



Secondary School Learners' Views on STEM Teachers' Non Verbal Communication that Inspires Them to Participate in STEM Subjects

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Abstract: Science, Technology, Engineering and Mathematics (STEM) play a critical role in a country's socio-economic development. Therefore, it is important for learners to excel in these subjects since they are prerequisites for admission to STEM courses in higher education institutions. This will provide the much needed workforce to drive a country's socio-economic development. However, statistics indicate that fewer learners enrol for these courses with an even fewer number graduating from the institutions. This could be attributed to inappropriate STEM teachers' nonverbal communication that does not inspire learners to participate in the subjects. Hence, this study sought to find out secondary school learners' views of their STEM teachers nonverbal communication that inspires them to participate in STEM subjects. Stratified simple random sampling technique was used to select a sample of 466 form three learners from Nakuru County, Kenya. A secondary school learner's questionnaire, which was validated by experts in Curriculum and Education Psychology was used to collect data. Data was analysed by categorising the responses into themes, which were then tallied and expressed as percentages. The findings indicated that learners' view STEM teachers' nonverbal communication as influencing their participation in STEM subjects. It is therefore, recommended that STEM teacher education programmes mainstream nonverbal communication in their training and that the Teacher Service Commission should provide clear guidelines, monitor and enforce teachers' nonverbal communication.

Keywords: Learners' Views, STEM Subjects, STEM Teachers, Teachers' Behaviour, Teachers' Dressing and Grooming.

How to cite this work (APA):

Barmao, A. C. & Ndeke, G. C. W. Secondary School Learners' Views on STEM Teachers' Non Verbal Communication that Inspires Them to Participate in STEM Subjects. *Journal of Research Innovation and Implications in Education*, 6(3), 209 – 220.

1. Introduction

Science, Technology, Engineering and Mathematics (STEM) play pivotal roles in a country's socio-economic development. This is evident in the education sector of the so called "Economic Tigers" Asian countries. According to Jack (2018), Singapore, Korea and China have consistently produced some of the top scores as measured by international assessments such as Programme for International Student Assessment (PISA), which tests 15-year-olds in Mathematics, Science and Reading. These good results have enabled their learners to enrol in STEM courses in higher education institutions (HEIs), hence availing the requisite manpower for the countries' technological development. According to vision 2030 blue print,

Kenya hopes to become industrialized by the year 2030 (Government of Kenya [GOK], 2007) and hence needs to equip its learners with the necessary knowledge, skills and attitudes to achieve this milestone.

The Basic education curriculum in Kenya lays the foundation for STEM courses at HEIs by ensuring that Science and Mathematics subjects are taught to all learners at all levels. These subjects include; Mathematics, Biology, Chemistry and Physics. In secondary school, these subjects prepare learners to enter into STEM related careers, which drives a country's socio-economic development. However, in Kenya, evidence available indicates low numbers of students transitioning from secondary education with the qualifications required for enrolment in STEM

programmes (Kenya-Nessp-2018-2022.Pdf, n.d.). This assertion is further supported by Mutisya (2017), who notes that only 25% of undergraduates study a course in STEM, with only 20 % graduating from both public and private universities in Kenya between 2012 and 2015. Feed the Future Kenya Activity Provides Grants to Young Women to Expand STEM Studies (2020), point out that in the recent past, student numbers pursuing STEM in Kenya HEI is declining, leading to fewer students enrolling in them. Due to the critical role that STEM plays in socio-economic development, Kenya needs to invest more in STEM subjects if it is to realize its 2030 vision of transforming herself into an industrialized middle-income country.

