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Analysing Grade 9 Technology examination papers' design and learners' performance: A case of two schools in KwaZulu-Natal

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ABSTRACT

Poor performance in the senior phase Technology has been a challenge for a very long time now, which led to many scholars investigating the issue. This qualitative study was conducted to analyse how Grade 9 Technology teachers design examination papers and how learners perform. To meet the objective of this study, researchers conveniently selected two (2) secondary schools in the Maqongqo area on the outskirts of Pietermaritzburg and collected data through document analysis of Grade 9 Technology examination papers and learners' scripts. Analysis of the data was done in accordance with Bloom's taxonomy grid to gauge how cognitive levels were distributed. The theory of Bloom's taxonomy by Benjamin Bloom (1957) was used to frame this study. The findings emanating from the data show that Grade 9 Technology teachers are unable to align the examination question papers with Bloom's Taxonomy cognitive levels, which leads to learners' poor performance as the examination papers are poorly structured. In addition, the findings indicated that Grade 9 Technology learners are struggling with the topic of electrical systems and control. Based on the findings, the study recommended that Grade 9 Technology teachers should be subjected to developmental workshops aimed at implementing Bloom's taxonomy when setting examinations. The department of education should be responsible for the designing of Grade 9 Technology examinations while teachers are getting relevant training.

KEYWORDS

Bloom's taxonomy; cognitive levels; technology; electrical systems and control, Grade 9.

INTRODUCTION

Technology is one of the subjects taken by learners in the senior phase (Grades 7-9) as part of their school curriculum. According to Mapotse (2012) and Seleke et al. (2018), it was first introduced in 1998 and then revised again in 2002, when the majority of educators were having difficulty implementing it, especially in rural schools. The inclusion of Technology as a subject in the classroom created a pressing demand for in-service teacher training as part of the professional development of educators. The fact that the Technology subject was added as a relatively recent addition to the curriculum since its establishment has made this need worse (Baş & Şentürk, 2019). Technology was introduced to the South African curriculum, as it was realised that more engineers, technicians, and artisans are needed to create readiness for a competitive and technologically driven economy (DBE, 2011). Although the introduction of Technology was merely a solution-based step to counter the shortage of engineers in South Africa, more problems have followed in the offering of the subject. As per the study done by Gumbo (2020), findings revealed that Technology teachers lack the pedagogical content knowledge of the subject. Odeyemi (2020b) further cited that poor performance in the senior phase (Grade 9) stems from factors such as school environment and the influence of learners' attitudes towards their performance.

Furthermore, many hindrances that disrupted the teaching and learning process were brought about by the inclusion of Technology in the South African curriculum. These barriers have led to learners performing poorly in this crucial subject, which is a gateway to engineering courses after Grade 12. Scholars have associated these hindrances with teachers who are not qualified to teach Technology. This statement is echoed by Odeyemi (2020a), who argues that poor performance in Technology is because teachers that are teaching Technology without professional training from the universities. Literature has further revealed that Technology teachers are deprived of capacitation workshops since most of them were never professionally trained to teach Technology (Gumbo, 2020). Another challenge in teaching Technology is that teachers do not know how to incorporate the design process into their instruction, which negatively affects how learners approach the mini PAT (Kubheka, 2018).

All the above challenges have been written about, but the poor performance persists. As a result, this study sought to investigate the way Technology teachers are setting their examinations and how learners are performing in those exams. This is necessitated by the shortage of studies interrogating the way assessments are designed amid the increasingly poor performance in Technology. This study is done to gauge if the ways teachers are setting exams are the source of problems. This will be done through investigating the application of Bloom's taxonomy when setting exams and how that affects learners' performance. In terms of Bloom's taxonomy, Gul et al. (2020) mention that teachers are failing to use it when preparing examination papers. Gichuhi (2014) echoes the same assertion, stating that secondary school teachers are not adequately using Bloom's taxonomy when preparing their examination papers. The above studies were done in Pakistan and Kenya, respectively, so this has necessitated the

need to conduct this study in the South African context to gauge if Technology teachers are using Bloom's taxonomy when setting examination papers, and this will provide a direction on how poor performance can be improved in Technology Grade 9.

