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Gendered Views of Science and Technology in the Performing Arts: Characterisation and Casting in the Kenya Schools Drama Festival Items

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Introduction

Kenya's education system has changed several times since independence. In the current education system, science is introduced to the students in upper primary school, and the students are exposed to scientific concepts ranging from physical to natural sciences. In secondary school, the students begin to study actual science subjects such as Chemistry, Physics and Biology. In their second or third year in secondary school, they make subject choices in readiness for the Kenya Certificate of Secondary Education (KCSE) examinations. Besides academic programmes, there are also co-curricular activities that the Ministry of Education regulates, including drama, music, athletics, ball games and various clubs and societies. These are available to all students. However, despite the availability of similar learning programmes and environments for girls and boys, girls do not perform as well as boys in science-oriented subjects as they progress from kindergarten, lower primary, upper primary school and on to secondary school. This is a global phenomenon and has had extensive coverage internationally. The explanations given have varied according to different research findings, but two main lines of enquiry have emerged: psychological and sociological (Kitetu 1998).

From observations made by teachers and parents alike, girls are usually interested in sciences when young. In kindergarten, they get involved in hands-on projects and draw pictures of themselves in an imagined future as doctors, archaeologists, ma-



rine biologists, etc. (Stueber 2002). But when the same girls are studied later in their schooling years, they are found to have lost interest in becoming scientists. The concern of researchers has been to finding out why this happens.

Girls' poor performance in the sciences at school results in women being under-represented in science and technology occupations (Eshiwani 1983; Duncan 1989; Alele-Williams 1987) and in differential participation of the sexes in science education (Erinosho 1994). Appraising girls' science status has therefore taken centre focus in feminism. It has been argued that girls need to excel in science subjects so that they can be part of mainstream development and also because science leads to technological advancement, which is essential in human resource development (Erinosho 1994). Recommendations have therefore been made to involve the curriculum in bringing about the desired changes:

Curriculum materials must be re-designed to ensure that they are relevant for boys and girls. At the same time, science teachers must be sensitized to treat girls and boys the same way in the classroom (Rathgeber 1995:185).

Here, the school has been identified as the vehicle for bringing about the desired change in the status of girls and women as a whole. However, although school systems are believed to be about cultural revolution and improving the social status of those who go through the systems, educational institutions have remained conservative and have shown little willingness to depart from patriarchal societal set-ups (Kelly and Nilhen 1982). This is basically because teachers and students often bring into the school the patriarchal values, attitudes and beliefs learned from their social experiences at home and in the community as a whole.

This paper's main argument is that if some of the factors that hinder girls' access to science and technology are social, and there are social activities in schools such as drama festivals, then those activities can play a role in enabling girls to change their perceptions of science and technology, provided girls are given an opportunity to participate actively in the roles that express the changed perceptions. These perceptions can manifest themselves through characters created by the scriptwriters. Thus, there is a need to design and provide means through which the girls can be encouraged to develop an interest in science through what they already like. In view of this, a study was designed whose objectives were:

- to establish scriptwriters' awareness of the science and technological notions in the performing arts items
- to assess the characterisation and casting criteria used by scriptwriters and directors
- to determine the gendered tendencies in characterisation and casting for the scientific and technological roles.

The study was partly quantitative and partly qualitative. Quantitative data was suitable because certain information required actual numbers. However, qualitative data was suitable because the subjects of study were required to explain issues. So, this gave the respondents an opportunity to freely express their thoughts, attitudes and

opinions. The responses were described and interpreted, and deductions were drawn. The expected responses included explanations of what was considered to be the greatest hindrance to providing equal opportunities to both girls and boys to take up science and technology roles in the drama items produced for the Kenya Schools drama festivals. The population included all the drama teachers in Kenya who are also scriptwriters and directors for the items usually presented by students during the annual schools drama festivals. A purposive sample from scriptwriters was obtained from the drama teachers attending the national workshop in August 2003. These represented all the eight provinces in Kenya. Two hundred drama trainers were invited, and 50 secondary school trainers participated in this study. The sample is summarized as follows:

- Female respondents were 9.5 percent, while 90.5 percent were male.
- The participants were from both single-sex and co-educational schools.
- They had all been involved in scripting for different periods as follows: 1 year and below—12 percent, 2-5 years—34 percent, 5 years and above—54 percent.
- The respondents had also participated in the festivals at various levels in different genres as summarised in Table 1 below.

