FACTORS INFLUENCING QUALITY OF FEEDBACK IN TEACHING IN BOTSWANA SENIOR SECONDARY SCHOOLS.

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ABSTRACT

Feedback is a very effective technique in assessment for learning and its absence during teaching rids classroom assessment of its effectiveness in enhancing learning. This study explored the quality of teacher feedback in Gaborone senior secondary schools through determining the extent to which the school culture, the level of students’ achievement, the gender of the teachers, as well as the level of difficulty of the questions that the teachers ask influence the quality of feedback in mathematics classrooms. A questionnaire (α = .78) was used to collect survey data from 306 students in three private and four public senior secondary schools in the city of Gaborone. Data were analyzed using t-test, and ANOVA inferential statistical techniques. The main findings showed that the quality of feedback in mathematics lessons was significantly poor; and the gender of teachers had no significant influence on the quality of feedback. However, the type of school, the level of difficulty of questions asked, and the achievement levels of students had significant influence on the quality of feedback given in mathematics classes. Similarly, the interaction of gender and students’ achievement level had significant influence on students’ perception of the quality of feedback. Based on these findings, relevant recommendations have been made.

Key words: Quality of feedback, assessment for learning, mathematics teacher, student’s perceptions, senior secondary school in Gaborone.

1. INTRODUCTION AND BACKGROUND

Feedback in communication, whether in or outside the classroom, is a useful technique for ensuring effective impartation and acquisition of knowledge, skill and habits. In the classroom, it is seen to play vital role in teaching and learning. The modern understanding of the concept feedback dates from the 1920s whereby feedback was used in electronics to explain the distortion of sound due to “the return of the output signal from one stage of a circuit … to the input of the same or preceding stage … tending to increase or decrease the amplification” (Oxford, 2006). This is when the sound from the loudspeaker reaches the microphone thereby distorting the quality of the sound. But unlike in electronics, in teaching feedback is construed as the interactive process in which the teacher offers constructive advice with the intention of improving the learner’s performance (Van de Rider, Stocking, McGaghie & Gate, 2008; Conn, 2002). This means that feedback is the information provided to the learner about his/her performance in a given task giving insight into his or her performance with the intention of promoting positive, improved and desirable behaviours (Archer, 2010; Clynes & Raftery, 2008).

1.1 Assessment for Learning

Brophy (1986) defines assessment as, “a systematic process of gathering information about what a student knows, is able to do, and is learning to do” (p.324). Assessment is an
The integral part of instruction that enhances, empowers, and celebrates student learning. He adds that, “mathematics classroom assessment should therefore provide opportunities where students’ misconceptions are clarified and challenges are posed with the goal of improving and celebrating student learning” (p.328). The ultimate call to this challenge is two fold: students’ empowerment and clarification of misconceptions. This clarification of misconceptions can be achieved through effective teacher’s feedback in the classroom.

Additionally, other researchers have suggested that between the two types of assessment (formative or summative) being propagated in modern debates, formative assessment substantially enhances learning (Black, Marshall & William). Also Popham (2008) argues that that any activity in form of tests or examinations or quizzes, project work constitutes formative assessment provided the results are used by both students and teachers to adjust the manner in which they currently do things. He explicitly defines formative assessment as “a planned process in which teachers or students use assessment-based evidence to adjust what they're currently doing”. This adjustment essentially calls for effective feedback practices to improve learning in the classroom. That is, quality feedback embraces assessment for learning (and not of learning where the learner is assessed by a mark/grade to show the level of achievement of the desired outcomes).

1.2 Quality of Effective Feedback

The quality of effective feedback has also been an area of interest for researchers on feedback in teaching. Effective feedback is helpful feedback. It is the feedback in which information about previous performance is used to promote positive and desirable development (Archer, 2010). Effective feedback is the feedback that is objective and descriptive of what was actually observed. A key characteristic of effective feedback is that it should be highly specific and descriptive of what actually occurred (Wiggins, 1998). This means that effective feedback is one that is based on observable behaviour, not on assumed intentions or interpretations (Conn, 2002).

The other quality of effective feedback is that it should relate specifically to the task and behaviour at hand. Latham (2009) reported that learners strictly wanted feedback to be associated with the assessed tasks. Archer (2010) argues that effective feedback should be directly linked to the task. This means that effective feedback is that which informs learners of what they are doing wrongly or what they have misunderstood. Hewson and Little (1998) have made detailed examination of the qualities of effective feedback. They argue that effective feedback is one that focuses on specific skills and makes specific suggestions for improvement on what was actually observed. In this case, they conclude that effective feedback is corrective feedback. In addition they state that effective syllabus is one that is given lovingly, friendly, supportively, and caringly.