Purpose and research question

The purpose of the study was to analyse the Technology examination design in Grade 9 and how learners are performing in different sections. This enquiry was guided by the following research questions:

1. To what extent do Grade 9 Technology teachers adhere to Bloom's taxonomy when setting examination questions?
2. What specific areas do Grade 9 Technology learners find challenging during examinations?

LITERATURE REVIEW

Application of Bloom's Taxonomy in Assessments

Learners are diverse in all respects, from their backgrounds and preferred learning styles to their cognitive abilities, and a good teacher should always be cognisant of that when imparting knowledge to them. This phenomenon also speaks to the assessment given to learners who should be able to cater to all learners with different cognitive abilities. This concept basically means that no learner should be disadvantaged in an assessment simply because of their cognitive abilities. This is why, in 1956, Benjamin Bloom coined Bloom's taxonomy, which classifies cognitive abilities into six stages. According to Forehand (2010), Bloom's taxonomy is a multi-tiered model that classifies thinking abilities into stages. The exercise was done to ensure that all learners in class are not given a fair chance to succeed in an examination. In essence, the prime objective of the assessment is to test learners' cognitive level but in a balanced manner.

Bloom's taxonomy is not applied to assist learners but also to enable teachers to set balanced examination papers through testing different cognitive skills from learners. The above shows that Bloom's taxonomy is important; however, there are still teachers who are not applying Bloom's taxonomy in a proper manner (Gul et al., 2020). Findings in a study by Gul et al. (2020) further show that teachers often use the higher-order domain, whereas other large domains were found on average, which means that teachers are set unbalanced papers. On the contrary, Gichuhi (2014) asserts that most of the test items functioned at the lower thinking levels, neglecting other levels. The six (6) cognitive stages of Bloom's taxonomy serve as the basis for these domains, which range from low- to high-order questions. The six (6) cognitive stages of Bloom's taxonomy, as shown in Table 1 below, guide the process of setting assessments.

Table 1.

Cognitive stages of Bloom's taxonomy

Stage	Description	Order Level
1. Remembering	Recall facts and basic concepts	Lower Order
2. Understanding	Explain ideas or concepts	Middle Order
3. Applying	Use information in new situations	Middle Order
4. Analysing	Draw connections among ideas	Higher Order
5. Evaluating	Justify a decision or course of action	Higher Order
6. Creating	Produce new or original work	Higher Order

Table 1 illustrates the alignment of each cognitive stage with the three (3) order levels. According to DBE (2011), the Grade 9 Technology CAPS document stipulates that the lowest order should be 30%, the middle 40%, and the highest 30% to ensure that every learner is afforded a fair chance of success in the assessment. According to DBE (2011), each subject has a set of different order arrangements depending on how each subject's learning outcomes are structured.

As mentioned above, Bloom's taxonomy plays a major role in setting assessment. The application of Bloom's Taxonomy in assessments also improves students' metacognitive abilities (Sudirtha et al., 2022). This further speaks to the central role played by Bloom's taxonomy in shaping learners' performance, as it shapes critical thinking and analytical skills (Chandio et al., 2021). In support of the above, an experimental study done by Adijaya et al. (2023) revealed that learners who benefitted from the Bloom's taxonomy-orientated learning activities outperformed their counterparts in the examination. As per the above, the application of Bloom's Taxonomy in assessments continued to yield positive results. However, there is still a concern about teachers who do not understand how Bloom's taxonomy is applied. This concern is echoed by Gichuhi (2014), who put forth that secondary school teachers do not adequately employ Bloom's cognitive-level objectives in constructing their test items. As a result, this study seeks to uncover how Grade 9 Technology teachers are designing their assessments with regard to the alignment of Bloom's taxonomy.

