

## Learners' Perceptions of the Teaching Effectiveness of Science Tutors during Winter School Sessions

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**ABSTRACT** This study investigated the perceived teaching effectiveness of science tutors by grade 12 learners who attended the Winter School programme. It aimed at equipping them with critical concepts and skills in science and related subjects, organised by a University of Technology in South Africa. The participants were 198 grade 12 learners enrolled for Physical Sciences at the Winter School, comprising 93 (47%) females and 104 (53%) males with age range 17-25 years old. Data were collected by means of a questionnaire on teacher efficacy administered during the final week of the Winter School session and analysed using Descriptive statistics. The study found that, participants (learners) were satisfied with delivery modes utilized by the tutors during teaching sessions. The learners were also content on how tutors managed classroom activities and how they, the learners, were able to reflect upon personal experiences and hands-on discovery learning that can overtly be connected to the tenets of constructivism.

### INTRODUCTION

Students may require supplementary instruction on critical subject content; and this is true across disciplines. In science, learning critical or building block concepts enable learners to form concepts by providing them with suitable experiences to develop skills that will foster their impulse to perform and also in matching their classroom activities with concepts already engrained in their cognitive structures (Mayesky 2012; Tiruneh et al. 2014; Van Heerden 2013). The development of these skills may require tutorial assistance. Axelrod (2008) reported student's perceptions of effective tutorial support as essential for learners to acquire critical science subject matter skills (Corbett and Wilson 2002; Hargreaves 2010; McIntyre and Battle 1998; Thomas 1998; Tiruneh et al. 2014; Tofade et al. 2013). Children take delight in participating in concrete everyday activities, all of which support science and mathematics concept development. Science activities, where children learn through active investigation that provides them with knowledge about the world around them and this investigating process is more important than the knowledge that the children gain (Chuan and Heng 2014; Mayesky 2012). The new knowledge in this case is built upon the prior knowledge and experience the individual has as a result of purposeful actions in a particular situation.

This study investigated learner's perceptions on their acquisition of science subject matter from a winter school session (focusing on science tutor's teaching effectiveness and management of classroom activities) aimed to improve on their performance in mathematics and science.

The Central University of Technology, Free State annually organises winter school sessions aimed at assisting Grade 12 learners, particularly Science learners, with the aim of enhancing their science self-efficacy as well as preparing the learners for the final examinations. Another reason for organising this is to also improve their opportunity to have access to higher education. The two major goals for the project, amongst others, including specific objectives within each of the goals were:

- To reduce the degree of failure rate in Mathematics, Physical Sciences, Life Sciences and Accounting in Grade 12.
- To increase the number of Grade 12 learners who become eligible for a Bachelors programme at a university and also to increase the number of Grade 12 learners who pass Mathematics and Physical Science.

The project was concentrating more on the enhancement of the work done by the schools on Mathematics, Physical Sciences and Life Sciences. Tuition for the learners, during the sessions, is mostly offered in the form of revision so as to supplement what has been taught

at their respective schools during the first semester of the year. It should be noted that, the majority of these learners attend schools located in historically disadvantaged contexts. Such schools lack facilities such as laboratories, libraries, etc. to teach these subjects effectively and efficiently.

Generally, the learners' perceptions, of the tutorial support that they receive, influence their interest to pursue studies in science related fields. This implies that, science tutors can have a notable impact on learners' attitudes and perceptions. Furthermore, this is possible if instruction is appropriately planned and delivered.

### Objective of the Study

The objective of this study was to investigate learner perceptions of subject matter and delivery competence efficacy of science tutors during the June 2014 winter school sessions that were organised by a University of Technology in South Africa.

### Research Question

The study sought to address the following research question:

- How do learners perceive instructional delivery efficacy of the winter school science tutors based on tutors' teaching effectiveness and tutors' efficacy in managing classroom activities?

## METHODOLOGY

### Participants and Setting

A sample comprising 197 grade 12 learners, age range between 17-25 years enrolled for winter

school was used in this study (see the summary on Table 1):

As reflected on Table 1, the entire sample comprised of 109 Black learners, 59 Coloured learners, 25 White learners and 4 Asian learners. In terms of gender; 93 (47%) female learners and 104 (53%) male learners participated in the study. This reflects a fair representation regarding race and gender. All participants had a Mathematics and Physical Sciences background. About 39 (19.9%) of the participants did not have a Biology background.

