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# Primary Teacher Trainees Preparedness to Teach Science: A Gender Perspective

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**Abstract**

The purpose of this study was to determine Primary Teacher Education (PTE) Trainees' perceptions regarding their preparedness to teach science in primary schools. A descriptive survey research design was used and stratified proportionate random sampling techniques used to select 177 males and 172 females. The study found out that more male trainee than female trainees had studied the three science subjects in secondary schools. Overall more male trainees than female trainees expressed high level of conceptual understanding of science subject content and SPS. More male trainee than female trainees further indicated they were ready to teach science during teaching practice and after training. The study recommends that science tutors to use SPS approach in teaching of PTE science, PTE to ensure trainees have high mastery of science subject content and SPS and to provide a gender-appropriate training to demystify gender differences in performance in science and promote gender equity in science education. The study further recommends that affirmative action be used in subject specialization selection to ensure gender parity in science education. Finally Kenya National Examination Council to include practical science examination measuring competency to teach science.

**Key words:** Science Process Skills and Science Content, Inquiry Based science Education

## 1. Introduction

Initial teacher education has a critical role to play in making of a teacher. The importance of competent teachers to the nation's school system can in no way be over overemphasized. National Curriculum Framework for Teacher Education [NCFTE] (2009) has identified teacher's competence as one of the primary determinant of quality and extent of learners' achievement. NCFTE further indicates that the level and quality of subject matter knowledge critically influences the quality of curriculum transaction in classrooms and pupils learning. In line with this observation, subject matter has been identified as one of the component of preparing teachers for teaching job (Peter, 1977).

Debora and Williamson (n.d.) further indicate that subject matter is an essential component of teachers knowledge since teaching is more than mere delivery of facts. Teaching involves assisting learners develop intellectual skill to enable them participate in the learning process effectively. To this end Conant (1963) argues that teachers own subject matter influences how they assist pupils learn subject matter. Scheffler (1973), further argue that teachers' knowledge of subject matter determines their capacity to engage students in the leaning process. Thus teachers' quality is a function of many factors, their academic and professional education.

One of the National philosophies underpinning provision of education in Kenya emphasizes on provision of holistic, quality education and training that promotes the cognitive domains of learners (Republic of Kenya, 2012). Towards this end primary teacher education is expected to ensure an adequate supply of professionally competent science teachers to teach science in Kenya's primary schools. This would be achieved if science teacher have the expected competences for teaching science.

It is the aim of any teacher education programme to produce pre-service teachers who can start their career with sufficient competencies and skills. Sharbain and Tan (2012), single out knowledge and competences as some of the determinants of success in teaching profession. The teacher is considered to be competent when he or she has knowledge and skills required to perform as a teacher. Thus for primary school teachers trainees to be prepared to teach science they should be highly competent in science subject matter knowledge and science process skills.

Deborah and Williamson (n.d.) further states that if teachers possess inaccurate information or conceive knowledge in narrow ways, they may pass the same to their students. Deborah and Williamson further argue that teachers who possess misconception on science concepts may fail to challenge pupils own misconceptions, use science textbooks uncritically or alter them inappropriately. Towards this end a study done in Kenya by Keraro et al. (2004) found out that primary school pupils held alternative frameworks (misconceptions) on science concepts whose major source was the teachers.

These alternative frameworks by teachers need to be identified and corrected. It is only teachers who are adequately prepared to teach science who can correct primary school pupils' misconceptions in science. Debora and Williamson (n.d.) conclude that teachers' conception of science knowledge shapes their practice, the kind of question they ask, the ideas they reinforce and the sort of tasks they assign to pupils.

To this end in Kenya, KIE (2002) science syllabus shows that in the first year trainees study integrated science subject matter. The topics studied in the first year are: philosophy of science which includes definition of science, nature of science, problem solving process, scientific skills and attitudes. The other major topics covered in the first year are: methodology of teaching science, health education, weather and astronomy, soil, plants, animals, properties of matter, food and nutrition and environment.

