Feedback that Facilitates Learning: Perceptions of Mathematics Student Teachers in a Higher Learning Institution in Central Zambia

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ABSTRACT

Lecturer's feedback on students' written tasks is generally considered as one of the primary means of learning in higher learning institutions. While this is the case there is little known research on student teachers' perspectives of the content of the feedback on written assessment tasks that can facilitate students' learning. This qualitative study first establishes the nature of the feedback that is given to Mathematics student teachers. It then, through the student teachers' shared perceptions, finds out the effectiveness of lecturers' feedback on students' written tasks in improving students' learning and preparing them for giving feedback. Data were collected through document review and interviews from 20 purposively selected fourth year student teachers majoring in Mathematics at a University in Central Zambia. The study was guided by Hattie (2009) framework on effective feedback. The findings show that the student teachers acknowledged that lecturers' written feedback is an important learning strategy, but it had not been effective enough in improving their learning and preparation for giving feedback. They indicated that there were problems with the feedback they had been receiving. The problems identified as being associated with the feedback received included: (a) no clear understanding of the meaning of the given feedback (b) no clear understanding of what may need to be done to improve (c) feedback mode of delivery and timeliness. The results of this study suggest some key qualities of effective feedback and provide insights into possible changes in the nature of, and approach toward feedback on written assessment tasks for Mathematics student teachers who themselves are also being prepared for the role of giving feedback.

Keywords: Feedback, Effective, Mathematics student teachers, Perceptions, Learning

INTRODUCTION

Teacher Education (TE) is designed to prepare student teachers (STs) to teach effectively and enhance learners' learning (Sandholtz, 2011). TE programmes in Zambia commonly offer student teachers (ST) compulsory education courses, including educational psychology, sociology of education and special education, which relate to educational theory and practice. According to Banja & Mulenga (2019) such courses are designed to provide general and foundational knowledge and skills for teaching. ST also have to take courses in their two chosen teaching subjects of specialization through which they would further develop skills and knowledge relating to the content area of the teaching subject(s) they have chosen to specialise in. When in third year, the students are supposed to add on what is generally considered as methodology courses which are pedagogical in nature' (Nalube, 2014, p.17). These are the courses which contribute to the development of pedagogical content knowledge which include techniques, strategies and procedures for teaching and assessing understanding of the content of the chosen subject of specialization.

Feedback on written assessment tasks in TE

Assessment is an integral part of Higher Education level teaching and learning (Brown, 2020; Masaiti, Kakupa and Mupeta 2023; Bwembya and Daka, 2024) including TE. Assessments can be in the form of written

assignments, tests and examination. They can be given to individual or group of students depending on the: setting(s), objectives of the assessment and learning and the nature of course/course content. In whichever case and especially in the formative assessment context, feedback is supposed to be given to the students.

Feedback can be defined as information about the gap between actual level and the desired level of performance, which in turn leads to corrective action to minimize the gap (Ramaprasad, 1983; Buhagiar, 2013; Daka, Namafe and Katowa – Mukwato, 2019). It is information given to the students about their performance in relation to learning outcomes (Aligula, 2024). Evans (2013) comments that Feedback can have different functions depending on the needs of the learner, the purpose of the task, the learning environment and the adopted feedback paradigm. However, its core aims include: producing improvement in students' learning; redirecting or refocusing the students' actions to achieve a goal, by aligning effort and activity with an outcome and; improving confidence, self-awareness and enthusiasm for learning is being taught (Evans, 2013; Agricola, Prins and Sluijsmans, 2020; Kanchebele-Sinyangwe and Daka, 2022; Gálvez-López, 2025). It is also one way of preparing student teachers to assess and give feedback later on when they become teachers (Ahmad, Noorani and Sewani, 2025: Rahman, Irfan, Yusuf, Ali and Abadi, 2025).