The lack of requisite qualifications by secondary school graduates to enrol in STEM courses in HEIs can be attributed to students' attitude towards science, lack of interest and lack of a good foundation in science, leading to poor performance (Martinez-Hernandez et al., 2015). This could be an indicator of lack of good role modelling for learners by STEM teachers. According to Merriam-Webster (n.d.) dictionary, a role model is a person whose behaviour in a particular role is imitated by others, while *Role Model* (n.d.) defines a role model as a person who someone admires and whose behaviour they try to copy. The role of STEM teachers as role models is indispensable, whether teachers like it or not, since they are the main influential adults in students' lives (ClarendonLearning, 2016). Good role modelling motivates learners to imitate or want to be like their teachers. According to Bandura (2008) and Dasgupta (2014), students' motivation is the element that leads students' attitude towards deciding their career goal. Therefore, the way a teacher acts in class, dresses and grooms, all which are aspects of nonverbal communication can entice learners, hence creating a positive attitude in them towards the subject. This would make learners want to imitate and become like their teachers. However, teachers tend to concentrate more on the verbal aspects of communication overlooking the critical role of nonverbal communication in stimulating learners' interest in the subject. Guerrero and Floyd (2006) and Muchemwa (2013) further point out the importance of teachers' nonverbal communication by arguing that more meaning is generated from it and that it is one of the tools that is key in teaching, instruction and classroom management. Hence, this study sought to explore secondary school learners' views on their STEM teachers' nonverbal communication that inspires them to participate in STEM subjects that are prerequisites to STEM courses in HEIs.

1.1 Objectives of the Study

The study was guided by the following objectives

- i. To investigate secondary school learners' STEM subject taught by their favourite teacher.
- ii. To find out secondary school learners' favourite STEM teachers' nonverbal traits that inspires them to participate in STEM subjects.

- iii. To find out secondary school learners' least favourite STEM teachers' nonverbal traits that does not inspire them to participate in STEM subjects.
- iv. To investigate secondary school learners' views on Nonverbal communication that STEM teachers should adhere to in order to inspire them to participate in STEM subjects

2. Literature Review

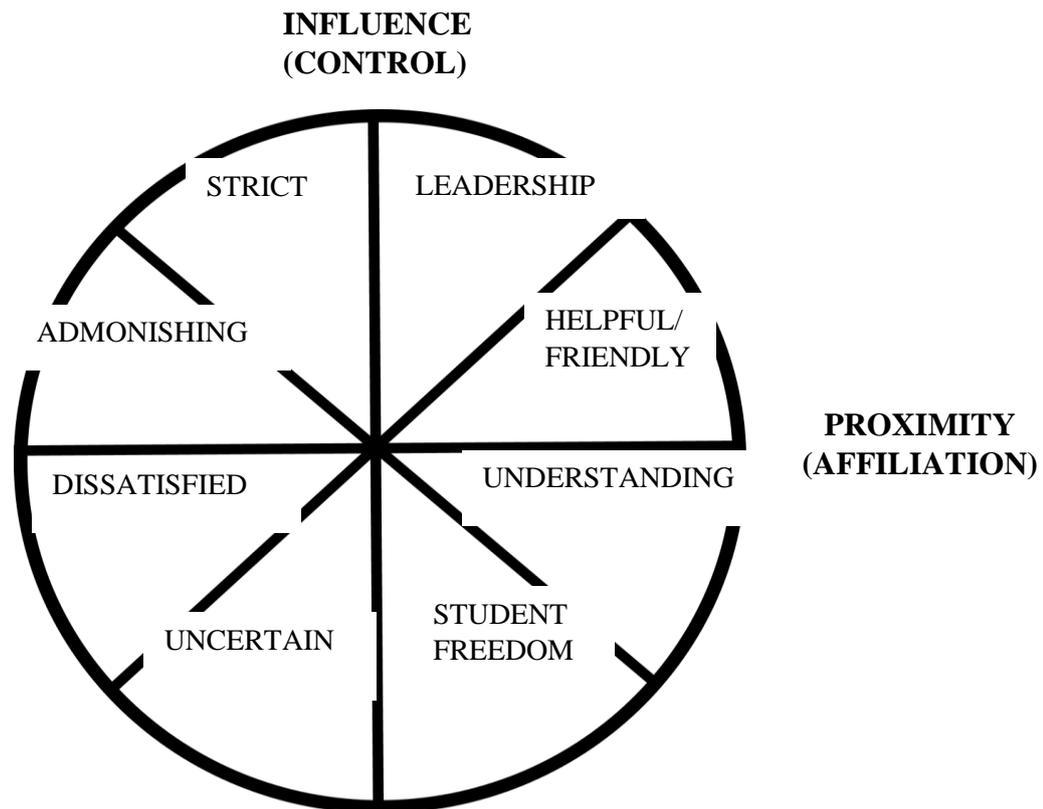
2.1 Conceptual Definition of Nonverbal Communication