A critical look at the content covered in these topics shows that they are drawn from biology, physics, agriculture and home science. Content from chemistry is not covered in the first year and so those trainees who specialize in arts in the second year have no opportunity to study chemistry subject matter in PTE. The situation is worse for those trainees who did not take a science subject cluster with chemistry. Thus to assume that trainees who specialize in arts can also teach science in primary schools just like those who specialize in science is farfetched.

In the second year trainees either specialize into science (option A) or arts (option B) (KIE, 2002). According to KIE, science subject in PTE include three subjects (science, agriculture and home science). Under science, the following topics are taught: simple machines, energy, water, the human body, acid, bases and salts, energy, water and the human body. Topic covered in agriculture include: general introduction to agriculture, school farm organization, environmental factors influencing agricultural production, soil, land reclamation, principles of crop production, livestock health and diseases, livestock products, pastures, farm tools and equipment, farm structures, principles of economics and farm management, agricultural organization and sources of agricultural information and services.

The other subject covered in science is home science where the following topics are covered: introduction to home science, good grooming, common accidents in the home, home based care, care of the compound, drainage systems, laundry work, care labels, laundering different fabrics, housing the family, ventilating the house, cleaning equipment and materials, cleaning the house, materials used for house hold items, kitchen equipments, kitchen plans, management of time and energy, nutrition, methods of cooking, meal planning, preparation and service, cookery, textiles, basic needlework tools and equipments, stitches, seams, garment construction processes, maternal child health care, preparation for a baby's arrival, confinement, breastfeeding, weaning, childhood diseases and ailment and habit training.

It can therefore be concluded that in Kenya PTE has made a deliberate effort to ensure that PTE trainees are well grounded in science subject matter. However, the challenge is whether the syllabus demand in terms of the subject matter is proportionate to the duration of the course. The science topics expected to be covered in one year by trainees specializing in science are quite many. Hence college science tutors may face a challenge in allocating adequate time for all the topics in the syllabus. This implies teaching of science in PTE is through expository approach. It is also clear that trainees specializing in science are exposed to more contentment in science impeding the competence to teach science by trainees in the arts option. Time is also an essential factor if PTE trainees are to develop competence as science teachers.

In situations where trainees are ill equipped in terms of science content knowledge and SPS they result to expository teaching approaches which do not reflect adequate preparation for science teaching. This is worse in the situation where trainees who specialize in arts are made to teach science. In Kenya even trainees who specialize in arts subjects are also expected to teach science once they graduate. This an impediment in teaching of science since their mastery levels of science subject matter and SPS is low. SPS are defined as the skills used by scientists to create scientific knowledge, think about a problem and make conclusions about the problem (Karsili and Sahin, 2009). Mei et al. (2007) suggest that science process skills describe a set of broadly transferable abilities that reflects what scientists do while Ostlund (1992) assert that science process skills are the tools used by scientists to produce and arrange information about the world.

Shulman (1986) states that other than teachers being able to define for students the acceptable truths in a domain, they must also be able to explain why particular propositions are deemed acceptable, worthy knowing and how they relate to other propositions. This kind of understanding suggests an understanding of the essence of philosophy of science by science teachers. However, the content on philosophy of science in Kenya's PTE lacks in details on the nature of scientific knowledge and how scientific knowledge is attained. For example science teachers need to know how to interpret scientific concepts to the learners and show its application in life. Science teachers should know the nature of scientific knowledge and what science is and what it is not. According to Debora and Williamson (n.d.), subject matter knowledge includes knowledge of the ideas, facts and theories of a subject (science).

While most of the science education research agrees on the fact that pedagogical practices based on inquiry-based methods are more effective, the reality of classrooms practice in Kenya is that actual science teaching does not follow this approach. Khatete (2010) observe that primary school teachers were drilling pupils for the purposes of passing examinations. Hence there is no meaningful learning where teachers are guiding learners to create scientific knowledge on their own. Khatete further argues that the assessment system used at primary school level is a great impediment to teaching of science since science teachers tend to tailor their teaching approaches depending on the cognitive skills emphasized by the assessment system and not the process of acquiring scientific knowledge.