### Data Collection

Data were collected by means of a ten (10) item instrument questionnaire based on teaching effectiveness of winter school science tutors and how is their efficacy in management of classroom learning activities. The questionnaire was administered at the end of the winter school sessions. Each statement on the questionnaire was scored on a five-point Likert scale with a score of 1 indicating unsatisfactory and a score of 5 to indicate excellent. The completion of the questionnaire took learners approximately ten to fifteen minutes.

### Data Analysis

Data were statistically analysed using Statistical Packages for the Social Sciences (SPSS). Descriptive statistics were used including frequency distribution, measures of central tendencies and measures of variability.

### Ethical Considerations

Permission to conduct the study was sought through the organising committee of the Winter

**Table 1: Demographic data of participants**

|                   | <i>Gender</i>                             |                    | <i>Race</i>       |                      |                   |                   |
|-------------------|---|--------------------|-------------------|----------------------|-------------------|-------------------|
|                   | <i>Male Freq</i>                          | <i>Female Freq</i> | <i>Black Freq</i> | <i>Coloured Freq</i> | <i>White Freq</i> | <i>Asian Freq</i> |
|                   | (53%)<br>104                              | (47%)<br>93        | (55%)<br>109      | (30%)<br>59          | (13%)<br>25       | (2%)<br>4         |
|                   | <i>Mathematics and Science Background</i> |                    |                   |                      |                   |                   |
| Biology           | 88  | 70                 | 99                | 40                   | 15                | 4                 |
| Physical Sciences | 104                                       | 93                 | 109               | 59                   | 25                | 4                 |
| Mathematics       | 104                                       | 93                 | 109               | 59                   | 25                | 4                 |

School project. The aims and objectives of the study were explained verbally to the learners by the researcher prior to their participation (Leedy and Ormrod 2014; McMillan and Schumacher 2014). Participants individually consented. Assurance was given to participants that neither they nor their schools would be identified. All participants concerned were assured that data collected will be treated with utmost confidentiality and anonymity.

## RESULTS AND DISCUSSION

### Learner Perceptions of Teaching Effectiveness

Table 2 displays the mean scores and standard deviations of the 6 items on teaching effectiveness of tutors at the Winter School.

Among the 6 items surveyed as reflected in Table 2 on teaching effectiveness, teacher organisation and preparedness for each class as well as the concern about learners were perceived as very good (Mean = 4.84); learners also perceived that the tutors did very well in covering enough work and material in class amidst time constraints. The ability of tutors in eliciting active participation by learners in teaching and learning activities was also perceived as good

(Mean = 4.79). Learner participation somehow reduces learner dependency on the teachers or tutors. The learners perceived the tutor's ability to actively involve learners in teaching and learning activities as good (Mean = 4.79). Through participation, learners are motivated to learn better and become critical thinkers (Tiruneh et al. 2014; Tofade et al. 2013; Tschannen-Moran and Hoy 2007). If learners feel unappreciated by their teachers or tutors they experience no drive for hard work because they feel they are not treated with respect (Agili et al. 2012; Makgato 2007). The last item rated as good (M = 4.74) by the learners related to the tutor's provision of learning activities that stimulated thinking. Effective teachers are visibly and actively involved in the learning, they endeavour to create trusting relationships and provide structured and yet flexible learning environments (Chuan and Heng 2014; Tschannen-Moran and Hoy 2007; Wolhuter 2010).

### Perceived Tutor Efficacy in Managing Class room Activities

As reflected in Table 3, on managing classroom activities, learners reported commitment to teaching and learning by the tutor as very

**Table 2: Means and standard deviations of tutor's teaching effectiveness**

| No. | Items of teaching effectiveness   | Mean* | Standard deviation |
|-----|---|-------|--------------------|
| 1   | The tutor was well organised and prepared for each class                  | 4.84  | 0.20               |
| 2   | The tutor was concerned about each learner                                | 4.84  | 0.18               |
| 3   | In the time available the tutor covered enough work and material in class | 4.79  | 0.23               |
| 4   | The tutor has a stimulating style of teaching.                            | 4.79  | 0.22               |
| 5   | There was active participation in teaching and learning activities        | 4.79  | 0.22               |
| 6   | The tutor provided learning activities that stimulated thinking           | 4.74  | 0.27               |

\*excellent (4.90-5.00); very good (4.80-4.89); good (4.70-4.79); marginal (4.50-4.59); unsatisfactory (1.00-4.49).