According to the American Psychological Association (n.d.), nonverbal communication is the act of relaying information without the use of words. This occurs through facial expressions, gestures, body language, and tone of voice. Further Tijana, et al. (2014) and A primer on communication studies (2012) add that clothing and physical appearance such as grooming are aspects of nonverbal communication. Chaudhry and Arif (2012) points out that 75 to 90% of messages are transmitted nonverbally yet nonverbal aspects of teaching are ignored. These nonverbal aspects of teaching have been found to be more effective than verbal communication and can convey meaning better than words (Bambeeroo & Shokrpour, 2017). In this study, nonverbal communication referred to STEM teachers' behaviour, dressing and grooming.

2.2 Learners' View of Their Teachers' Non Verbal Communication

Carr et al. (2009), argue that what teachers do and how they act may be as significant as lessons discussed in the classroom. The authors further argue that students' judgment of the course and its instructor is influenced by teachers' behaviour. According to den Brok et al. (2010), students with caring and supporting interpersonal relationship with their teachers reported more positive academic attitudes. Good and Brophy (2000) argue that an ideal classroom starts with creating a supportive climate in which students feel free in asking questions and contributing to lessons without fear of embarrassment or ridicule. When learners perceive that their teachers show interest in them, they are friendly, considerate, able to make a joke, inspire confidence and trust, then a positive attitude develops towards the subject (Brekelmans et al., 1990). It is important for teachers to be mindful of their words and actions while in and out of school (ClarendonLearning, 2016), since they are on display to learners every day (Ivery, 2019).

According to Wubbels et al. (2012), teachers' interpersonal behaviours are described along two dimensions, control and affiliation, also referred to as influence and proximity, respectively as shown in Figure 1.



Note. Adopted from Wubbels et al. (2012).

Figure 1: Model for Interpersonal Teacher Behaviour

The influence (control) dimension encompasses behaviour that reflects the degree to which teachers exercise control over their learners while the proximity (affiliation) dimension encompasses behaviour that represents cooperation between teachers and students. Influence behaviours include reprimanding, enforcing, dissatisfied and uncertain. Proximity behaviours include steering, friendly, understanding and accommodating. These dimensions are interdependent in that a teacher can be high in both dimensions, high in one and low in the other or low in both. For example, a teacher who is moderately high in influence dimension and high in proximity is considered friendly. Teachers who are friendly and understanding were found to relate positively to students cognitive outcomes (Schofield, 2013). Proximity style is beneficial for all students irrespective of subject matter.

Brekelman's et al. (2002) and den Brok et al. (2004) point out that teacher interpersonal behaviour is a major element of classroom management. According to them, healthy teacher-student interpersonal relationships are indispensable for engaging students in learning activities which leads to higher student cognitive outcomes and motivation in all subject areas. Further, den Brok et al. has identified pleasure/ enjoyment, relevance, confidence and effort as elements of subject specific motivation. They recommend that all the

elements should be collectively taken into account by teachers as opposed to only focusing on relevance and ignoring all the other aspects. Studies have shown that proximity seems to be of greater importance for student motivation than teacher influence (Brekelman's et al. 1990; den Brok et al.2005). However, they recommend high amounts of proximity and limited amounts of dissatisfied and correcting behaviours as important in strengthening students' motivation and in turn learners' cognitive outcomes.