Kerre (2008) conclude that PTE trainees are often secondary school graduates who could not make it to higher level of training and in most cases they had performed poorly in sciences. Again, in secondary schools in Kenya very few schools offer a science cluster of the three sciences (biology, physics and chemistry) for the four years of secondary education. Most schools offer chemistry and biology as a compulsory cluster and very few students take a science subject cluster with physics.

It is assumed that if science process skills are tested in summative national examination in PTE and accorded equal weight as scientific knowledge in PTE science examinations, science tutors in PTE would change their teaching approach to ensure trainees acquire high mastery of science process skills and science content matter increasing their level of preparedness to teach science in primary school. PTE should therefore emphasize the teaching of science through science process skill approach if PTE trainees are to master them and use them later as science teachers in primary schools.

Mei et al. (2007) proposes that curriculum designs should emphasize acquisition of science process skills. NARST (2011) asserts that learners can acquire science process skills if they are planned as the expected outcomes of learning science. Planning of teaching of science therefore should state in specific terms the activities to be provided to the learners and the specific scientific skills targeted by the learning process. Primary Teachers Education should thus rethink the teaching approaches they use and go for teaching approaches that enable trainees to develop competence in science process skills to be used in guiding primary school learners to create scientific knowledge on their own.

Eurydice (2002) proposes that school curriculum should be designed to achieve the following education aims: Acquisition of knowledge, skills and development of competencies or the ability to apply the knowledge and skills imparted by education to real life situations. Kenya's PTE should therefore be structured towards ensuring PTE science teachers have good mastery of SPS and scientific content in addition to appropriate pedagogies for science education. Holbrook (2009) indicates that education institutions should be ready to abandon the inappropriate science education practices that characterized the 20th and the 19th century. Instead, Holbrook proposes for more effective and appropriate teaching practices that facilitates learners to acquire scientific skills, values and attitudes for meaningful sustainable development in the society

PTE trainees should spend more time on activities that promote understanding of scientific skills and science subject matter. Beaumont-Walters (2001) assert that teaching science using activity based approach significantly improved pupils' achievement. Some of the factors influencing acquisition of science process skills are suggested by Berry et al. (1999). Berry proposes that learners need scientific knowledge assumed by the activities provided during the teaching process. Thus learners' activities in science lesson should validate the scientific knowledge acquired.

Meador (n.d.) concludes that teachers need to facilitate learning experiences that provide pupils with sufficient opportunities to develop scientific understanding, science process skills, and creative thinking skills. PTE should thus provide trainees with adequate experience on opportunities that empower them to use experimentation and discovery in teaching of science in primary schools.

Though gender parity is ensured in admission to PTE training, the criteria used to select trainees' for subject specialization introduces gender disparity in subject specialization where slightly more male trainees than female trainees specialize in science. This implies that more male trainees are exposed to more science content and science process skills than their female counterparts yet they are all expected to be science teachers in primary school.

Namunga and Otunga (2012), argue that teachers are the drivers of social, economic and political development of society. A policy document on teacher education identifies the need for a reformed education curriculum in Kenya that meets the aspiration of Vision 2030 (Kenya's Development Blueprint) (Republic of Kenya, 2012). Thus if science education is to play its role towards achievement of Vision 2030 in Kenya, the quality of the science teacher as human resource in education should be addressed. Kenya's Sessional Paper No. 1 of 2005 noted that there were gaps between competences and responsibilities of education staff in majority of the posts (Republic of Kenya, 2005a).

It is said that the destiny of a country is shaped in her classroom and that no people can rise above the level of its teachers. Hence this study determined Kenya's PTE trainees' preparedness to teach science in primary school. This was achieved by determining trainees' perceptions of their conceptualization of content in biology, chemistry, physics, PTE science and conceptualization of SPS. In addition the study assessed trainees' mastery of SPS and finally investigated PTE trainees' opinions on whether the PTE training had equipped them with adequate science inquiry skills and whether they would choose to teach science during and after their training. The SPS which were the focus of this study were: ability to identify and control variables, ability to operationally define variables, ability to state hypotheses, ability to design investigations and ability to graph and interpret data.