Thus feedback on students' assessment tasks, verbal or written, plays an important role in the teaching/learning process (Black and William, 1989; Hattie, 2009; Wiliam, 2011; Kanchebele-Sinyangwe and Lubbungu, 2020; Daka, Mulenga-Hagane, Mukalula-Kalumbi and Lisulo, 2021). Studies such as by: Mulenga - Hagane, Daka, Msango, Mwelwa, and Kakupa, 2019; Daka, Chipindi and Mwale, 2020 and; Daka, et al, 2021 have been done in the Zambian context to show how feedback contributes to students' learning. While feedback is one of the primary means of learning in higher education institutions there is little known research on the content of the feedback that can contribute to mathematics student teachers' learning and preparation for giving feedback to learners at the time they will be serving teachers. Hence this study. The following research questions were used to collect data on how feedback can facilitates learning. (1) What is the nature of lecturers' feedback on students' written tasks? (2) How do students' perceive lecturers' feedback, on their written tasks, with respect to its effectiveness in contributing to their learning?

METHODOLOGY

This study adopted a qualitative descriptive research design. A total of 65 fourth year mathematics major student teachers made the population. They were in their final year of their TE programme and were considered to have been more widely exposed to receiving feedback based on the assessment tasks they had engaged in for their minor, major subjects of specialization and education courses than the third, second or first year mathematics students and hence capable of providing the in-depth data required for the study. Out of the 65, 20 not only completed the open ended questionnaire, but also availed some marked (lecturer-checked) assessment scripts, from the different courses they were undertaking, and indicated willingness to be interviewed. These 20 are the ones that made the sample of the study. The data presented in this paper is drawn from the reviewed documents (lecturer-checked/marked student assessment scripts) and interviews conducted. Thematic analysis for qualitative data was used which led to the identification of themes relevant to the study. The study was guided by Hattie (2009) framework on effective feedback.

Framework for understanding effective feedback

What may qualify to be effective feedback may differ across disciplines, but Hattie (2009) provides a framework for understanding effective feedback. There are three major areas of effective feedback from the framework. The first looks at 'where am I going?' This question is answered through a clear set of goals given to students. It is vital that lecturers communicate purpose for an assessment with the students. This may entail demonstrating to students what an A+ paper looks like and provide a contrast of what a C- paper looks like. This is more applicable to higher learning institutions.

The second area of the framework is 'how am I going?' This looks at the delivery of effective and timely feedback. Daka, et al (2021) emphasised that feedback must be timely. When student feedback is given immediately after showing proof of learning, the student responds and remembers the experience about what is being learned more positively. When feedback is delayed the student might not connect it (the feedback) with the learning moment.

The third and last area in the framework focuses on, 'where to next?' This is a very vital question in feedback. In this area, students need to know what they have to do for them to reach the goal. In order to guide where to next, the feedback should be focused, clear, and considers motivation and learning, not justifying a grade or on copyediting. There is need to provide an explanation in the feedback of what they are doing correctly and incorrectly. It becomes most productive to a student's learning when it is provided with an explanation as to what is accurate and inaccurate about their work. In order to achieve this, lecturers need to use comments to teach rather than to justify the grade, focusing on what you would most like students to address in future work (Mwamba, Musonda and Daka, 2021). Lecturers are to avoid over-commenting or "picking apart" students' work. The lecturer should in their final comments, ask questions that will guide further inquiry by students.

Presentation and Discussion of Findings

The findings of the study are presented in line with the research objectives and under the subthemes: the nature of lecturers' feedback on students' written tasks and students' perceptions on the effectiveness of lecturers' feedback and its contribution to their learning and preparation for feedback giving.