How teachers look and wear has communicative power (Carr et al., 2009). Studies show that instructors who dress professionally are perceived by learners as being competent, believable, qualified and knowledgeable (Carr et al.; Morris, et al., 1998 & Saiki, 2006). This indicates the critical role of STEM teachers' attire in creating learners interest in subjects they teach. This leads to development of positive attitudes in such subjects, thereby improving their performance, enabling them to pursue STEM courses in HEIs. Carr et al., argue that students are more likely to favourably evaluate the course and its instructor if the instructor is professionally dressed. This is further supported by Sampson (2016), in a study done in a rural Georgia School, which found that local teachers perceived that their professional attire had a positive influence on students' learning and behaviour and that students

appear to model teachers who are professionally attired. According to Smith and Larry (2015), grooming and dressing contributed to effective delivery of information to an audience. This goes to show why teachers should be aware of the influence that their dressing and grooming has on learners' motivation and attitude towards the subject. This is especially critical for secondary school learners who, being in their adolescent stage, struggle to find their identity and confidence, and can be easily distracted by unprofessionally dressed teachers (Sanjiyan-Barg, 2009). This later influences their performance in the subject, which affects their career choices. The nonverbal communication aspects that the study focussed on were dressing, grooming and behaviours in class.

From the forgoing discussion, it is evident that STEM teachers need to be aware that what they say, do and how they dress has an influence on their learners' interest in the subject. This interest motivates them to learn and perform better in the subject. This implies that teachers should be good role models to their learners so as to motivate them to participate in STEM subjects and therefore pursue courses in STEM in HEIs. According to (Nugent et al., 2015), science teachers are in a unique position to promote learners' interest in STEM by impacting their attitudes. They argue that, this can improve their performance and hence qualify to further their education in STEM courses. This study sought to investigate secondary school learners' views of their STEM teachers' nonverbal communication. Further, the study investigated the influence of these views on their aspirations to pursue STEM courses in HEIs.

3. Methodology

3.1 Research Design

The study employed descriptive cross sectional survey research design. According to Kothari (2003), descriptive research is used to obtain pertinent information concerning the status of a phenomenon and draw valid conclusions. The cross sectional survey design was appropriate because it allows for a lot of information to be collected within a relatively short time and at one point in time from a random sample that represents a given population at a particular time (Gall, Gall & Borg, 2007; Wiersma & Jurs, 2005).

3.2 Sample Size and Sampling Technique

The target population for the study was public secondary school learners while the accessible population was made up of Form three learners from East and West Sub Counties of Nakuru County, Kenya. This is because, at Form three level, learners have selected at least two sciences subjects as per the curriculum requirements. Cochran (1977), recommends a sample size of 384 for a survey where the population is large and at 95%

confidence level and 5% margin error. However, Goodrich & St. Pierre (1979) recommends an increment of 20% of the sample size to take care of attrition and non-response. The sample size was therefore increased by 82 giving a total of 466. The accessible population was stratified based on gender. Thereafter, simple random sampling technique was employed to select 221 female and 245 male form three learners.

3.3 Instrumentation

Data was collected using the Secondary School Students Questionnaire (SSSQ). The Questionnaire was validated for content by 5 experts in science education and psychology from Egerton University. The instrument was then piloted in two secondary schools in the neighbouring Njoro Sub County in order to improve the clarity of the items. Self-administration of the questionnaire to the sampled learners was done to ensure a higher return rate.

3.4 Data Analysis

The questionnaire had four open ended items. The items were preferred so as to solicit in-depth information from learners about how their STEM teachers' behaviours in class, dressing and grooming were likely to influence their aspirations to participate in STEM subjects so as to perform and qualify for STEM courses at HEIs. Learners provided more than one response for each item. The responses were coded and categorized into two themes, teachers' behaviour and dressing/grooming in class. Under each theme, there were several sub themes which were tallied and expressed as a percentage of the total sample. To increase the reliability of the results, the researchers first coded independently of each other and thereafter compared their outcomes. Where there was lack of agreement, discussions were held and a consensus arrived at.