## 2. Methodology and research Design

This study adopted a descriptive survey research design, one which does not manipulate variables or arrange for events to happen (Mugenda & Mugenda, 2003). This was used to determine PTE Trainees' perceptions regarding conceptual understanding of biology, chemistry, physics, PTE science and SPS. The study further assessed trainees' mastery of SPS and finally evaluated trainees' perceptions regarding adequacy of SPS learned in PTE and whether they were ready to teach science during teaching practice and after their initial training. All the PTE trainees had already been exposed to the whole PTE curriculum.

### 2.1. Population

The target population was all the PTE trainees in the 5 public PTTCs in the Rift Valley Zone in Kenya. The Zone had 2014 (1011 male and 1003 female) trainees (see Table 1). These PTTCs were chosen because admission in PTTCs is done in such a way that all counties are represented in each PTTC. Furthermore the trainees are relatively homogeneous in terms of entry behaviour and gender parity at admission to the institutions. PTE trainees also pursued a common curriculum which was delivered under relatively similar conditions.

**Table 1:** Accessible Population of PTE Trainees per PTTC According to Subject Specialization

| PTTC | Male | Female |
|---|---|---|
| Kericho | 193 | 200 |
| Mosoriot | 241 | 244 |
| Tambach | 279 | 284 |
| Moi Baringo | 186 | 188 |
| Narok | 112 | 87 |
| **Total** | **1011** | **1003** |

### Sampling Procedures and Sample Size

Stratified proportionate random sampling techniques were used to select male trainees and female trainees (see Table 2).

**Table 2:** Sample size of PTE Trainees per PTTC per Subject Specialization

| PTTC | Male | Female |
|---|---|---|
| Kericho | 29 | 28 |
| Mosoriot | 36 | 36 |
| Tambach | 41 | 42 |
| Moi Baringo | 28 | 28 |
| Narok | 17 | 15 |
| **Total** | **151** | **149** |

Stratified sampling procedure assures the researcher that the sample is representative of the population in terms of factors used for stratification (Fraenkel and Wallen, 2000). Stratified proportionate sampling ensured that the elements selected from each group were in the same proportion of the groups in the target population. Records from the five PTTCs in the Rift Valley Zone indicate that there were a total of 1011 male and 1003 female trainees (see Table 1) which formed the accessible population of the study.

When the population is more than 10,000 individuals, 384 of them are recommended as the desired sample size (Mugenda and Mugenda, 2003). The accessible population in this study was the 2014 PTE trainees. Mugenda and Mugenda recommend the formula:

$$nf = \frac{n}{1 + \frac{n-1}{N}}$$ to be used to calculate samples size.

According to the above formula:

nf= desired sample size when the population is less than 10,000,

n= desired sample when the population is more than 10,000,

N= estimate of the population size.

Using the above formula sample size was:

$$nf = \frac{384}{1 + \frac{384-1}{2014}}$$ = 323 PTE trainees.

To cater for those subjects that would decline to participate or dropped out during the process of investigation, the study proposed a sample size of 350 (see Table 2). However, 300 (85.7%) trainees were finally sampled and participated in the study (see Table 2).

### 2.2. Instrumentation

A paper and pencil survey, the Primary Teacher Trainees Questionnaire (PTTQ) and Testbof Integrated Skills (TIPS) were used. PTTQ which was developed by the researchers comprised 9 structured open and closed ended questions. PTTQ sought to establish PTE trainees' perceptions of their level of conceptual understanding of science content and Science Process Skills. Trainees rated their level of conceptual understanding of the content of science subjects they had studied in secondary school, PTE science content and science process skills.

TIPS was further used to investigate trainees' mastery in SPS. TIPS was a paper and pencil test developed by Kazeni (2005) and consisted of 30 multiple-choice items. This test was adopted and modified to suit the context of the study. Each item had four optional responses whereby only one response was correct and the other three options served as distracters. The respondents were informed of the intensions of the instruments before it was administered.