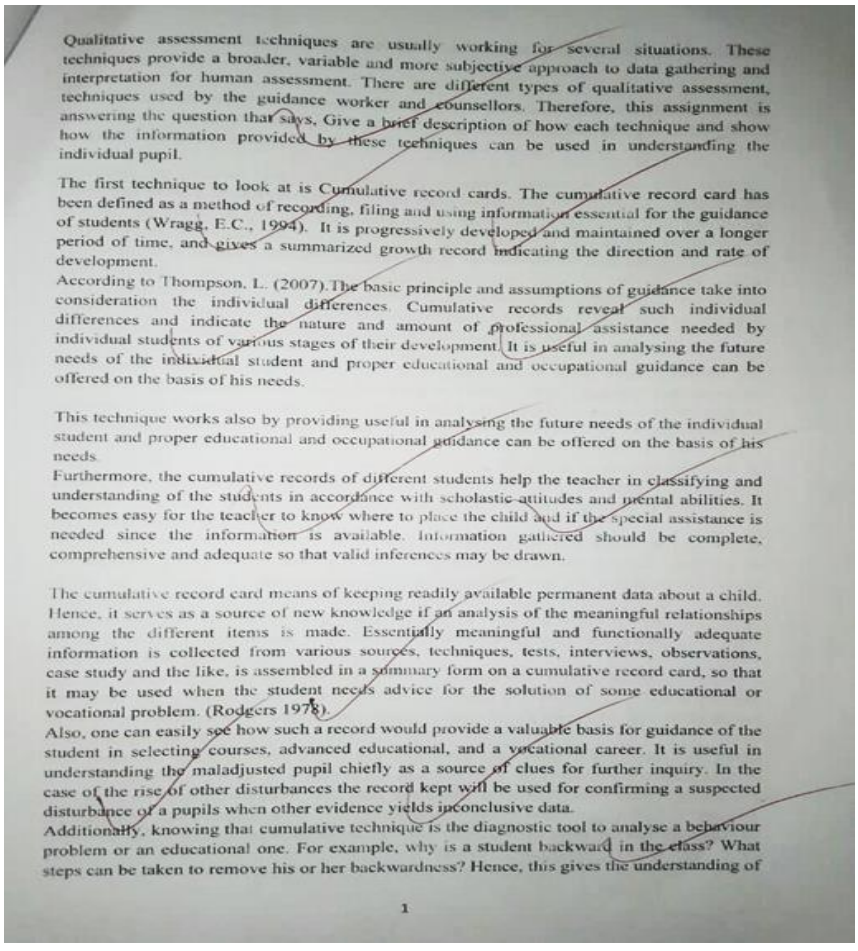
Nature of lecturers' feedback on students' written tasks

The themes reflecting the nature of feedback received are: written feedback verbal feedback and a combination of written and verbal feedback.

Written feedback

Examples of written feedback that stirred the discussion included the following: Written mark(score)/letter grade, written comments, Tick(s)√, Cross(s) **X**, Question mark(s)**?** and Underlining. There was also a combination of these which included: written comments and written mark, Tick(s) √ and written mark, Question mark(s)**?** and mark(score), Cross(s) **X**, Tick(s) √ and written mark. The examples of written feedback are shown in the pictures labelled Figure1,2,3 and 4.

Fig. 1



Qualitative assessment techniques are usually working for several situations. These techniques provide a broader, variable and more subjective approach to data gathering and interpretation for human assessment. There are different types of qualitative assessment, techniques used by the guidance worker and counsellors. Therefore, this assignment is answering the question that says, Give a brief description of how each technique and show how the information provided by these techniques can be used in understanding the individual pupil.

The first technique to look at is Cumulative record cards. The cumulative record card has been defined as a method of recording, filing and using information essential for the guidance of students (Wragg, E.C., 1994). It is progressively developed and maintained over a longer period of time, and gives a summarized growth record indicating the direction and rate of development.
According to Thompson, L. (2007).The basic principle and assumptions of guidance take into consideration the individual differences. Cumulative records reveal such individual differences and indicate the nature and amount of professional assistance needed by individual students of various stages of their development. It is useful in analysing the future needs of the individual student and proper educational and occupational guidance can be offered on the basis of his needs.

This technique works also by providing useful in analysing the future needs of the individual student and proper educational and occupational guidance can be offered on the basis of his needs.
Furthermore, the cumulative records of different students help the teacher in classifying and understanding of the students in accordance with scholastic attitudes and mental abilities. It becomes easy for the teacher to know where to place the child and if the special assistance is needed since the information is available. Information gathered should be complete, comprehensive and adequate so that valid inferences may be drawn.

The cumulative record card means of keeping readily available permanent data about a child. Hence, it serves as a source of new knowledge if an analysis of the meaningful relationships among the different items is made. Essentially meaningful and functionally adequate information is collected from various sources, techniques, tests, interviews, observations, case study and the like, is assembled in a summary form on a cumulative record card, so that it may be used when the student needs advice for the solution of some educational or vocational problem. (Rodgers 1978).
Also, one can easily see how such a record would provide a valuable basis for guidance of the student in selecting courses, advanced educational, and a vocational career. It is useful in understanding the maladjusted pupil chiefly as a source of clues for further inquiry. In the case of the rise of other disturbances the record kept will be used for confirming a suspected disturbance of a pupils when other evidence yields inconclusive data.
Additionally, knowing that cumulative technique is the diagnostic tool to analyse a behaviour problem or an educational one. For example, why is a student backward in the class? What steps can be taken to remove his or her backwardness? Hence, this gives the understanding of