1.3 Factors that Influence Quality of Feedback

Some attempt has been made to explore the factors that influence the quality of feedback. Hewson and Little (1998) have isolated some of the factors; they include: being too general, being judgmental, giving gratuitous information, not soliciting person’s ideas, and giving feedback in inappropriate places. A number of researchers concur that the timing of feedback has the most considerable influence on the effectiveness of feedback. For example, Wood (2000) argues that the closer in time to the event, the more profitable the feedback will be for the learner. Parikh, et al (2001) found overwhelming evidence that learners prefer immediate individual feedback. Latham (2009) confirmed that learners wanted early feedback because it gave them greater opportunity to improve their performance. Similarly, Archer (2010) discovered that feedback given immediately after the behaviour is more effective than delayed feedback. The current study was a departure from the previous ones as it investigated the influence of teachers’ gender, school type, learner’s level of achievement, and difficulty level of the questions on the quality of feedback in mathematics classes in senior secondary schools in Gaborone.
2. PROBLEM AND PURPOSE OF THE STUDY

Lack of learners’ active participation in the learning process has been repeatedly attributed to poor feedback (Nenty, Adedoyin, Odili & Major, 2007). Non-provision of instant answers as to “why is my answer incorrect?” discourages classroom participation and affects learning. According to Shute (2008) poor feedback tends to result in frustration, anxiety and other psychological emotions. Therefore it is imperative to know how specific characteristics and practices of the teachers, learners, and schools influence the quality of feedback in teaching. This study investigated the quality of feedback and the extent to which the quality of feedback is influenced by factors such as the teachers’ gender, the type of school, the level of learners’ achievement as well as the level of difficulty of questions asked in mathematics classes in senior secondary schools.

2.1 Hypotheses

The following research hypotheses were posited to be tested in the null form:

$H_{01}$: Feedback in Gaborone senior secondary schools’ mathematics lessons is significantly poor.

$H_{02}$: In the perception of the students, the gender of mathematics teachers in Gaborone senior secondary schools significantly influences their quality of feedback.

$H_{03}$: The type of mathematics syllabus into which a learner enrolls has a significant influence on the quality of feedback in mathematics lessons in Gaborone senior secondary schools.

$H_{04}$: The type of school has significant influence on the quality of feedback in mathematics lessons in Gaborone senior secondary schools.

$H_{05}$: The level of difficulty of questions has significant influence on the quality of feedback in mathematics lessons in Gaborone senior secondary schools.

$H_{06}$: In mathematics lessons in Gaborone senior secondary schools, learners’ perceptions of the quality of the feedback given by their mathematics teachers are significantly influenced by the interaction of their gender and the level of achievement.

3. REVIEW OF LITERATURE

3.1 The Quality of Feedback

Giving feedback is an integral part of classroom instruction that enhances, empowers and celebrates student learning (Taplin, 2007). Brophy (1997) suggests that mathematics classrooms should provide opportunities where students’ misconceptions are clarified and challenges are posed with the goal of improving and celebrating student learning. Sutton and Krueger (2002) describe effective mathematics teachers as those teachers who ask questions of all types during their lessons. They further state that effective teachers pose more questions with higher cognitive demand, and ask more follow-up questions. Such questioning techniques prompt the students to also ask more questions, as compared to the less effective teachers. On the contrary however, most studies carried out in Botswana have reported learner passiveness in mathematics lessons where teachers just give an example, then get the students to practice on similar exercises, while the teacher sits down or goes round evaluating their performance by marking their answers right or wrong (Kaino, 2003; Taole & Chakalisa, 1995; Prophet & Rowell, 1991).

3.2 Gender and Quality of Feedback

According to Fuller and Snyder (1991), learners tend to feel freer to participate more in a female teacher’s class than in a male teacher’s class. Female teachers tend to be less reprimanding and more tolerant to students. Moreover, they tend to be more friendly and sociable with learners. Fuller & Snyder also found out that in classrooms for female teachers the spirit of anticipation was high and the relationships of care and trust were more evident. Based on these gender-based findings, one would therefore assume that there would be interaction and consequently more effective verbal feedback in female teachers’ classrooms than in classrooms of male teachers.
Furthermore, studies on the influence of gender on feedback also suggest that the gender of the learner has influence on the quality of feedback. For example, Jones (2007) indicates that in Wales there is a lot of anxiety and less enjoyment among girls than boys during mathematics lessons; hence the resulting limited participation of girls in Mathematics classrooms; while boys have remained vocal. This has compelled the teachers to offer them more elaborate feedback than girls. Similarly, Kaino (2003) has reported that in most Mathematics classes in Botswana junior secondary school girls are fearful and shy to respond in Mathematics classes.