### 2.3. Data Collection

The researcher trained 1 research assistant from each PTTC who assisted in administration of the instruments and invigilation. The researcher visited the five PTTC and was assisted by the research assistants to administer the questionnaire to the trainees in similar settings. This was to ensure a high return rate. Permission to carry the research was obtained in advance from the National Council of Science and Technology, PPTC principals and the trainees themselves. The researcher informed all the principals, tutors and trainees of the purpose of research, the expected duration of participation, and the procedure to be followed after data collection. The researcher also informed the respondents about the extent of privacy and confidentiality, the value of the research, and guaranteed that the data would be used for no other purposes. The trainees also had the right to remain anonymous and to decline to respond to items if they so wished. The researcher undertook to be sensitive to human dignity and to collect the returns for analysis immediately on completion.

### 2.4. Data analysis

Data generated by PTTQ was tabulated according to the opinions selected/given by the respondents. Frequencies and percentages were used to describe the data. Descriptive statistics enabled the researcher to meaningfully describe, organize and summarize the data (Mugenda & Mugenda, 2003 and Fain, 1999).

TIPS was scored using a scoring key developed by the researcher and the mean and the standard deviation (SD) calculated and used to describe trainees' mastery of SPS. The mean is the most commonly used measure of central tendency when data represented is in either interval or ratio scale (Fain (1999). The SD indicated how trainees' scores in TIPS spread out around the mean. Fain further indicate that the SD is the most commonly used measure of dispersion and like the mean SD is the most stable measure of variability that takes into account each score in a distribution.

## 3. Results and Discussions

The study determined PTE Trainees' perceptions regarding conceptual understanding of biology, chemistry, physics, PTE science and SPS. The study further assessed trainees' mastery of SPS and finally evaluated trainees' perceptions regarding adequacy of SPS learned in PTE and their readiness to teach science during teaching practice and after their initial training.

### 3.1. Conceptualization of Sciences Content

Primary Teacher Trainees Questionnaire (PTTQ) was used to find out the science subjects studied by PTE trainees in secondary education. The results are shown in figure 1.

 

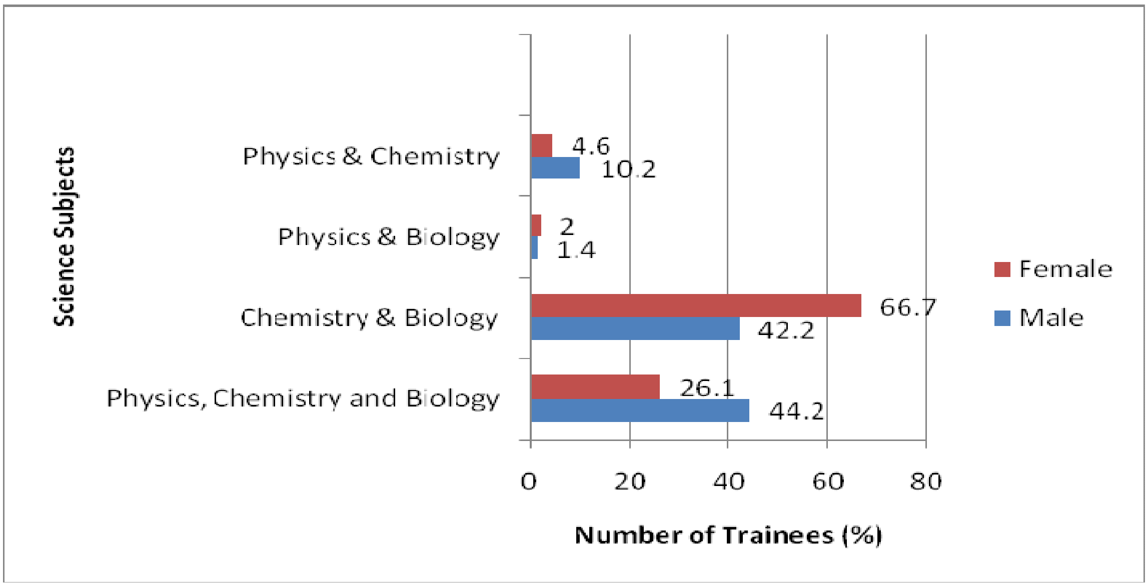


Figure 1. Science Subjects Clusters Studied in Secondary Education According to Gender (N=300)

The above results show that more female trainees (66.7%) had studied chemistry and biology in secondary education. However, more male trainees (44.2%) than female trainees (26.1%) had studied the three sciences (chemistry, biology and physics) in secondary school. According to KIE (2002), PTE science covers content in chemistry, biology and physics and so more male trainees than female trainees had better qualifications as science teachers in primary schools. Kerre (2008) observed that PTE trainees had a poor background in science.