Table 1: Percentage Distribution of Participation at Different Levels in the Four Genres

Level	Play	Dance	Verse	Narrative
Zonal	12%	6%	2%	2%
District	16%	4%	16%	10%
Provincial	24%	16%	22%	26%
National	24%	16%	26%	18%
Non-Participant	24%	58%	34%	44%

Table 1 shows that the highest participation was at the provincial and national levels. This is because the respondents were representing the eight provinces in Kenya. Table 1 also shows that there was high participation in the play category.

There were a total of 15 questions eliciting both quantitative and qualitative responses. The respondents were not expected to identify themselves, so their personal identities were not recorded. They were, however, both male and female, and all taught in secondary schools in Kenya and were involved in scripting for the schools drama festival. The types of schools in which they taught was not relevant for this study because the focus was on the conceptualisation of the ideas, characterisations and casting, regardless of whether the school was single-sex or co-educational. This was deliberately done in order to provide an opportunity for those who taught in single-sex schools to respond, guided by their own beliefs. Two instruments were used in this study, a short questionnaire from which quantitative data was obtained and a semi-structured interview from which qualitative data was obtained.

In the analysis of a character in drama, several things have to be considered: what the character does, what the character says, what other characters say about that character and, finally, the opinions of the scriptwriter and director. Thus, in order to analyse characterisation in the items, the scriptwriters were asked to state the kinds of characters they created for various roles. The analysis involved inferring meanings and implications from the narrations of the scriptwriters and the directors of the different genres of the drama items. This required them to indicate what influenced them when creating characters that expressed science and technology notions. They were also asked to explain how they determined who would take up the roles they created.

Social Influences on Girls' Interactions with Science and Technology

Socially, girls and boys are expected to behave differently. Children usually get explicit instructions on what is proper behaviour for girls and boys. Girls are told what is considered 'ladylike' and 'nice', while the boys are told what is expected of 'big strong men'. In fact, parents tend to punish aggression in their daughters and dependent or passive behaviour in boys (Weitzman 1982). When these gender expectations are transferred to classrooms, girls tend to depend on the boys to carry out experiments for them in science (Kitetu 1998). The gendered view of science is further perpetuated by science and technology being portrayed as a man's domain involving energy, dirty work and noise. Girls are not expected to be interested in such things (Lubega 1998). Thus, girls are implicitly discouraged from associating with science and technology activities, beginning with the classroom science subjects.

Besides being isolated from science subjects and experiments, teachers (male and female alike) tend to pay more attention to boys than girls in the classrooms. It has been established (Brophy and Good 1970) that the attention teachers give to pupils determines the development of self-confidence in pupils and contributes significantly to pupils' performance. Brophy and Good (1970) observed that boys have more interactions with the teacher than girls and appear generally salient in the teacher's perceptual field. These observations indicate that there is a discrepancy in the way teachers attend to girls and boys in the classroom. This isolation and stereotyping was even noticed as early as the 1960s (Weitzman 1982). School systems were observed as reinforcing sex-role stereotypes. For example, 73 percent of class readers were found to foreground male characters. When girls and women were included, they were represented as timid, inactive, unambitious and uncreative. They were also shown to be lazy twice as often as male counterparts and intellectually inferior. School textbooks were also found to retain these stereotypes (Weitzman and Rizzo 1974). Mathematics, science and even social studies textbooks purveyed an equally limited image of women. In science textbooks, only 6 percent of the pictures included adult women. This is how young girls in schools tended to be discouraged from science and channeled into more traditionally 'feminine' fields (Weitzman and Rizzo 1974).