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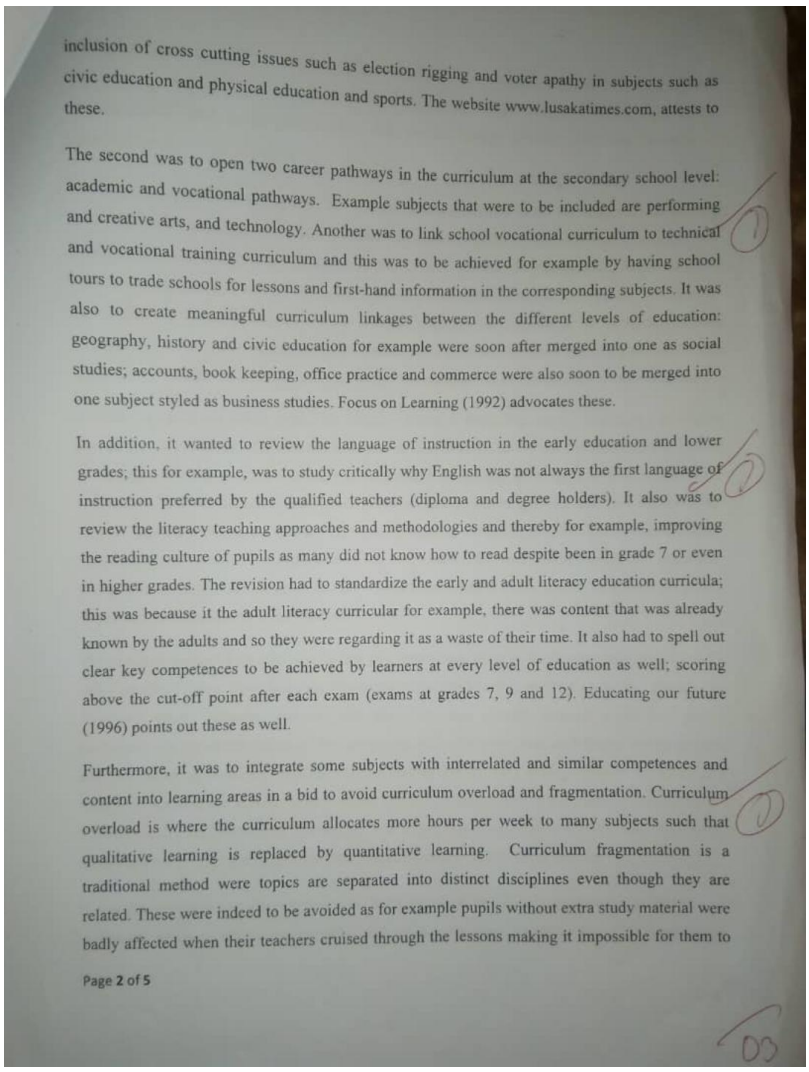
Fig. 2



inclusion of cross cutting issues such as election rigging and voter apathy in subjects such as civic education and physical education and sports. The website www.lusakatimes.com, attests to these.

The second was to open two career pathways in the curriculum at the secondary school level: academic and vocational pathways. Example subjects that were to be included are performing and creative arts, and technology. Another was to link school vocational curriculum to technical and vocational training curriculum and this was to be achieved for example by having school tours to trade schools for lessons and first-hand information in the corresponding subjects. It was also to create meaningful curriculum linkages between the different levels of education: geography, history and civic education for example were soon after merged into one as social studies; accounts, book keeping, office practice and commerce were also soon to be merged into one subject styled as business studies. Focus on Learning (1992) advocates these.

In addition, it wanted to review the language of instruction in the early education and lower grades; this for example, was to study critically why English was not always the first language of instruction preferred by the qualified teachers (diploma and degree holders). It also was to review the literacy teaching approaches and methodologies and thereby for example, improving the reading culture of pupils as many did not know how to read despite been in grade 7 or even in higher grades. The revision had to standardize the early and adult literacy education curricula; this was because it the adult literacy curricular for example, there was content that was already known by the adults and so they were regarding it as a waste of their time. It also had to spell out clear key competences to be achieved by learners at every level of education as well; scoring above the cut-off point after each exam (exams at grades 7, 9 and 12). Educating our future (1996) points out these as well.