### Type of School and Quality of Feedback

Johnson (2006) observes that private schools in United Kingdom give learners the social skills they need to get on in the workplace where the ability to communicate, interact and engage in constructive debates on issues is essential. He also urges the public schools to develop the social and emotional aspects of education besides academic and vocational skills. Such interactive social skills are not evident in public schools in Botswana (Fuller & Snyder, 1991). With limited interaction in public schools, quality feedback would be wanting. In addition, the significantly higher performance in private senior secondary schools in most national examinations seems to suggest that there is more quality feedback in private secondary schools than in public senior secondary schools in Botswana (Botswana Examinations Council, 2003).

#### 3.3 Quality of Feedback and Students’ Achievement

Cangelosi (1993) laments the fact that many activities in mathematics classes confront learners with high-level cognitive questions. As such, it is only those learners who have good reasoning skills that are likely to engage and participate fully. But learners with weak reasoning powers have difficulties in learning. For example, Loveridge and Taylor (2005) found out that higher-achievers in mathematics were more articulate and reflective, and considered learning from a process more important than the final answer. These findings suggest that a class with higher achievers is likely to elicit more responsive feedback from their teachers.

## 4. RESEARCH METHODOLOGY

A descriptive survey design employing quantitative methods of data collection and analysis was found to be the most suitable because according to Nenty (2008) and Gay, Mills and Airasian (2006), survey research involves a comprehensive look over, collecting, analyzing and interpreting data that represent phenomena to determine the components, conditions or relationship that exist and the processes or trends that are developing under the tenability of a research hypothesis or a research question.

### 4.1 Population and Sampling Procedures

The target population was students and mathematics teachers from eleven Gaborone public senior secondary and private high schools. Only seven were selected for the study: three private and four public. This represented 64% of the eleven schools in Gaborone. Convenient sampling method was used to select the schools involved in the study. In all 53 teachers of mathematics were involved in the study. This represented 66% of the total population of the teachers in the selected secondary schools. The total number of students involved in the study was 306 students. This was 10.2% of the total population of the students in the eleven senior secondary schools in Gaborone. The purposive method of random sampling was used to select the samples of both the teachers and the students from the seven senior secondary schools selected for the study.

### 4.2 Instrumentation

The study used questionnaires as instruments for collecting data. There were two separate questionnaires: one for students and the other for teachers. Both questionnaires had two sections: the first required respondents to give details of their biographical data like gender, age range, experience, and type of school. The second section of the questionnaire for students had a four-point Likert scale with 30 closed-ended items. The questionnaire for teachers used a five-point Likert scale with 20 closed-ended questions.
4.3 Data Collection

The researcher arranged with the school administration to visit the schools and administer the questionnaires at the times that were convenient to both the teachers and the students. The researcher gave the questionnaires to the heads of respective mathematics departments who passed them on to the willing teachers and students to complete. The researcher then went back to collect the completed questionnaires at agreed times when the teachers had free time. The questionnaires for students were also collected by the researcher at the same time as those for the teachers. The return rate of questionnaires for teachers was 88%; for students it was 93%.

5. DATA ANALYSIS

Descriptive statistics were used to analyze quantitative data. Statistical Package for the Social Sciences (SPSS) was used in this regard. There were a total of 306 students involved in the study. There were 139 boys, of whom 84 came from public secondary schools and 55 from private schools. There were 167 girls, 94 of whom came from public schools and 73 from private schools. So in all, there were 128 students from private schools and 178 from public schools. Out of the 306 students, there were 139 boys and 167 girls. Out of 139 boys, 71 were studying core syllabus, while 68 were doing Extended Syllabus. Out of 167 girls, 96 were studying core syllabus and 71 were doing Extended Syllabus. Finally, out of 306 students, 112 were taught by female teachers and 194 were taught by male teachers. There were 53 mathematics teachers involved in the study, 41 came from public secondary schools and 12 from private secondary schools.

5.1 Hypotheses Testing.

The data were analyzed and the results presented according to the null hypotheses of the study:

$H_01$: In the perception of the students, feedback in Gaborone senior secondary schools’ mathematics lessons is not significantly poor.