This study went out of the classroom in order to establish the subtle factors that may contribute to the isolation of girls from interacting with science and technology. The findings have been used to establish the gender discrepancy in non-academic activities and how this discrepancy could determine the foundation laid for science and technology. The study identified performing arts (plays, dramatised dances, dramatised verses and narratives) as one of the key socialisation activities in the school setting. During the presentations of different items, there has been a notable use of technological and scientific notions and applications such as telephones, lighting techniques, sound effects, guns, computers, cars and medical equipment. Drama being arts based, it is expected that more girls than boys would take part, but it has been observed that there are usually more boys than girls participating in the items presented by co-educational schools in the drama festivals in Kenya. Moreover, in line with societal perceptions and expectations, boys are cast in roles that bear scientific and technological notions.

Community Theatre, Participatory Theatre or Theatre for Development

Does theatre matter in changing perceptions? Lately, there has been an emergence of different types of theatre in which the participants are expected to experience and learn various things that either educate them or enable them to acquire certain knowledge and skills. This has been referred to as theatre for development, participatory theatre or community theatre. Various theatre groups have been formed in different parts of the world and have used this type of theatre to address various social problems. Theatre for development generally aims at eliminating perceptions that militate against individual and communal change. It can be understood within the larger frameworks of participatory processes and consciousness transformation. In Kenya, theatre for development anticipates the de-conditioning and de-construction of oppressive conditions and situations that undermine individual and collective development (Desai 1991). For this kind of theatre to succeed, Byam (1999) argues that it must be framed within a philosophy and ideology that encourages change and empowers people to transform their lives. Over the years, a number of different approaches to theatre for development have been tried. Some of the major approaches are briefly discussed in the following sections.

Theatre of the Oppressed

Augustino Boal developed a new way of working with theatre, which he called 'theatre of the oppressed', during the 1950s and 1960s in Latin America (Epskamp 1989). He aimed to use theatre to empower oppressed people to change their situation by re-enacting their problems on stage. He explained that, instead of being spectators, they would become 'spect-actors'; instead of individuals allowing others to define their lives, they would make images of their lives themselves:

To change the people from 'spectators'—passive beings in the theatrical phenomenon—into subjects, into actors, transformers of the dramatic action, ...the

liberated spectators, as a whole person, launches into action. No matter that the action is fictional, what matters is that it is action! (Boal 1979:122).

Oppression was defined as something that could be within you, as what Boal (1979) calls 'cops-in-the-head'. This internalised oppression is what prevents people from working together and changing their lives.

HIV/AIDS Communication

There are many theatre groups that have been involved in communicating HIV/AIDS messages to communities in the third world. These include Amakhosi Theatre for Social change in Zimbabwe, Arepp Educational Trust in South Africa, Atelier-Theatre Burkinabe in Burkina Faso and many more. Theatre has proven to be an effective mode of reaching out to people with crucial messages on the dreaded disease. In Kenya, many organisations have used theatre activities to communicate HIV/AIDS messages to different communities. One such organisation is PATH-Kenya, which works with various theatre groups on outreach communication programmes, especially for the youth. PATH is funded by UNDP and has had successful outreach programmes with groups such as Artnet Waves in the Rift Valley and Kenya AIDS Intervention/Prevention Project Group (KAIPPG/International) in Western Kenya. The activities of these groups (and others) have attracted the attention of the youth and have enabled many young people to address HIV/AIDS issues more freely. HIV/AIDS theatre activities include plays, dances, narratives, poetry and puppetry, and they have been successful in communicating messages that official public health agencies have not been able to articulate. They have simplified the mysteries of HIV/AIDS and enabled those who participate to comprehend otherwise complex issues.