Furthermore, it was to integrate some subjects with interrelated and similar competences and content into learning areas in a bid to avoid curriculum overload and fragmentation. Curriculum overload is where the curriculum allocates more hours per week to many subjects such that qualitative learning is replaced by quantitative learning. Curriculum fragmentation is a traditional method were topics are separated into distinct disciplines even though they are related. These were indeed to be avoided as for example pupils without extra study material were badly affected when their teachers cruised through the lessons making it impossible for them to

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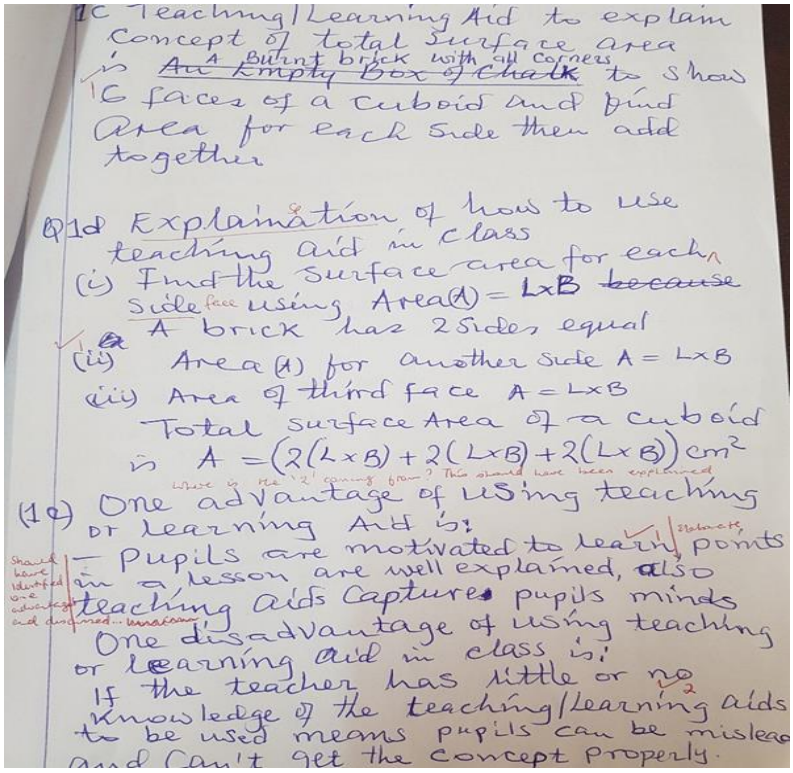
Fig 3



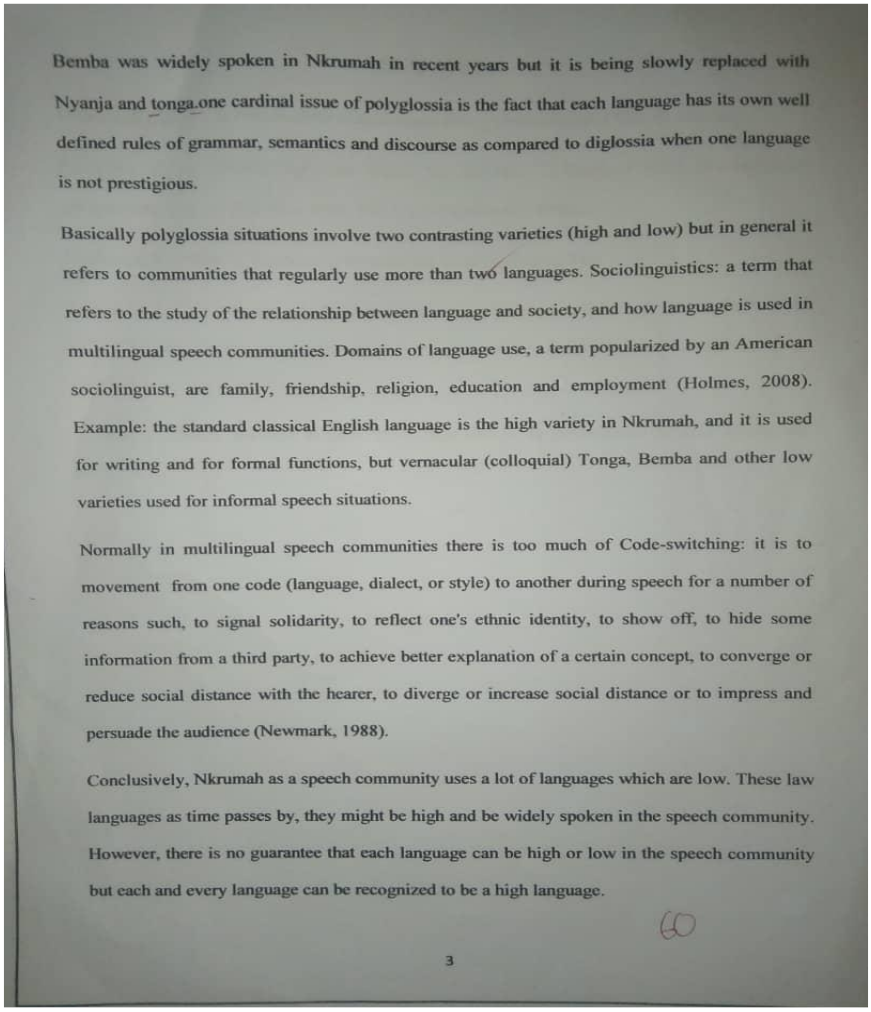
1c Teaching/Learning Aid to explain Concept of total Surface area is ~~An Empty Box of Chalk~~ A Burnt brick with all corners to show 6 faces of a cuboid and find Area for each Side then add together