Areas of concern in Technology as a subject

Learners' poor performance in Technology has been on the rise in recent years; teachers and subject advisors have indicated that learners are performing poorly in Technology. Despite this being known, learners are performing poorly; there has been little that has been done to ensure that learners' performance in Technology is improved. Many scholars, such as Ramaboea (2022), mention that learners' poor performance emanates from teachers who are not fully qualified to teach Technology. The concern about unqualified teachers who are teaching Technology is corroborated by Ndlovu and Gumbo (2018), who posit that the lack of Technology teachers with technology qualifications is still a challenge. This challenge of ill-qualified teachers

has been brought forward by many scholars, which shows the magnitude of this matter and how it influences the performance of learners. A study conducted by Mlambo and Mkhwanazi (2024) suggested that teachers without proper qualifications should not be hired to teach, as their expertise has been seen as the factor that influences learners' performance. Technology teachers are also struggling to teach the design process, which is regarded as the cornerstone of technology that allows learners to do their mini-PAT in a proper manner (Blose & Ndlovu, 2023; Ramaboea et al., 2022; Ramaboea, 2022). The same concern is echoed by Nkosi and Mtshali (2024); Technology teachers still struggle to adequately articulate the idea of creativity and what it entails even though the design process is there to assist them.

Reports indicate that learners are performing poorly in mechanical and electrical systems. This topic has been challenging for Grade 9 Technology learners for a very long time. In the same vein, Selkrig and Keamy (2017) assert that learners find it difficult to explain the components of a circuit. Learners also face difficulties with the meanings of the words presented in the electrical part of Grade 9 Technology. The main source of difficulties is the learner's inability to distinguish between the meanings of different electric components. Selkrig and Keamy (2017) further assert that Grade 9 learners are struggling to give even a basic explanation of a capacitor in the electric circuit.