In order to explore the quality of feedback in mathematics lessons, a population t-test was performed (see Table 1) and this gave a $t$-value of $-8.226$ (df = 305), which was found to be higher than the critical $t$-value of 1.98 ($\alpha = .05$) indicating a significant difference. The negative $t$-value implies that it is a lower observed mean than expected indicated that, based on the perception of the students, the quality of feedback in mathematics classrooms in Gaborone senior secondary schools is significantly poorer than expected by the students.

<table>
<thead>
<tr>
<th>Quality of feedback as perceived by students.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\mu$</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>22.50</td>
</tr>
</tbody>
</table>

* $p < .05$; Critical $t$ = 1.98

$H_02$: In the perception of the students, the gender of mathematics teachers in Gaborone senior secondary schools does not significantly influence their quality of feedback.

In order to find out if the gender of mathematics teachers has a significant influence on the quality of feedback. Data from 194 students taught by male teachers and 112 students taught by female teachers were
analyzed. The hypothesis was tested using an independent t-test analysis. This yielded an insignificant difference (t = 0.531, df = 304, p < .596; see Table 2). That is, in the perception of the students, the gender of teachers had no influence on the quality of feedback.

Table 2: Independent t-Test Analysis of Students’ Perception of Gender Influence of Teachers on Quality of Feedback.

<table>
<thead>
<tr>
<th>Gender of teacher</th>
<th>n</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
<th>df</th>
<th>t-value</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>194</td>
<td>21.186</td>
<td>2.857</td>
<td>0.205</td>
<td>304</td>
<td>0.53</td>
<td>.596</td>
</tr>
<tr>
<td>Female</td>
<td>112</td>
<td>21.000</td>
<td>3.087</td>
<td>0.292</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>306</td>
<td>21.118</td>
<td>2.940</td>
<td>0.168</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

H03: The type of mathematics syllabus into which a learner enrolls has no significant influence on the quality of feedback in mathematics lessons in Gaborone senior secondary schools.

This hypothesis was tested to explore if the level of achievement of students influences the quality of feedback offered by their teachers. Data from 139 students doing extended syllabus (higher level of achievement) and 167 students doing core syllabus were analyzed. A two-way analysis of variance was performed to test the hypothesis. Based on students’ perception of quality of feedback in mathematics lessons, there was a significant influence of learners’ level of achievement on the quality of feedback. (F = 12.077, df = 1, 302; p = .001; see Table 3). That is, those doing extended syllabus perceived the quality of feedback of their teachers as significantly higher (with a mean of 21.72) than those doing core syllabus (with a mean of 20.62).

Table 3: One-way Analysis of the Influence of Level of Achievement on Student Perception of Quality of Feedback by their Teachers.

<table>
<thead>
<tr>
<th>Type of Syllabus/ Level of Achievement</th>
<th>n</th>
<th>Mean</th>
<th>Std Dev.</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core syllabus</td>
<td>167</td>
<td>20.617</td>
<td>3.065</td>
<td></td>
</tr>
<tr>
<td>Extended syllabus</td>
<td>139</td>
<td>21.720</td>
<td>2.670</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>306</td>
<td>21.118</td>
<td>2.940</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syllabus</td>
<td>100.186</td>
<td>1</td>
<td>100.186</td>
<td>12.077</td>
<td>.001</td>
</tr>
<tr>
<td>Error</td>
<td>2505.392</td>
<td>302</td>
<td>8.296</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2605.578</td>
<td>305</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
H04: The type of school has no significant influence on the quality of feedback in mathematics lessons in Gaborone senior secondary schools.

In order to find out if the type of school influences the quality of feedback, a two-way analysis of variance was done using data from 128 students from private high schools and 178 students from public schools. The type of school (public and private) showed that there was a significant influence ($F = 5.329, df = 1, 302; p = .022; \text{see Table 4}$) on students’ perception of the quality of feedback in mathematics classes. That is the quality of teachers’ feedback in private schools is perceived by students as significantly higher (with a mean of 21.5) than that in public schools (with a mean of 20.8).