PTTQ Question 2 was used to investigate PTE trainees' perceptions regarding conceptualization Chemistry, Biology and Physics. The results are shown in Table 3.

**Table 3:** Level of Conceptualization of Science Subjects Studied in Secondary Education According to Gender (N=300)

| Science | Gender | No Response | High | Average | Low | Total |
|---|---|---|---|---|---|---|
| Physics | Female | 79 (51.6%) | 14 (9.1%) | 42 (27.5%) | 18 (11.8%) | 153 (100.0%) |
| | Male | 50 (34.0%) | 35 (23.8%) | 50 (34.0%) | 12 (8.2%) | 147 (100.0%) |
| | **Total** | **129 (43.0%)** | **49 (16.3%)** | **92 (30.7%)** | **30 (10.0%)** | **300 (100.0%)** |
| Chemistry | Female | 6 (3.9%) | 21 (13.7%) | 105 (68.6%) | 21 (13.7%) | 153 (100.0%) |
| | Male | 3 (2.0%) | 39 (26.5%) | 93 (63.3%) | 11 (8.1%) | 147 (100.0%) |
| | **Total** | **9 (3.0%)** | **60 (20.0%)** | **198 (66.0%)** | **33 (11.0%)** | **300 (100.0%)** |
| | Female | 10 (6.5%) | 78 (51.0%) | 62 (40.5%) | 3 (2.0%) | 153 (100.0%) |
| Biology | Male | 14 (9.5%) | 76 (54.7%) | 53 (36.1%) | 4 (2.7%) | 147 (100.0%) |
| | **Total** | **24 (8.0%)** | **154 (51.4%)** | **115 (38.3%)** | **7 (2.3%)** | **300 (100.0%)** |

On average 30.0% of the male respondents perceived their level of conceptualization in the three sciences to be high while 24.6 % of the female trainees had the same opinion. These perceptions by trainees are in line with the assertion by Kerre (2008) that PTE trainees had a poor background in sciences. Female trainees' perception can be attributed to the fact that fewer female trainees than male trainees had taken a science cluster composed of chemistry, biology and physics (see Figure 1). PTTQ Question 3 investigated PTE trainees' perception of their conceptualization of the science content in the PTE science syllabus. The results are shown in Table 4.

**Table 4:** Conceptualization of Science Content in the PTE Science Syllabus According to gender (N=300)

| Groups | | No Response | High | Average | Low | Total |
|---|---|---|---|---|---|---|
| Gender | Female | 12 (7.8%) | 57 (37.3%) | 84 (54.9%) | 0 (.0%) | 153 (100.0%) |
| | Male | 9 (6.1%) | 74 (50.3%) | 62 (42.2%) | 2 (1.4%) | 147 (100.0%) |
| | **Total** | **21 (7.0%)** | **131 (43.7%)** | **146 (48.7%)** | **2 (.6%)** | **300 (100.0%)** |

The results revealed the same trend observed in conceptualization of the three sciences taught in secondary school (see Figure 1) where more male (50.3%) than female (37.3%) trainees perceived their level of conceptualization of PTE science content to be high. Hence there is a direct relationship between conceptualization of PTE science and conceptualization of science subjects studied in secondary education.

In Kenya, secondary school students are supposed to study at least two science subjects drawn from the cluster of Chemistry, Biology and Physics (Amunga et al., 2012). However, most schools treated biology and chemistry as compulsory subjects which must be taken by all the candidates. The results of this study have shown that very few girls studied the three science subject in secondary school and very few girls had taken a science subject cluster combined with physics. Furthermore, Wambugu et al. (2013) report that students in Kenya performed poorly in physics. More female trainees than male trainees had little exposure to physics content in secondary school and hence they had limited knowledge in physics.