THEORETICAL FRAMEWORK

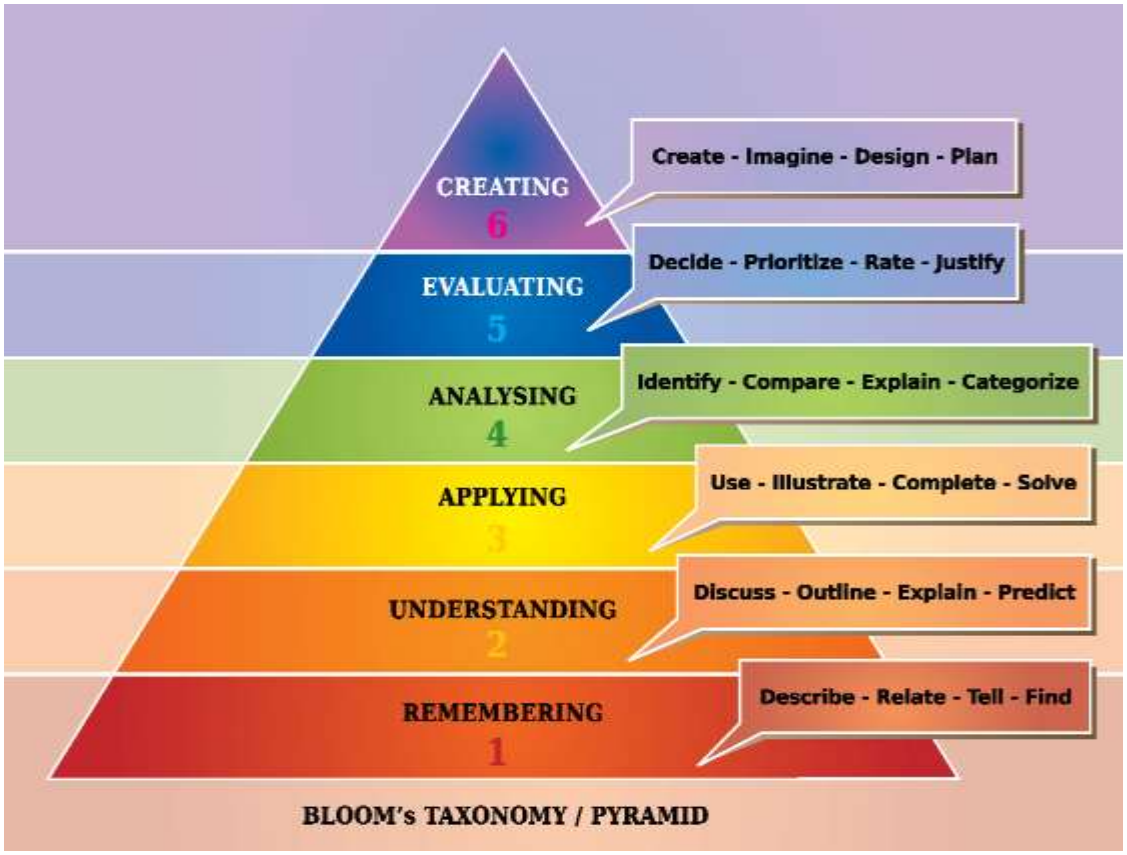
This study was aimed at analysing the way Grade 9 Technology teachers set their examination papers. In the South African context, assessments should be set in alignment with the cognitive levels in Bloom’s taxonomy. Therefore, this study adopted the theory of Bloom's Taxonomy, which is based on the works of Benjamin Bloom. According to Yamada (2017), Bloom's Taxonomy is a classification of learning objectives that educators establish for learners. This taxonomy's cognitive domain aims to evaluate a learner's cognitive proficiency in a written exam. Educators may confront the issue of determining whether their examination questions meet the requirements of Bloom's taxonomy at various cognitive levels. Bloom's Taxonomy offers a framework for creating questions with varied complexity and cognitive levels in educational contexts. Teachers can use Bloom's Taxonomy's six levels to develop questions that measure various skills, ranging from basic knowledge to higher-order thinking (Forehand, 2010). These levels are shown in Figure 1 below.

Figure 1 above shows the pyramid of Bloom’s taxonomy, which ranges from levels 1 to 6 and is further classified into lower order (1), middle order (2-3), and high order (4-6). According to the Grade 9 Technology CAPS document, lower-order questions should be 30%, 40% for middle-order questions, and 30% for high-order questions. Technology teachers should consistently follow these levels to ensure a well-rounded examination paper. This study adopted the Bloom’s taxonomy theory to analyse the examination papers set by Grade 9 Technology teachers. Bloom’s taxonomy is the standard procedure adopted by all teachers when setting the assessments to ensure that all learners are catered for and they are all standing a chance to pass

the administered assessment. Failure to align the assessment accordingly to Bloom's cognitive levels will result in learners (1) failing or (2) if they are not tested on all cognitive levels in a proper manner, learners will lack the much-needed skills to survive in the real world. Therefore, aligning assessments with Bloom's cognitive levels is crucial and goes beyond simply passing or failing the learner's scenario.

Figure 1.

Bloom's taxonomy pyramid by Yamada (2017)



The above statements point to the importance of Bloom's Taxonomy in setting assessments of quality standards; hence, employing Bloom's Taxonomy as the framework was the rational decision in ensuring that evaluations designed by Grade 9 Technology teachers are of the expected quality and standard. In the context of this study, Grade 9 June 2024 examination papers were sought from the two sampled schools, and the analysis grid was obtained from the DBE CAPS document for Technology, which was used in analysing the examination question papers. The framework also provided support for the study's findings.