**Table 3: Means and standard deviations of tutor's efficacy in managing classroom activities**

| No. | Items of management of classroom activities   | Mean* | Standard deviation |
|-----|---|-------|--------------------|
| 1   | The tutor commitment and professionalism were displayed when conducting teaching and learning activities. | 4.82  | 0.22               |
| 2   | The tutor gives individual attention and feedback on learner mastery of learning.                         | 4.81  | 0.26               |
| 3   | The tutor motivates learners to pursue learning activities  | 4.80  | 0.22               |
| 4   | The tutor effectively managed teaching and learning activities  | 4.79  | 0.24               |

\*excellent (4.90-5.00); very good (4.80-4.89); good (4.70-4.79); marginal (4.50-4.59); unsatisfactory (1.00-4.49).

good (M=4.82). Commitment is important because it is one of the key factors of successful teaching and learning (Sridhar and Javan 2011; Wolhuter 2010). Giving individual attention and feedback to learners is very important. This item was also rated very good (M= 4.81) as cited by Ip (2005), the knowledge that learners are progressing well gives them a sense of achievement and motivates learning. Learners need to know where they have gone wrong so as to take corrective measures. When people receive “evaluative feedback” (Bandura 1997: 101) they seem to strengthen their belief on the capabilities they have to achieve what they want. Prompt, quality and constructive feedback could encourage learner’s learning and provide experiences that could bolster self-confidence.

The ability of tutors to motivate learners to pursue learning activities was rated very good (M= 4.80). Learner participation somehow reduces learner dependency on the teachers or tutors. The learners perceived the tutor’s ability to actively involve learners in teaching and learning activities as good in this aspect (M= 4.79). Through participation, learners are motivated to learn better and become critical thinkers (Tiruneh et al. 2014; Tschannen-Moran and Hoy 2007).

From the results of both Winter School Tutors teaching effectiveness and management of classroom activities as perceived by the learners, it is very evident that learners perceived the teaching effectiveness and management of classroom activities from the tutors as good. The psychological safety within the learning environment influences the learners’ motivation, perceptions, and achievement of desired outcomes.

### **Implications**

A committed and caring teacher displays interest in his/ her learners, makes them feel comfortable and this creates a conducive teaching and learning environment in the classroom. Norman (2004: 19) asserted that “when you feel good... you are better at brainstorming, at examining multiple alternatives.” Learners place a premium on tutors who are cognisant and respectful of them as human beings.

Participants clearly indicated that they believe Winter School science tutors were effective teachers because they displayed a strong content knowledge as well as pedagogical knowledge and expertise on how to teach what they

know involving learners actively and engaging them in meaningful activities during lesson presentation. Science building blocks of knowledge and skills are accumulated and built upon through experiences and physical activities that learners are engaged in (Tiruneh et al. 2014; Van Heerden 2013; Parajes 1992). Learners learn in many different ways; it is therefore important to deliver the lesson effectively in as many ways as necessary and possible.

### **CONCLUSION**

The study found that participants were satisfied with the teaching effectiveness and management of classroom activities by the winter school science tutors. Winter school appears effective for enhancing student’s hands-on discovery learning of science concepts. Learning to comprehend in a science classroom requires well-designed hands on, as well as minds on, activities that challenge the learner’s existing conceptions leading them to reconstruct their personal theories. The learners seemed aware of their own preferred teaching and learning styles, classroom activities and beliefs, moving towards the achievement of reform oriented constructivist approaches to learning physical science. Also, being more informed about the tutor’s teaching efficacy can assist the organising team to improve or sustain educational standards by providing excellent tutors to learners, thus ensuring effective teaching and learning during Winter School Sessions. This may lead to overall improvement of tutor teaching efficacy, quality and improved results.

### **RECOMMENDATIONS**

Since this study was only based on learner perceptions of subject matter and efficacy of the winter school science tutors, it is recommended that further studies should cover the other teaching subjects at school level and not only during winter school. This will give an absolute finding on teaching effectiveness of tutors across all the teaching subjects.

### **LIMITATIONS**

The findings of this study were based on the analysis of the conceptions of 193 grade 12 learners who were enrolled for physical science

on their perceptions of subject matter and delivery competence efficacy of their tutors at the June 2014 Winter School sessions. Therefore the sample size, sample frame and sampling method make it difficult to generalise these results to the whole population of grade 12 learners.

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