Kerre (2008) indicates that PTE trainees had a very weak background in science because they had performed poorly in sciences in most cases. Deborah and Williamson (n.d.) observe that if teachers possess inaccurate information or conceive knowledge in narrow ways, they may pass the same to their students. Towards this end a study done in Kenya by Keraro et al. (2004) found out that primary school pupils held alternative frameworks (misconceptions) on science concepts whose major source was the teachers. Based on the findings of this study male trainees had a better background and conceptual understanding in science than female trainees and hence more prepared than female trainees to teach science in primary schools.

### 3.2. Trainees Perceptions Regarding Conceptualization of Science Process Skill

PTTQ Question 4 investigated PTE trainees' perception of their conceptualization of the SPS. The results are shown in Table 6.

**Table 5:** Conceptualization of Science Process Skills (N=300)

| Group | | No Response | High | Average | Low | Total |
|---|---|---|---|---|---|---|
| Gender | Female | 15 (5.0%) | 61 (20.3) | 58 (19.2%) | 7 (2.4%) | 141 (46.9%) |
| | Male | 11 (3.7%) | 69 (23.0%) | 59 (19.7% | 4 (1.4%) | 143 (47.8) |
| | **Total** | **26 (8.7%)** | **130 (43.3)** | **117 (38.9)** | **11 (3.8%)** | **284 (94.7%)** |

The results revealed that more male trainees (23.0%) than female trainees (20.0%) perceived their level of understanding SPS to be high. Almost equal number of male and female trainees expressed their level of conceptualization of SPS to be average. Performance in five SPS namely: identifying and controlling variables, operationally defining variables, stating hypotheses, designing investigation and graphing and interpreting Data was tested. The overall mean score was 16.4 while overall variation in performance was 7.3 as shown in Table 6.

**Table 6:** PTE Trainees Performance in SPS According to Gender (N=300)

| Gender | Mean | N | Std. Deviation |
|---|---|---|---|
| Female | 15.5 | 153 | 7.68631 |
| Male | 17.4 | 147 | 6.85760 |
| **Total** | **16.4** | **300** | **7.34155** |

The results in table 6 shows that male trainees had a higher performance mean score in SPS (mean of 17.4). They also had a lower standard deviation (6.9) compared to the female trainees performance in SPS. This implies that male trainees had high mastery of SPS than female trainees. PTTQ Question 6 investigated PTE trainees' opinions on whether their knowledge on science process skills made them better science teachers. The results are shown in figure 2.

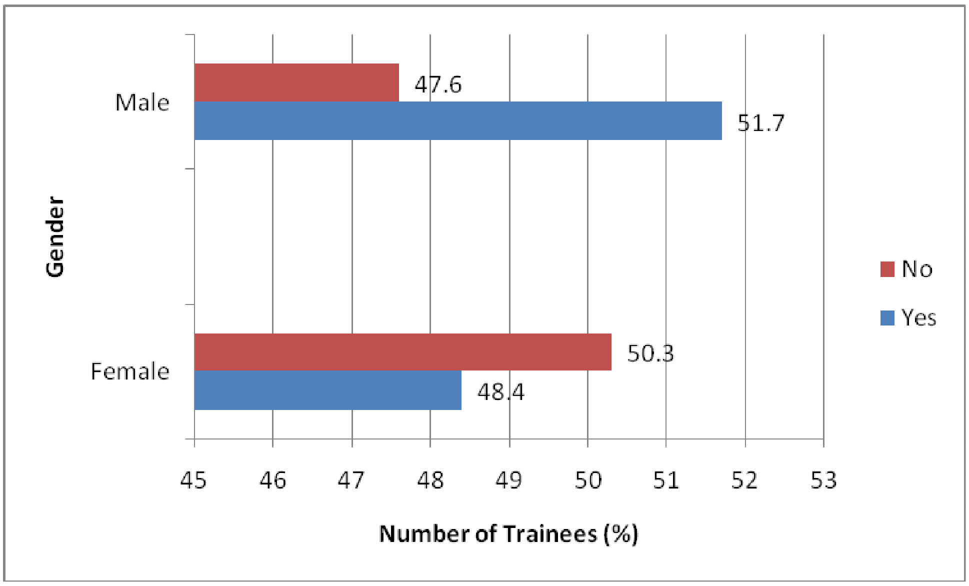


**Figure 2:** Opinion on Whether Knowledge of Science Process Skills Make One a Better Science Teacher According to Gender (N= 300)