RESEARCH METHODOLOGY

Research approach and design

The goal of this study was to analyse the design of the Grade 9 Technology examination and the performance of learners in specific topics. Therefore, this study adopted a qualitative research

approach that focusses on representing data in words instead of figures (Creswell & Creswell, 2017). Creswell (2014) defines qualitative research as data that is non-numerical. The aim of this study is to investigate how Grade 9 Technology teachers design their examination papers. This was necessitated by the poor performance observed in Technology. Based on the nature of the study, a case study design was adopted. Baxter and Jack (2008) suggest using a case study to investigate complex phenomena. As such, this study investigated the complex phenomena of how Technology teachers set their examination papers and how that influences learners' performance. The choice of case study was mainly because this study investigated two schools hence findings can also be generalised only on these two schools therefore the case study design was deemed relevant.

Population and sampling

The study conveniently selected both the participants and the study site. Taherdoost (2016) states that the study selects participants who are easily and readily available. The two schools used in this study were selected as they were close to the researcher, which ensured easy access, as mentioned by Sharma (2017) and Taherdoost (2016). The selected schools had very small populations, and as a result, there were only two Grade 9s in each school, which resulted in the use of examination question papers set by the two teachers from the two schools selected.

Data collection and analysis

Because this study adopted the qualitative approach, a document analysis was used to collect data. Document analysis is a qualitative data collection tool that involves evaluating physical and electronic documents for the purpose of interpreting them to gather in-depth information (Bowen, 2009; Morgan, 2022). As mentioned above, the study employed a qualitative research approach, using document analysis to examine Grade 9 Technology examination papers. Bloom's taxonomy was used as an analytical framework to categorise the cognitive demand of exam items. To ensure a systematic coding process, each exam question was analysed and assigned a level based on the revised Bloom's taxonomy (i.e., remember, understand, apply, analyse, evaluate, and create). A coding guide with definitions and examples for each level was developed prior to the analysis to maintain consistency.

The researcher obtained the Grade 9 June 2024 question papers from the sampled schools and performed an item analysis to determine whether the questions were appropriately distributed according to Bloom's Taxonomy. The learners' scripts were analysed to pinpoint specific questions or sections where they encountered difficulties. The researcher analysed the question papers using a Bloom's Taxonomy grid and performed a diagnostic analysis on the learners' scripts. We then identified and reported common patterns and trends in the learners' responses. DBE (2011) states that diagnostic analysis is used to uncover the misunderstandings that students have before they come to class, and in this study, we looked for these misunderstandings in Grade 9 Technology exams to find out what difficulties students face.

Data triangulation ensured validity and reliability in this pure qualitative study. Natow (2020) maintains that triangulation is one way to ensure that results emerge reliably by gathering data from multiple sources. Hastings (2022) agrees and states that gathering data from multiple sources enhances the credibility of the findings. To ensure the credibility and reliability of the findings, this study collected data from multiple sources, specifically through the analysis of the examination paper and the learners' scripts. Furthermore, two seasoned Grade 9 Technology teachers were asked to verify the findings if they were in order. Both totally supported that the Bloom's analysis was accurate.

Ethics and gaining access

Before the data collection commenced, ethical clearance was sought from the Durban University of Technology with ref: IREC 005/25. Thereafter, gatekeepers' permission was sought from KwaZulu Natal Department of Basic Education (DBE) which permitted the researchers to gather data from the schools within the province of KwaZulu Natal.

As mentioned above that this study employed convenience sampling, thus data was collected from two schools in Maqongqo area. the principals of the two participating schools were approached to request access to the school premises and permission to collect data, including access to learners' assessment records. Both principals provided written consent for their schools to be used as research sites.

Informed consent was obtained from all participating teachers through signed consent forms, which outlined the purpose of the study, the nature of their involvement, and their right to withdraw at any stage without any consequences. Participants were assured that their identities and those of their schools would be kept confidential. To ensure anonymity, pseudonyms were used for all schools, teachers, and learners in all documentation and publications arising from the study.