(d) Explanation of how to use teaching aid in class
(i) Find the Surface area for each side face using Area(A) = L×B ~~because~~ A brick has 2 Sides equal
(ii) Area (A) for another Side A = L×B
(iii) Area of third face A = L×B
Total surface Area of a cuboid is $A = (2(L \times B) + 2(L \times B) + 2(L \times B))\ cm^2$
Where is the '2' coming from? This should have been explained

(1e) One advantage of using teaching or learning Aid is:
— Pupils are motivated to learn, points in a lesson are well explained, also teaching Aids Captures pupils minds
One disadvantage of using teaching or learning aid in class is:
If the teacher has little or no knowledge of the teaching/learning aids to be used means pupils can be misled and Can't get the concept properly.

Should have identified one advantage and disadvantage... instead

Fig 4



Bemba was widely spoken in Nkrumah in recent years but it is being slowly replaced with Nyanja and tonga.one cardinal issue of polyglossia is the fact that each language has its own well defined rules of grammar, semantics and discourse as compared to diglossia when one language is not prestigious.

Basically polyglossia situations involve two contrasting varieties (high and low) but in general it refers to communities that regularly use more than two languages. Sociolinguistics: a term that refers to the study of the relationship between language and society, and how language is used in multilingual speech communities. Domains of language use, a term popularized by an American sociolinguist, are family, friendship, religion, education and employment (Holmes, 2008). Example: the standard classical English language is the high variety in Nkrumah, and it is used for writing and for formal functions, but vernacular (colloquial) Tonga, Bemba and other low varieties used for informal speech situations.

Normally in multilingual speech communities there is too much of Code-switching: it is to movement from one code (language, dialect, or style) to another during speech for a number of reasons such, to signal solidarity, to reflect one's ethnic identity, to show off, to hide some information from a third party, to achieve better explanation of a certain concept, to converge or reduce social distance with the hearer, to diverge or increase social distance or to impress and persuade the audience (Newmark, 1988).

Conclusively, Nkrumah as a speech community uses a lot of languages which are low. These law languages as time passes by, they might be high and be widely spoken in the speech community. However, there is no guarantee that each language can be high or low in the speech community but each and every language can be recognized to be a high language.

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3

Verbal feedback

Examples of verbal feedback included the following: ‘Well done’, ‘Very good piece of academic work’; ‘Critical analysis here’; ‘Well done’; ‘Excellent piece of writing’; ‘You have done very well’; ‘Passed’; ‘You did not do well’; ‘You did not answer the question’; ‘You missed the point’; ‘Work hard(er)’; ‘Failed’; and ‘Checked’. The student teachers generally indicated that the verbal feedback was given when the assessment script(s) was being given back to them. ‘…Sometimes the lecturer would not even give us the scripts and just tell us “you did not do well” ’explained **ST 8**.