The results show that more male trainees (51.7%) than female trainees (48.4%) were of the opinion that knowledge on science process skills makes one a better science teacher. More male trainees had also expressed that their level of conceptualization of science process skills was high compared to female trainees.

Similar studies have indicated that pre-service teachers had poor understanding of science process skills (Emereole, 2009; Mbewe, Chabalengula & Mumba, 2010). Mei et al. (2007) proposes that curriculum designs should emphasize acquisition of science process skills. IBSE approach of teaching science requires that science teachers have good conceptual understanding of SPS. Thus male trainees were more prepared to teach science in primary schools than female trainees.

### 3.3. Perceptions on Whether to Teach Science During and after PTE Training

PTTQ question 7 and 8 investigate PTE trainees' opinions on whether they would choose to teach science during and after their PTE training. The results are shown in Table 7.

**Table 7:** Willingness to Teach Science Subject during and After PTE Training (N=300)

| Responses | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| During Training | | | | | After PTE Training | | | |
| Gender | No Response | Yes | No | Total | No Response | Yes | No | Total |
| Female | 0 (0.0%) | 133 (86.9%) | 20 (13.1%) | 153 (100.0%) | 1 (0.7%) | 137 (89.5%) | 15 (9.8%) | 153 (100.0%) |
| Male | 1 (0.7%) | 131 (89.1%) | 15 (10.2%) | 147 (100.0%) | 0 (0.0%) | 135 (91.8%) | 12 (8.2%) | 147 (100.0%) |
| **Total** | **1 (0.3%)** | **264 (88.0%)** | **35 (11.7%)** | **300 (100.0%)** | **1 (0.3%)** | **272 (90.7%)** | **27 (9.0%)** | **300 (100.0%)** |

The results revealed that almost equal number of male (89.1%) and female (88.0%) trainees would choose to teach science while undergoing PTE training (during teaching practice). Again almost equal number of male (91.8%) and female (90.7%) trainees would further choose to teach science after undergoing PTE training.

Though not many male and female trainees expressed high conceptualization of content in the three sciences subjects (biology, chemistry and physics) taught in secondary school, PTE science content and SPS, and despite the fact that most trainees lacked adequate exposure to the science content, majority of the trainees (male and female) expressed readiness to teach science in primary schools. Hence the attitude of male and female trainees towards teaching science in primary schools was similar and both were equally prepared to teach science in primary schools. Sharbain (2012) asserts that success in teaching profession depends on knowledge, competences and attitudes of the teachers. Hence male trainees perceived themselves to be better prepared in terms of knowledge and competence to teach science in primary schools than female trainees. There is therefore need to ensure PTE trainees both male and female have high mastery of SPS and science subject content so as to improve their preparedness to teach science in primary schools.

### 3.4. Conclusion

Based on the results of this study, more male trainees had been exposed to biology, chemistry and physics subject contents than female trainees. More male trainees than female trainees also expressed high conceptual understanding of science content, SPS and mastery of SPS. Slightly more male trainees than female trainees further expressed willing to teach science during and after training. It can therefore be concluded that male trainees were better prepared to teach science in Kenya's primary schools than female trainees.

### 3.4. Recommendations

The study recommends PTE science tutors to use SPS approach in teaching of PTE science, ensure trainees have high mastery of science subject content and SPS, PTE training to provide a gender-appropriate training to demystify gender differences in performance in science and promote gender equity in science education. Affirmative action be used in subject specialization selection to ensure gender parity in science education. Finally Kenya National Examination Council to include practical science examination measuring competency to teach science.

### Authors

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