As the study involved sensitive data, including learners' examination scripts and scores, strict data protection measures were followed. For instance, pseudonyms were used to protect the identity of the participants. All physical documents, including learners' tests, were stored in a locked cabinet accessible only to the researcher. After data analysis, the physical scripts were retained securely and will be destroyed (shredded) after the research findings have been successfully published. These measures were taken to uphold the principles of confidentiality, anonymity, and responsible handling of sensitive information throughout the research process.

PRESENTATION OF RESULTS

Data was collected through document analysis to respond to the main objective of this study, which was to analyse the Grade 9 Technology examination. The document analysis was in the form of Grade 9 learners' scripts and the Grade 9 Technology examination papers set by Grade 9 Technology teachers.

Findings from Grade 9 Technology examination paper

An analysis of the question paper was done using Bloom's Taxonomy to determine how Grade 9 Technology educators set their examination papers. Bloom's Taxonomy test analysis is a method used to evaluate how well assessment items align with different cognitive levels of learning. The researcher conducted this analysis against the Bloom's taxonomy grid, as the table below illustrates. Table 2 below presents Bloom's taxonomy analysis of School A.

Table 2.

School A: Bloom's Taxonomy Analysis of the Examination Paper

Q. No.	Knowledge	Understanding	Application	Analysis	Synthesis	Evaluation	Marks
1.1	✓						1
1.2		✓					1
1.3	✓						2
1.4	✓						2
1.5			✓				3
2.1	✓						2
2.2	✓						1
2.3	✓						2
2.4.1		✓					3
2.4.2		✓					3
2.5	✓						2
3.1				✓			4
3.2			✓				3
3.3						✓	5
3.4	✓						1
3.5			✓				3
4.1	✓						2
4.2.1	✓						2
4.2.2		✓					3
4.3						✓	5
5.1	✓						2
5.2			✓				3
5.3				✓			4
5.4	✓						1

Table 2 above shows the analysis of the question paper set by Grade 9 Technology teachers at School A, which had a total of 60 marks. The analysis was done in accordance with Bloom's taxonomy, which ranges from level 6 of difficulty. The outcomes of the analysis are presented in Table 3 below.

Table 3.

Bloom's Taxonomy analysis outcomes from School A

LEVELS	TOTAL MARKS PER LEVEL	PERCENTAGE
Low order	21	35%
Middle order	21	35%
High order	18	30%

Table 4.

School B: Bloom's Taxonomy Analysis of the Examination Paper

Q No.	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation	Marks
1.1	✓						2
1.2	✓						2
1.3	✓						1
1.4	✓						2
1.5			✓				3
1.6	✓						1
2.1	✓						2
2.2	✓						2
2.3					✓		4
2.4		✓					3
3.1	✓						2
3.2					✓		4
3.3	✓						2
4.1	✓						1
4.2					✓		4
4.4						✓	5
5.1			✓				3
5.2.1	✓						2
5.2.2	✓						2
5.2.3					✓		5
5.3	✓						2
5.2			✓				3
5.3						✓	5
5.4	✓						2

Table 3 above indicates that Teacher A did not align the question paper with Bloom's Taxonomy cognitive levels. According to Technology CAPS for Grade 9, cognitive levels should be 30% for lower-order questions, 40% for middle-order questions, and 30% for higher-order

questions (DBE, 2011). In addition, School B conducted a similar analysis on a question paper, as displayed in Table 4 above.

A Grade 9 Technology examination paper set in School B was analysed using Bloom's taxonomy criteria to gauge if they set a balanced paper. The outcomes of the examination analysis set at School B, which has a grand total of 70 marks, are depicted in Table 5 below.

Table 5.