A combination of written and verbal feedback

Some student teachers indicated that they had received a combination of the written and verbal feedback before, but it was rare. This would include verbal remark (positive/negative/neutral) and written mark or verbal remark (positive/negative/neutral) and written letter grade.

Analysis of what was considered as the nature of feedback revealed that written feedback was more common than the verbal and combination of written and verbal feedback. This aligns with findings by Gul, Tharani, Lakhani, Rizvi and Ali, 2016; Agricola et al., 2020; Daka, et al., 2021 that written feedback is the main form of feedback in higher education. Some of the written feedback was detail-oriented and which to some extent ‘…delayed the processing and understanding of the same feedback’ reported **ST20**. Such kind can induce anxiety. Brandmo & Gamlem (2025) extend the argument when they state that when feedback is overly corrective it can induce anxiety. This could be the reason that some of the feedback given was in the form of a cross X or tick √ which on the other hand was also considered to be inadequate. ‘We are not orientated about feedback, like what the symbols mean…we generally make assumptions and I guess that is what the learners we will be teaching are going to do’ **ST17** commented.

Verbal feedback was not as common, but was to some extent appreciated for its immediacy. Another benefit being that it could be used to clarify written feedback thus prevent misunderstanding (of written feedback) (Agricola et al., 2020). What is considered as downsides are that it generally remains a one-sided with directive statements and not dialogical in addition to not being as common. In addition, the challenges that accompanied it such as easily forgetting the feedback by the time it is to be written down (Mwamba, Musonda and Daka, 2021). Where and whenever possible a combination of meaningful written and verbal feedback would be encouraged. As already stated above, this has potential to prevent misunderstanding of the written feedback.

Effectiveness of lecturers' feedback

Analysis of the interviews with the student teachers revealed three dominant themes regarding the effectiveness of feedback. The first one being actionability gap. This is illustrated by representative extracts including: **'**Feedback is important. You can learn from it, but there is nothing much to learn from a cross (X)…'**ST2** and **'**…if it is for learning…there is no knowing what to learn or improve on exactly from a tick (√)?'**ST3**. Another student teacher **(ST5)** also asked 'What is there to learn from a question mark? …' thereby also indicating how vague the feedback was especially that it was not clarifying the errors to be corrected or the improvement pathway to be taken.

The other theme that emerged from the analysis of the data collected was feedback possessing affective dimensions or consequences. This is illustrated by representative extracts including: 'I can probably learn from it, but I don't read the comments anymore…what is the point? When all that is written is negative…'**ST1**. **ST14** also indicated that: **'**it is overwhelming –in the negative sense…there is too much writing from the lecturer… and you don't even know where to start from to make sense of what could be there…'. **ST7** equally stated that: 'I fail to make sense of the comments so I just check the mark if it is there and …sometimes just tear the papers into pieces…'. While these were generally in the negative and indication of triggering demotivation and self-doubt, there were also some who spoke the opposite. These include **ST11** who stated that 'comments written on my paper shows that my lecturer took time to read my work and that he values my input… s/he wants me to learn something and get better'. Despite this **ST11** critiqued delays when he stated that '…I only wish it could be given to me in good time to allow me chance to apply apply…'.

The findings confirm Hattie's (2009) suggestion of what constitutes effective feedback where feedback must answer the questions: 'Where am I going?', 'How am I going?' and 'Where to next?' The symbols, including the cross✗ and or the tick ✓ commonly used especially in mathematics assessment tasks generally fail at these levels. As Higgins, Hartley, Skelton (2002); Nicol and Macfarlane-Dick (2006); Geyskens, Donche and Van Petegem (2012) as well as Daka et al, (2019) argue, feedback is only useful if it reduces the gap between current and desired performance. Student teachers' frustration with what is generally considered vague feedback reflects this disconnect. This aligns with a point that Price, Handley, Millar & O'Donovan (2010) who present that vague feedback can result in students' frustration and dissatisfaction. In addition, little or no guidance could lead to feedback avoidance behaviour (Lipnevich, Berg and Smith, 2016).