3.5 Ethical Considerations

Ethical considerations were taken into account by seeking consent from the respondents and explaining to them the purpose of the research prior to data collection. The respondents were also assured of confidentiality of the information that they would provide. They were also not required to identify themselves for anonymity purposes. Finally, respondents were assured that the information provided would only be used for the purpose of the research.

4. Results and Discussion

The first objective was to investigate secondary school learners' STEM subject which is taught by their favourite teacher. Learners were asked to indicate the subject that their favourite teacher teaches. Only 448 learners responded to the item. The results are summarized in Table 1.

Table 1: Subject Taught by Most Favourite Teacher (N = 448)

Subject	Frequency	Percentage
Biology	181	40.4
Chemistry	160	35.7
Mathematics	11	2.5
Physics	96	21.4

The results indicate that a majority of secondary school learners felt that the subject taught by their favourite teacher is Biology, while Mathematics is the subject taught by their least favourite teacher. This could be attributed to Mathematics teachers' failure to sufficiently motivate learners to develop interest in the subject. This could perhaps explain the general poor performance of a majority of learners in Mathematics.

The second objective was to find out secondary school learners' favourite STEM teacher nonverbal traits that

inspires them to participate in STEM subjects. Learners were probed further to indicate the behaviours, dressing and grooming of their favourite STEM teacher, that they liked most and may inspire them to participate in STEM subjects so as to pursue STEM courses in HEIs. Learners' responses were categorized under two main themes, the teacher's behaviour in class and dressing and grooming. 466 learners responded to the item. The results are summarized in Table 2.

Table 2: Behaviour, Dressing and Grooming that Learners Like Most about their Favourite STEM Teacher (N = 466)

Scale	Behaviour	Frequency	Percentage
	Friendly/cheerful/jovial	107	23.0
	Honest	86	18.5
	Punctual/time conscious	59	12.7
	Dedicated to work	52	11.2
	Funny/jokes	34	7.3
	Treats students well/humane	30	6.4
	Disciplined/well behaved	25	5.5
	Encourages/motivates/inspires	24	5.2
	Understanding/patient	19	4.1
	Supportive/caring/ready to help	13	2.8
	Humble/kind/polite	13	2.8
	Organized	5	1.1
	Confident	4	0.9
Dressing/grooming	Clean/neat	65	14.0
	Groomed (hair, nails, beard, perfume, polished shoes)	59	12.7
	Dresses formally (office attire, suits)	54	11.6
	Decent dressing (cloth not tight/short)	48	10.3
	Smart (clothes fits well)	41	8.8
	Wears pressed clothes	39	8.4
	Matches clothes (attire, shoes, ties)	27	5.8
	Puts on clothes with scientific text/graphics	9	1.9

The results in Table 2 indicate that learners liked most the following behaviours from their favourite STEM teacher; friendly/cheerful/jovial (23 %), honest (18.5 %) and punctual/time conscious (12.7 %). However, fewer learners identified being organized (5 %) and confident (4 %) as likeable teacher traits that are likely to encourage them participate in STEM subjects.

In terms of dressing and grooming, a majority of the learners identified being clean/neat (14%), well-groomed hair, nails, beard, and polished shoes(12.7%) and dressing formally in office attire and suits(11.6%) as the most likeable traits. A lower percentage of learners identified matching of clothes with shoes and

ties (5.8%) and putting on clothes with scientific text/graphics (1.9%) as likeable traits that inspire them participate in STEM subjects.