Human Rights Advocacy

There are many groups in Kenya that have used theatre activities to communicate human rights messages. The earliest known group was Kamiirithu, which operated under the umbrella of Kamiirithu Cultural and Educational Centre. The Kamiirithu Cultural and Educational Centre became a historical landmark in the history of theatre in Kenya and, specifically, theatre for development, when Ngugi wa Thiong'o and other facilitators from the University of Nairobi introduced the concept of theatre as a tool for development to peasants and workers in this impoverished village on the outskirts of Nairobi. As Ndigirigi (1999:71) notes, 'by having workers and peasants act in *Ngaahika Ndeenda*, the Kamiirithu group ... departed radically from the practice of other groups by having the underprivileged act in the drama about their lives'. Although the success of Kamiirithu has been attributed to its collective approach, it must be recognised that the presence of external facilitators with a vast knowledge of participatory education and theatre for development made a difference. The Kamiirithu project remains, however, a process of demystifying knowledge and bringing about realisation of reality.

Currently, the Kenya Human Rights Commission runs many theatre programmes, including 'Human Rights Outreach', a project that uses popular theatre, including drama, puppetry, music, dance and poetry, as a tool of mass education on human rights, especially to generate public dialogue on human rights. The programme utilises theatre artists based in local communities and has proved very effective, although the participants have often found themselves involved in controversy due the political overtones of their activities.

Kenya National Schools and Colleges Drama Festival: Disguised Theatre for Development

The annual Kenya National Schools and Colleges Drama Festival is the single largest theatre event in East and Central Africa. It draws larger audiences to theatre spaces in several regions of the country than any other festival at any other time. The festival begins in February and continues to mid-April. The performances take place at zonal levels, then move through the districts to the provincial level and finally to the national level. The main performance genres include plays, dramatised verse, oral narratives and dramatised cultural dances. These performances deal with topical themes and issues that are of great concern to the society. Although the mode of presentation at the festival strictly follows traditional conventions of the proscenium arch theatre, it is interesting to note how much these theatrical pieces fit with the approach of theatre for development that Frank (1995) calls 'campaign theatre':

Campaign theatre (CT) is a form of theatre for development which is concerned with raising the consciousness of the people on such topics as childcare, environmental issues, health care, etc. The notion among the organisations which advance CT is that, with the help of theatre, a message will reach a larger number of people, and also that theatre, through its inherent entertainment value, is better suited to convey that message than, for instance, a series of lectures (78).

A major transformation of the Kenya National Schools and Colleges Drama Festival, which enhanced its capability as campaign theatre, occurred in 1981. A decision was taken to shift the national finals from the Kenya National Theatre in Nairobi, where it had been held for over twenty-one years, and rotate the site in the various provinces. This is how the festival still operates today. This meant that more people now have the chance to watch and learn from these highly educative and entertaining productions. From the foregoing, it is obvious that the festival does indeed perform some of the functions of theatre for development.

This study, therefore, aimed at finding out if the scriptwriters and directors of the items performed were aware that science, technology and the performing arts are complimentary and that none can exist without the other in the contexts in which they are studied and applied. The assumption was that, if performing arts have been used successfully to bring about change through theatre for development approaches, it should be possible to use the performing arts in educational settings to solve the problems that exist there. In Kenyan schools, both boys and girls take part in the drama festivals, and some of the roles students play articulate various scientific and

technological applications. This means that those who take part in those roles have a chance to experience those applications as they participate. The results of the study are described, interpreted and discussed below.

Script Writers' Awareness of Science and Technological Notions

Responding to a question that required them to indicate if they were aware of the inclusion of scientific and technological ideas in plays, dances, verses and oral narratives, all the respondents indicated that they were aware. They also indicated that they utilised scientific and technological ideas by writing items that included technologies such as computers, industrial chemicals, bombs, radio and television, cameras, vehicles, medicines, lighting and sound effects, air travel and the use of telephones, etc. Ninety percent of the respondents indicated they were aware that these technologies were related to science subjects taught in schools. The majority singled out physics and chemistry as the basis of those ideas. In this regard, when they were asked if they consulted other subject teachers in the schools in preparation for the festivals and competitions, 96 percent indicated that they consulted, not at the scripting stage, but during rehearsals. Some of the subject teachers who were consulted included those in the subject areas that had been identified earlier. But they also said that they also consulted the language and art and design teachers.