Student teachers' requests for clearer and more specific feedback show they struggle to understand how to improve. As comments/notes, feedback can help make learning to happen (Brown, Race, & Sambell, 2025) and must equip students to be own accessors (Sadler, 2013). Non-explanatory symbols such (✗/✓) can deny them entry into evaluative discourse and experiencing self-regulated learning as explained by Zimmerman (1990) and Schunk (2005). This can easily be passed on to school going learners they would be teaching in the teaching service.

The reference to late feedback highlights its expired utility. As Boud and Molloy (2013) argue, delayed feedback only explains past mistakes and can't guide improvement it. This applies to assessment feedback in any field that student may specialize in. From the shared views and experiences, it can be deduced that Student teachers can learn a lot about receiving, giving feedback and the constructive role of feedback when it is modelled by their lectures. This implies that lecturers would have to not only teach about, but also lead by example including in the context of feedback on assessment tasks (Buhagiar, 2013). This includes in the context of now competence based curriculum in which Zambia which may bring about changes in the assessment and assessment feedback giving landscape.

LIMITATIONS OF THE STUDY

Among the limitations of this study is its reliance on mathematics student teachers' perceptions. The STs' perceptions may be inaccurate or biased. It must also be noted that STs were asked to consider the feedback they had received in the current Mathematics Education course and all other courses they were taking during the final term of their final year of their programme. They may have had too much to process with respect to similarities and or differences if any between feedback on written tasks in Mathematics, Mathematics Education and all the other course they were taking. In addition, their perceptions may have been influenced by the complex interaction between their personalities and their different lecturers, among other factors, and may be inaccurate or biased. Despite the stated limitations, the student teachers' shared perceptions provided an opportunity for them to interrogate and express their views on feedback received, and thus further extend understanding of what it means or meant to receive feedback in their context and lessons to be learnt and applied when they will be giving feedback to the school going children they will be expected to teach upon successful completion of their teacher education programme. It also provides ideas for further research that can be done on the subject. For example, there may be need to research on: feedback received for the Mathematics content courses only and or mathematics content and mathematics methodology courses only: mathematics teacher educators' views as well on feedback given on student teachers' assessment tasks as a way of providing a balanced view of the feedback process and highlighting possible gaps between giver and receiver intentions: role of digital feedback tools in providing feedback among other possible areas.

CONCLUSION AND RECOMMENDATIONS

This study provided While acknowledging the limitations, the study concludes that students acknowledged that lecturers' written feedback is an important learning strategy, but it has not been effective enough in improving their learning and preparing them for giving feedback to school-going learners when they complete their TE programme. The student teachers indicated that there were problems with the currently given feedback which included:

a) no clear meaning of the given feedback, that is, what it means to (not) do well,
b) no clear understanding of what may need to be done to improve
c) the mode of delivery and timeliness.

What the STs shared also reflected gaps in their preparedness for giving school-going learners' feedback on their written tasks.

The findings of this study provide insights into possible changes in the nature and or form of, and approach toward feedback on students' written tasks in universities. The researchers recommend consideration for adopting or adapting Hattie (2009) form of questioning i.e. 'Where am I going?'; 'How am I going?'; and 'Where to next?' as it relates to tasks given to student teachers when giving timely feedback which may contribute to making feedback an effective learning strategy.

Secondly, it is recommended that taking consideration of the mode of delivery and alternative forms of feedback in making feedback an effective learning strategy for the students especially in the context of large classes and time constraints. The mode of delivery may take the form of accommodating both written and verbal feedback when possible to provoke student teachers to further inquiry. Integrating visual examples of feedback directly into the discussion for clarity to be considered too. An alternative form of feedback form could be use of peer feedback systems where student teachers with similar working/answers share and or discuss feedback/comments. Greater emphasis on feedback training or workshops for student teachers could be considered/ studied as an intervention, measuring pre- and post-training changes in feedback literacy.

Additionally, it is recommended that lecturers refine their feedback giving practices on written to better prepare prospective teachers for their role of giving feedback. This includes lecturers modeling feedback interpretation and usage is another. This may contribute to improving feedback literacy and making student teachers effective users of lecturer-given feedback and equip them to model it to the school going learners they will be teaching upon completion of their training programme.

One of the limitations of the study is the reliance on perceptions without statistical or measurable learning outcomes. It is recommended a mixed-methods approach be done to help provide for further empirical validation and evaluation of the actual impact of feedback on student teacher learning outcomes.

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