The third objective of the study was to find out secondary school learners' least favourite STEM teacher nonverbal traits that discourages them from participating in STEM subjects. Learners were asked to indicate the behaviours, dressing and grooming of their least preferred STEM teacher that may discourage them from participating in STEM subjects. Learners' responses were categorized under two main themes, the teacher's behaviour in class, dressing and grooming. The results are summarized in Table 3.

Table 3: Behaviour, Dressing and Grooming that Learners Disliked Most about their Least Favourite STEM Teacher (N = 466)

Scale	Dislike	Frequency	Percentage
Behaviour	Too serious/never jokes	63	13.52
	Mistreats learners (abusive, disrespectful, discriminative, unfair ,Intimidating)	40	8.59
	Not dedicated to duty /Not always punctual/ irregular class attendance	38	8.15
	Looks confused	28	6.01
	Unfriendly	26	5.58
	Harsh/rude/rough/hot tempered	25	5.36
	Never serious/a joker	15	3.22
	Does not care/appreciate/understand	13	2.79
	A drunkard	12	2.58
	Always sad/gloomy	11	2.36
Dressing and grooming	Ill-fitting clothes (short, tight, oversize)	65	13.95
	Wears wrinkled clothes	13	2.79
	Inappropriate dressing (jeans, sandals, heals)	12	2.58
	Not smart/sloppy/shaggy	12	2.58
	Smells alcohol/substances	10	2.15
	Heavy make-ups/strong perfumes	8	1.72
	Unclean/dirty clothes	7	1.50
	Unkempt hair/nails/beard/shoes not shined	6	1.29
	Does not put on lab coat	6	1.29

The results in Table 3 indicate that most learners identified being too serious/never jokes (13.52%), mistreats learners by being abusive, disrespectful, discriminative, intimidating and unfair (8.59%) and not dedicated to duty /not always punctual/ irregular class attendance (8.15%) as the least preferred teacher behaviours in class. Those that were identified by fewer learners as least preferred teacher classroom behaviours include being a drunkard (2.58%) and always sad/gloomy (2.36%).

On the aspect of dressing and grooming, a majority of learners identified wearing ill-fitting clothes that are short, tight, or oversize (13.95%), wrinkled clothes (2.79%) and jeans, sandals, heals (2.58%), as the least

preferred aspects. Fewer learners identified the aspects of unkempt hair/nails/beard/shoes and not putting on lab coat (1.29%) as the least preferred.

The fourth objective of the study was to investigate secondary school learners' views on behaviours, dressing and grooming STEM teachers should adhere to in order to inspire them to participate in STEM subjects so as to pursue STEM courses in HEIs. Learners were asked to suggest at least three (3) behaviours, dressing and grooming that STEM teachers should adhere to in order to inspire them to participate in STEM subjects. Learners' responses were categorized under two main themes, the teacher's behaviour in class, dressing and grooming. The results are summarized in Table 4.

Table 4: Learners' Views on STEM Teachers' Non Verbal Communication that would inspire them to Participate STEM Subjects. (n = 466)

Scale	Suggestion	Frequency	Percentage
Behaviour	Be friendly to learners/ Caring (kind, loving, humble)	99	21.3
	Punctual/regular class attendance	49	10.5
	Dedicated/committed to teaching	43	9.2
	Be honest	42	9.0
	Encourage/motivate/inspire learners	36	7.7
	Treat students well (respectful, humane, equitably)	35	7.5
	Be happy (jovial occasional jokes)	24	5.2
	Patient/understanding	13	2.8
	Be disciplined (behave decently)	10	2.2
	Keep off alcohol/drugs/substances	6	1.3
Dressing/grooming	Neat/clean	72	15.5
	Dress decently (appropriate, formal, not tight/short)	67	14.4
	Keep hair/beard/nails well (groomed)	47	10.1
	Match clothes (smart/stylish)	31	6.7
	Wear protective gear/lab coats)	28	6.0
	Iron/press clothes	15	3.2
	Avoid heavy make-ups/strong perfumes	7	1.5

The results from Table 4 indicate that learners gave more suggestions on teacher behaviour (76.7%) as compared to dressing and grooming (57.4%). This shows that learners viewed teachers' behaviour in class as key in inspiring them to participate in STEM subjects. A majority of learners identified being friendly and caring by being kind, loving and humble (21.3%), being punctual and regularly attending class (10.5%) and being dedicated and committed to teaching (9.2%) as teacher behaviours that influence their aspirations. Fewer learners identified being patient and understanding (2.8%), being disciplined (2.2 %) and keeping off alcohol, drugs and other substances (1.3 %) as teacher behaviours that influences them.