Characters and Casting

The respondents were asked to indicate if, during the scripting process, they decided whether it would be boys or girls who took the roles of the main characters that contain the science or technological ideas that they scripted. Seventy-eight percent of the respondents indicated that, as they scripted, they considered specific individuals who would play the roles they were creating. However, 50 percent of the female respondents indicated that the female or male factor did not arise. Nevertheless, in the creation of those characters, both male and female respondents clearly indicated that they did not balance the male and female *characters* but created more male characters for those roles than female ones. Seventy-one percent specifically said that they created more male characters to take up those roles that articulate science and technological notions. The reason for creating more male characters was generally ascribed to female characters being 'weak' or 'difficult to deal with'.

Besides the creation of characters, the directors were asked if they ever encouraged girls to take up the roles that carried the scientific and technological notions such as computer applications, use of guns, medical careers and lighting systems. Seventy percent of the male and 60 percent of the female respondents indicated that they did not. Various reasons were given for not encouraging girls to take up these roles. The following are some of the actual responses to this question:

It is hard to control girls or even a female character playing such roles. They make many mistakes and clumsily. Give a female character to use a gun and the results are disastrous ... She will hold it like a cob of maize and you can lose a lot of marks on character

credibility When you correct them repeatedly, they sulk and, as you know, we have a short period; I have no time to mother them (Respondent A).

You know as much as I do that most girls have short concentration span on these things. When a girl is playing a crucial role, you will die many deaths before you can have confidence in her The idea of working with a female for such roles is tedious, you need extra skills to succeed (Respondent B).

Boys are usually very cooperative and are obviously more confident in such operations. They don't usually worry about their bodies and such like things. They can also handle any emergencies without me getting ulcers during the festivals (Respondent C).

From such responses, we can see that the scriptwriters and directors of the drama items view girls as unreliable and unmanageable when playing science and technology roles.

When the respondents were asked to explain how they would ensure that girls also participated equally in the drama festivals, they fell back on the idea of genres, saying that there was a difference in the strengths of the various genres and that the girls would be more comfortable with dances and choral verses. The major reason brought out was that 'girls do well as a team', whereas the boys would do better in genres such as plays, narratives and solo verses because 'they are not easily distracted', 'they can handle emergencies well' and 'they are not as shy as girls'.

Applicability of Scientific and Technological Notions to Science Subjects

While preparing for the performances, the respondents were asked to indicate if they encouraged the performers to relate the ideas they were articulating on the stage to real-life situations and subjects they learned in class. Sixty-five percent said they did so and also said they helped them understand that those subjects would enable them to go into careers like medicine, electricity, woodwork and computers and information technology. Generally, they indicated that they encouraged them indirectly by saying such things as 'you are doing well', 'bring out that section like the engineer/doctor you are' or 'do that like you were in the examination room'. These are encouraging utterances and would make the performers reflect on the parts that they play and infer their importance.

Asked to indicate how their performers did in both science and arts subjects, they responded in a variety of ways. Most said their performers generally enjoyed arts subjects more than science subjects and did better in them. The measure of 'enjoy' was, however, gauged against class performance. A few of the respondents indicated that some of the best science students were their main characters in the items that they performed during the Kenya National Drama Festivals. This, they indicated, was because they interpreted the science concepts with ease.

Can Participation in School Drama Festivals Enhance Performance in Science Subjects?

The respondents were asked to suggest ways in which participation in school drama festivals could help enhance students' performance in academic science subjects. Table 2 summarises the responses. The responses were placed in five clusters as shown in the table. The clusters refer to the possible ways in which the students can experience science notions through drama. The responses were varied, so the clusters imply they referred to the terms included in Table 2.

