Early Mathematics Skills: Relations Between Home, Classroom, and Mathematics Achievement. *The Journal of Educational Research*, *108*. https://doi.org/https://doi.org/10.1080/00220671.2014.880394

Thain, E. (2024). What is Poverty? In *Reimagining Poverty through Social Contextual Analyses* (1st ed., pp. 11-32). Routledge. https://doi.org/10.4324/9781003453970-2

Valero, P. (2015). Re-interpreting Students' Interest in Mathematics: Youth Culture and Subjectivity. *Educational Paths to Mathematics*. https://doi.org/10.1007/978-3-319-15410-7_2

Valoyes-Chávez, L., & Martin, D. B. (2016). Exploring Racism Inside and Outside the Mathematics Classroom in Two Different Contexts: Colombia and USA. *Intercultural Education*. https://doi.org/10.1080/14675986.2015.1106135

Varelas, M., Martin, D. B., & Kane, J. M. (2012). Content Learning and Identity Construction: A Framework to Strengthen African American Students' Mathematics and Science Learning in Urban Elementary Schools. *Human Development*, *55*. https://doi.org/10.1159/000345324