Table 4: One-way Analysis of the Influence of Type of School on their Perception of the Quality of Teachers’ Feedback

<table>
<thead>
<tr>
<th>Type of school</th>
<th>n</th>
<th>Quality of feedback</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>128</td>
<td>21.539</td>
<td>2.913</td>
</tr>
<tr>
<td>Public</td>
<td>178</td>
<td>20.815</td>
<td>2.929</td>
</tr>
<tr>
<td>Total</td>
<td>306</td>
<td>21.118</td>
<td>2.940</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of School</td>
<td>1</td>
<td>45.439</td>
<td>5.329</td>
<td>.022</td>
</tr>
<tr>
<td>Error</td>
<td>302</td>
<td>8.526</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>305</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

H05: The level of difficulty of questions has no significant influence on the quality of feedback in mathematics lessons in Gaborone senior secondary schools

An independent t-test analysis was done to find out if the level of difficulty of questions asked in class influences the quality of feedback. While 149 students perceived the difficulty level of questions asked by their teachers as low, 157 students perceived them as of high. Data were later analyzed to find out how these levels of difficulty of questions influence the quality of feedback. The difficulty level of questions showed significant influence ($t = -2.855, df = 304, p = .005; \text{see Table 5}$) on the quality of feedback. The high difficulty level of questions had significantly more influence than the low one. That is, the higher the level of difficulty of questions the higher the quality of feedback.
Table 5: Independent t-Test Analysis of the Influence of Difficulty Level of the Questions on Quality of Feedback in Mathematics Classroom.

<table>
<thead>
<tr>
<th>Difficulty Levels of Question</th>
<th>n</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>df</th>
<th>t-value</th>
<th>p&lt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>149</td>
<td>20.630</td>
<td>2.881</td>
<td>.236</td>
<td>304</td>
<td>-2.855</td>
<td>.005</td>
</tr>
<tr>
<td>High</td>
<td>157</td>
<td>21.580</td>
<td>2.929</td>
<td>.234</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>306</td>
<td>21.118</td>
<td>2.940</td>
<td>.168</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

H06. In mathematics lessons in Gaborone senior secondary schools, learners’ perceptions of the quality of the feedback given by their mathematics teachers are not significantly influenced by the interaction of their gender and the level of achievement.

In order to find out if the interaction of gender of students and the level of achievement has influence on the quality of feedback; a two-way analysis of variance was performed. Out of 167 students doing the core syllabus, data was analyzed from 71 male and 96 female students; and out of 139 students doing extended syllabus, data was analyzed from 68 male and 71 female students.

Table 6: Two-way Analysis of the Influence of Level of Achievement and Gender of students on Student Perception of Quality of Feedback by their Teachers.

<table>
<thead>
<tr>
<th>Level of Achievement</th>
<th>Gender of Student</th>
<th>n</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement Level for Core Syllabus</td>
<td>Male</td>
<td>71</td>
<td>20.282</td>
<td>3.398</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>96</td>
<td>20.865</td>
<td>2.786</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>167</td>
<td>20.617</td>
<td>3.065</td>
</tr>
</tbody>
</table>
Achievement Level for Extended Syllabus

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>68</td>
<td>71</td>
<td>139</td>
<td>139</td>
<td>167</td>
<td>306</td>
</tr>
<tr>
<td>2.722</td>
<td>2.572</td>
<td>2.6707</td>
<td>3.214</td>
<td>2.698</td>
<td>2.940</td>
<td></td>
</tr>
</tbody>
</table>

Source of Variation

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>p&lt;.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syllabus</td>
<td>100.186</td>
<td>1</td>
<td>100.186</td>
<td>12.077</td>
<td>.001</td>
</tr>
<tr>
<td>Gender</td>
<td>1.214</td>
<td>1</td>
<td>1.214</td>
<td>.146</td>
<td>.702</td>
</tr>
<tr>
<td>Syllabus * Gender</td>
<td>37.842</td>
<td>1</td>
<td>37.842</td>
<td>4.562</td>
<td>.034</td>
</tr>
<tr>
<td>Error</td>
<td>2505.318</td>
<td>302</td>
<td>8.296</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2635.765</td>
<td>305</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2 Summary of Findings.

The study found that the quality of feedback in mathematics lessons in senior schools in Gaborone is poor. Gender of both teachers and students has no influence on the quality of feedback; higher achievers (doing extended syllabus) perceive their teachers’ feedback as of higher quality than the low achievers (doing core syllabus). Private schools offer more quality of feedback than public schools. Regarding the influence of difficulty level of questions on the quality of feedback, the higher the level of difficulty of questions, the higher the quality of feedback. Whereas male students doing extended syllabus perceive their teachers’ feed back as of more quality than female ones.