Table 2: Clusters of Comments on How Participation in Drama Can Enhance Performance in Science Subjects

Cluster	Percentage
Themes and theories	21%
Props, sound effects and stage craft	24%
Participation (attitude and confidence)	53%
Other	2%

A slight majority (53 percent) of the respondents indicated that participation of students in drama items could help them improve their attitudes and gain confidence when dealing with science and technology subjects in classroom situations. They indicated that this would happen when the students transferred their creativity in drama to activities in science and technology. Table 2 also shows that 24 percent of the respondents indicated that students could relate the themes selected and the theories of drama applied in their festival performances to classroom science and technology subjects. Twenty-one percent indicated that using the props in drama would be helpful in understanding the practical aspects of science and technology concepts. Two percent of the responses did not fit in any of the five clusters. These include comments about science being beauty and about the value of creating scenery for a production, which should be beautiful because it uses scientific inventions.

From Table 2, therefore, we can observe that a majority of the scriptwriters recognised that there is a relationship between the performing arts and science and technology applications. This observation can be solidified by quoting some of the actual responses as follows:

- Using science-oriented items can help the students create their own relevant items. When given roles of science ideas, they have to consult the people with science knowledge (Respondent D).
- Use of sound tracks and lighting exposes them to the beauty that can be created by science (Respondent E).
- They will change their attitude or perception of science by playing the science roles (Respondent F).

- By scripting plays with scientists, like Darwin, as characters, the main ideas involve evolution (Respondent G).

Discussion

The findings above indicate that there are more male drama scriptwriters and directors than female ones. Although it is an arts-based activity, male scriptwriters and directors dominate it. This could be because of the implied scientific and technological applications, a possibility that can be inferred from the fact that all the scriptwriters, both males and females, were aware of the scientific and technological applications of the material they included in their scripts. They knew that those applications had science bases and that they had a relationship with science subjects. They also indicated that they consulted science teachers for their productions. So the scriptwriters know that their items have scientific and technological ideas which the students are expected to articulate during the drama festival presentations. This leads us to infer that the scriptwriters tend to create science and technology ideas specifically for male performers to articulate, since they create more male characters during scripting in readiness for male participation. This implies that fewer girls will get the opportunity to take up roles that articulate scientific and technological concepts, because the scriptwriters prefer male performers for those roles.

The majority of scriptwriters, who were also the directors of the items, tended to create roles that articulate scientific and technological ideas and assign them to preselected individual performers according to their assumed theatrical abilities. Boys and girls are not given an equal opportunity to compete for those roles. They reinforce this practice by creating more male characters than female ones. This means that, even if the script were written for a girls' school, there would be more male roles. This is why assigning of roles is sometimes done by typecasting, as indicated by some directors in such responses as 'the characters that I want' or 'obvious ones'.

From the results presented above, we can also infer that majority of the scriptwriters are aware they are required to encourage the artists to relate to real-life situations and the science subjects studied in school. This means that they are also aware that the ideas they create have a direct relationship with science subjects and that these ideas could easily be applied to technologies like communication systems, carpentry, woodwork, metalwork and also computer operations. The scriptwriters were also aware that the roles the performers play are directly linked to scientific and technological careers. This is why they encouraged the artists who took part to identify themselves with the scientific professions that were implied in the roles that they played like doctors and engineers.

It is also implied that the majority of scriptwriters and directors of the school drama festival items do not encourage girls to take up roles in which scientific and technological concepts are embedded. This means that they do not think that girls are capable of conceptualising and articulating those scientifically and technologically oriented ideas effectively, suggesting that the scriptwriters and directors believe that the girls are weaker than the boys and cannot be trusted to articulate the scientific

ideas effectively. This is demonstrated by one of the responses, which indicated that 'I will keep my fingers crossed'.