On the aspect of dressing and grooming, most learners viewed being neat and clean (15.5 %), dressing appropriately in formal and not in tight or short clothes (14.4%) and keeping well-groomed hair, beard and nails (10.1%) as influencing their aspirations. However, fewer learners viewed wearing of ironed and pressed clothes (3.2%) and avoiding the use of heavy make-ups and strong perfumes (1.5%) as influencing their participation in STEM subjects.

Discussion

The results in Table 1 indicate that a majority of secondary school learners felt that Biology is the subject taught by their favourite teacher, while their least favourite teacher teaches Mathematics. These findings concur with those of Gafoor and Kurukkan (2015), in a study titled 'Why High School Students Feel Mathematics Difficult? An Exploration of Affective Beliefs. They found out that 88% of students hated the

subject as compared to only 6% who liked it. This was attributed to teacher and instructional related factors. Studies by Acharya (2017) ; Arenillo and Cruzado (2014) found out that learners viewed mathematics as difficult. Yeh et al. (2019) points out to the existence of a significant percentage of low-achieving students in mathematics in Taiwan. This tends to indicate that learners could be having negative attitudes towards the teacher and the subject creating low interest. This is attributed to the anxiety learners have towards the subject due to teacher discouragement. This makes them afraid of the subject and of the teacher as well. Perhaps this explains why students rank mathematics as the subject taught by their least favourite teacher. This could be one of the contributing factors that may explain the consistent poor performance of learners in national examinations in the subject. Mohamed & Tarmizi (2010); Tsegaw, et al. (2021), note that teachers play a critical role in reducing anxiety towards mathematics among learners.

Further, learners provided their views on their favourite and least favourite STEM teacher behaviour traits that influences them to participate in STEM subjects and hence pursue related courses in HEIs. The results in Table 2 show that the behaviour that learners liked most about their favourite teacher was being friendly/cheerful/jovial, honest, punctual and dedicated to work. However, the least liked trait of this teacher was being polite, organized and confident. In comparison, as indicated in Table 3, most learners identified being too serious/never cracks a joke, disrespectful and not dedicated to work as behaviour traits of their least preferred teacher. Fewer learners identified the traits of not being appreciative of them, drunkard, always sad

and gloomy as behaviour traits of their least preferred teacher.

The findings are in agreement with those of a study done by Gedamu and Shure (2015) on the Association between English as a Foreign Language (EFL) Teachers' Interpersonal Behaviour and Students' Achievement in English Language among selected Secondary Schools in Focus in Ethiopia. Their findings showed strong and significant correlation between learners' perception of their teachers' understanding and leadership with learners' achievement in EFL, with understanding being higher. According to Wubbels et al. (1993), teachers with leadership behaviours notice what's happening in class, lead, organize and give orders. Further, they determine procedure and structure in classroom situations, explain and hold learners attention. They also point out that teachers with understanding behaviours show confidence and are open with students. They further argue that as such teachers interact with their learners, they listen with interest, empathize, accept apologies, look for ways to settle differences and are patient. A study by Beshir (1998), on Teacher Interpersonal behaviour, classroom environment and student Outcomes in Primary Mathematics in Singapore also found similar results. Their findings showed that students taught by teachers exhibiting behaviours in leadership, helpful/friendly and understanding had better achievement and attitudes than those taught by those exhibiting uncertain behaviour and those showing more cohesion and less friction. Teachers who are friendly and understanding were found to relate positively to students cognitive outcomes (Schofield, 2013). This argument confirms learners' views on the teachers' behaviour traits that would encourage them to pursue STEM related courses in HEIs as indicated in Table 4.