6. DISCUSSION

This study investigated the quality of feedback and the extent to which the quality of feedback is influenced by factors such as the type of school, the level of learner’s achievement, the gender of learner and teacher as well as the level of difficulty of questions in mathematics lessons at senior secondary school level. In the perception of the learners, feedback in mathematics classrooms in senior secondary schools in Gaborone was found to be poor in quality. The quality of feedback seemed to depend not on the gender of the teacher or learner, but rather on the type of school (public and private), the level of achievement of the learners, the difficulty level of the questions asked in class and the interaction of gender and the level of students’ achievement. As regards the quality of feedback, the finding of this study concurs with the findings of studies by Taole and Chakalisa (1995) who found out that feedback in mathematics in Botswana was poor.

For the students, a mathematics teacher is effective to the extent that he or she asks many and varied questions. Such teachers not only posed more questions with higher cognitive demand, but also asked more follow-up questions. This confirmed the findings of Sutton and Krueger (2002). Providing students with the opportunity to ask and answer questions in class is the hallmark of good quality feedback. And the absence of such opportunity tends to prompt anxiety and fear of the subject among the learners; and hence leads to poor interaction. This may subsequently limit teachers in giving feedback. Prompt attempts to clarify their doubts and correct their errors are in effect giving effective feedback to students. This strengthens understanding of the content, and enhances performance in a subject like mathematics which is viewed by many as difficult. Unfortunately, lack of such effective feedback as found out in this study could be a contributing factor to poor performance and students’ negative attitude towards mathematics.

The study found out that gender of both students and teachers does not influence their perceptions on the quality of feedback. This is
contrary to the finding of the study by Kaino (2003) that girls are shy and fearful in mathematics lessons at junior secondary school level in Botswana. One would suggest that may be at senior secondary school level girls are mature enough and career-oriented such that their attitude towards mathematics is more positive. About the gender of teachers, the finding is contrary to the finding of the study by Fuller and Snyder (1991) who suggested that female teachers are perceived by students as more tolerant and caring hence more elaborative feedback is enhanced. In this study, that was not the case. This could reflect the commonalities of feedback practices by mathematics teachers in the classroom which are not teacher-gender biased at senior secondary school level.

The findings also suggest that a class with higher achievers is likely to elicit responsive feedback from their teachers. This confirms the findings of Loveridge and Taylor’s (2005) that higher-achievers in mathematics were more articulate and reflective and that these achievers considered learning from a process more important than the final answer. In addition, the study found out that girls who are high achievers perceived quality of feedback by their teachers as lower than boys. According to other studies by Loveridge and Taylor (2005), they found out that more girls than boys thought that learning a process was more important than obtaining a correct answer. Learning through a process, knowing what is wrong or right and why, and step-step interaction about a specific task are aspects of effective feedback (Archer, 2010). Consequently, the finding in the study suggests that teaching practices in high achievers’ classes lack learning through a process and step-step interaction.

This study also found out that teachers in private secondary schools provided more quality feedback than those in public schools. This might be so because, according to Ingersoll (1999), the teachers in private schools were more experienced, better qualified and had smaller classes than those in public schools.

Mixed findings have been observed as to the level of difficulty of questions and their influence on feedback. It was found out that higher order questions ignite more explanations from the teacher, who hence provides more quality feedback. This supports the findings of Jones and Jones (2004). However, on the contrary, higher order questions tend to make low achievers to feel discouraged. This prompts the teachers to provide supportive feedback. The quality of feedback, therefore, tends to improve with the difficulty level of questions. This implies that difficult questions cause teachers to give extensive and therefore quality feedback. This confirms the findings of Fuller and Snyder (1991) that secondary classrooms in Botswana have vocal teachers but silent students.

**Recommendations**

How do mathematics teachers in public schools achieve the same or higher level of quality feedback as do teachers in private schools?

1. Given the importance of feedback in mathematics learning, workshops should be mounted by the Ministry of Education and Skill Development (MoESD) to train teachers in the skills of giving quality on-the-spot verbal and written feedback.

2. Skill in using feedback in assessment for learning should be developed and encouraged among teachers through such workshops.

What should mathematics teachers practice in order to enhance the quality of feedback?

3. They should vary the difficulty level of questions knowing that higher order questions give them the opportunity to provide more effective feedback.

4. They should be gender sensitive when giving feedback to female and male students in an extended class (high achievers), as students do not perceive feedback the same way. Female students’ perception is lower hence it needs to be enhanced. This might be done by intensifying learning through a process and step-step interaction about a specific task.

5. They should vary the styles of giving feedback knowing that the low and high achievers perceive feedback strategies differently. Offering
the same feedback strategies in the same way to both low and high achievers might not be as effective.

7. REFERENCES