From the results presented, we can also infer that the scriptwriters and directors of the school drama festival items know that participating in the items provides an opportunity for the performers to experience the ideas they communicate to the audience. The information becomes part of them. This means that those who take part get a chance to internalise the ideas. Consequently, when they participate in the items that contain science and technology ideas, they experience and absorb those ideas. Thus, those who take part in those items that articulate science and technology ideas are likely to build confidence about, and cultivate desirable attitudes towards, the subjects related to the ideas that they articulate on stage. Their confidence will even be stronger if the items that they take part in win awards at the festivals. This will encourage them to experiment and try to apply what they have experienced. This is demonstrated by the observation of one respondent that 'they can easily do various experiments on their own and improvise props by applying their knowledge in the science subjects' and the comment by another that 'they will change their attitude or perception of science by playing the science roles'. However, despite the scriptwriters' knowledge about the usefulness of participating in items that contain scientific and technological notions, they still isolate girls. This denies girls an equal chance to participate in those items and experience the ideas therein.

Conclusion

We observed earlier in this paper that schools have failed to meet their expectation of being able to provide conditions through which gender stereotypes can be eradicated. It has also been observed that schools in Kenya provide social settings through which students at secondary level interact. There are many social activities in the school setting. This paper focused on the drama festival and the items that the students participate in, which are usually scripted and directed by their teachers. We have seen from the findings that the schools have not been able to provide friendly environments with equal opportunities for girls and the boys to access science and technology concepts even in the so-called social activities within the school. The scriptwriters share those stereotypes about girls being weak and not being able to measure up to the required standards. They will therefore not let them handle critical roles in the drama items for the festivals.

However, the scriptwriters also know that drama can enable the students to interact with science and technology subjects more easily, if they are exposed to similar concepts in drama items. Despite that knowledge, the teachers as scriptwriters seem to be perpetuating the isolation of female students from science and technology activities. This is done through scripting science concepts to be played by male rather than female characters. In reference to the literature cited, drama activities have been used to enable individuals to change their attitudes and perceptions. The scriptwriters and directors of drama items for the schools drama festivals indicated that participation can change the perceptions and attitudes of those who participate. In the same way, we can conclude that girls and boys can be given equal opportunities

to participate in the science and technology drama items. This will enable them to experience the concepts equally and in turn encourage them to develop more positive attitudes towards related science and technology subjects. We have also seen that the drama teachers tend to isolate girls from interacting with the science and technology ideas during the drama festival activities. This is consistent with the earlier observation that teachers pay little or no attention to female learners. This situation can change if the teachers are made aware of the consequences of their actions.

The findings of this research suggests that out-of-class activities and students' participation in these should be scrutinised to see how, if at all, they challenge and are helping change societal gendered perceptions on science and technology. More specifically, in relation to the results and the conclusions of the study presented above, the following recommendations can be made:

1. The Kenya Schools Drama Festival scriptwriters need to be sensitised about the usefulness of balancing the male and female characters when they are scripting, so that they provide equal opportunities to both boys and girls to experience the science and technology ideas they include in their scripts.
2. The directors of the items that are presented at the festival should be encouraged to audition both girls and boys for the main roles that they create in order to give equal opportunities to the performers regardless of their sex.
3. The scriptwriters and directors should not ignore girls or discourage them from taking up roles in which scientific and technological concepts are embedded. Instead, girls should be encouraged, if they show interest.
4. The writers should also script without any gender discrimination. This will provide more opportunities for girls to experience the scientific ideas and enable them to enhance their interaction with science and technology subjects.
5. A special award should be created in all categories and genres for items that articulate scientific ideas through balanced gender characterisation.
6. The Kenya National Drama Festival Association needs to restate the objectives of participating in the festival so that they could include enabling the students to develop desirable attitudes towards academic subjects, with specific reference to science and technology.
7. Further research should be undertaken in order to find out what the girls and boys themselves have to say about their experiences, especially in items that reflect scientific and technological ideas. Further research should also be undertaken to study the finished scripts so as to analyse the discourse used and compare it with the findings in this study.

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