Table 2 results show the favourite STEM teacher dressing and grooming traits that inspires learners to participate in STEM subjects. The traits include; being clean and neat, well-groomed and dressing neatly and formally. Learners further identified putting on ill-fitting, wrinkled and inappropriate clothes as traits that do not inspire them to participate in the subjects as indicated in Table 3. These findings are in agreement with their suggestions in Table 4. Ivery (2019) asserts that due to the influential nature of teachers on their learners, their choice of attire can inspire their students to appreciate learning. This creates interest and positive attitudes towards the teacher and the subject leading to improved performance (Carr et al., 2009). Further, this may lead to learners having interest to pursue STEM related courses in HEIs.

Studies have shown that professionally dressed teachers are perceived as reliable sources of information, command respect and authority among their learners (Borba, 2006; Raviv et al., 2003; Saiki, 2006; Wong & Wong, 2005). In addition, Kashem (2019) found that teachers' dressing had a significant effect on both students' attitude and learning. A study by Joseph (2017) found that learners' viewed professionally attired teachers as more competent to teach. This enables the

teacher to focus more on teaching and other activities that bring about academic success rather than classroom management and behaviour (Sanjiyan-Barg, 2009). This in turn contributes to learners having interest and positive attitudes towards the teacher and the subject leading to better performance hence, qualifying for admission in to STEM courses in HEIs. On the other hand, if a teacher's attire is either highly casual or/and age-inappropriate, it may lead to loss of classroom authority and control (Butler & Roesel, 1989). This creates lack of interest, negative attitudes towards the teacher and subject, contributing to poor performance in the subject. Therefore, although a teacher is free to choose what to wear, it is important to consider that the attire sends a powerful message to the learners.

5. Conclusion and Recommendations

The findings indicate that a majority of learners identified Mathematics as the subject taught by their least favourite teacher. This has a lot of implications in view of the central role Mathematics plays in pursuit of STEM related courses in HEIs. Therefore, there is need to find out why this is so with a view of coming up with appropriate interventions that will increase learners interest in the subject. The findings also show that secondary school learners' views of their STEM teachers' nonverbal communication influences how they participate in STEM subjects. The findings show that certain STEM teachers' behaviours, dressing and grooming in the classroom, create learners' interest in the teacher and subject. This creates positive attitudes towards the subject hence better performance thereby, enabling them to pursue STEM courses in institutions of HEIs. STEM teachers need to be aware of the critical role that their classroom behaviour, dressing and grooming plays in learners' attitude towards them and the subject and hence their performance. Therefore, STEM teachers need to be good role models for their adolescent learners' to pursue STEM related courses since at this stage their career trajectories are crystallizing (Bandura et al., 2001).

In view of the above conclusions, science teacher education programme needs to put a lot of emphasis on the critical role of nonverbal communication in shaping learners' career aspirations especially in STEM related fields. The Teachers' Service Commission, which is the constitutionally mandated body to employ and regulate the teaching service in Kenya, should provide clear guidelines devoid of misinterpretations on teachers' behaviours, dressing and grooming which they should monitor and enforce.

Limitations and Recommendations for Further Study

The research relied on data from questionnaires which did not provide for in depth information on how STEM teachers' nonverbal communication influences learners' participation in STEM subjects and hence inspire them to pursue STEM courses in HEIs. Consequently, future studies of this nature should make use of data collection tools that provide opportunities to further probe the

respondents in order to explain how various aspects of STEM teacher nonverbal communication influences them.

Data Availability

The data used to support the findings of this study have not been made available because of confidentiality.

Conflicts of Interest

The authors declare that there no conflict of interest regarding the publication of this paper.

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