Bloom's Taxonomy analysis outcomes from School B

Cognitive Level	Total Marks	Percentage (%)
Low Order	25	42%
Middle Order	12	20%
High Order	23	38%

Table 5 above shows that Teacher B did not align the question paper with the cognitive levels specified by Bloom's Taxonomy. According to Technology CAPS for Grade 9, cognitive levels should be 30% for lower-order questions, 40% for middle-order questions, and 30% for higher- order questions (DBE, 2011). However, Table 5 above indicates that Grade 9 Technology teachers are having difficulty balancing the question paper in accordance with Bloom's taxonomy.

Diagnostic analysis of learners' performance per question

School A

In question 1, all the learners managed to define what a thermistor is, and they did exceptionally well when they were asked to label a circuit in question 1.4. unfortunately, most learners were unable to name the main component that is used to set the temperature at which the alarm should go off on the circuit for the fire alarm.

In question 2, learners failed to tell how much voltage does the battery supply to the circuit. Learners did very well as they were all able to draw a component that is used to switch off-output device when it gets too hot.

Table 6.

Type of lines and their use

Column A – Type of Line	Column B – Use
3.8.1 Chain Line	B – Show symmetry
3.8.2 Dark Line	C – Outlines
3.8.3 Dashed Line	D – Hidden detail lines
3.8.4 Feint Line	A – Construction lines

Grade 9 learners from School A failed to answer question 3, they were unable to show the emitter, base, and collector of the transistor. Another question that was very simple and easy, but they failed to answer was: Study the table below and match the types of lines in Column A with their uses in Column B.

Regrettably, none of the learners managed to correctly identify the purpose of the lines. Most learners did extremely well in question 4, which asked them to neatly draw a freehand, three-dimensional sketch of the combined staircase and ramp for 9 points.

In the last question, which was question 5, all the learners did very well in terms of explaining the use of a wire, bulb, switch, and dry cell in the electric circuit. The learners effectively articulated the use of wires to connect each electrical component in a circuit. The circuit uses a bulb to generate light. The switch completes or interrupts the electrical current in the circuit. Dry cells supply electrical energy.

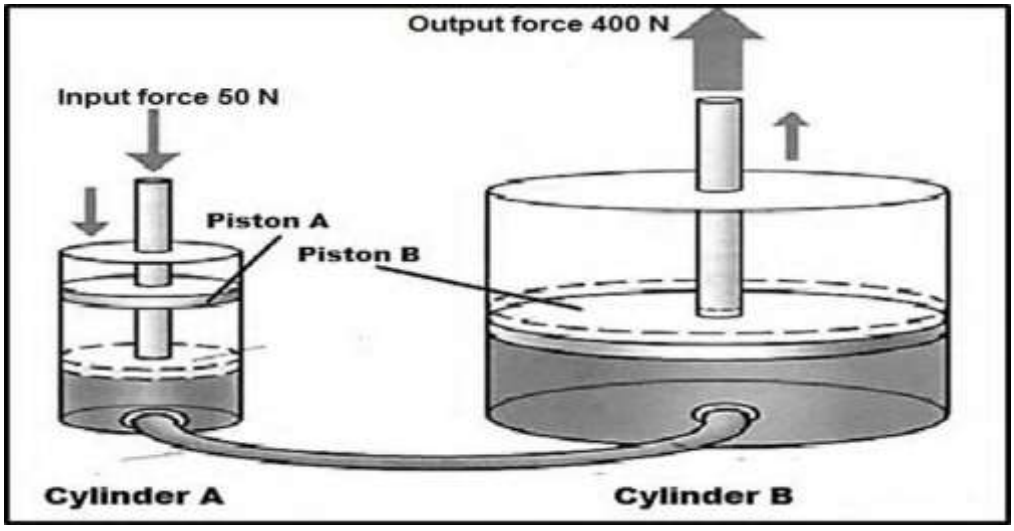
School B

Learners from School B did exceptionally well answering question 1. The question required them to draw and label a systems diagram for a hydraulic jack for 3 marks, and they all managed to draw and label it very well. Question 1 also featured an easy-to-answer question: Name THREE methods of food preservation from the past. Everyone was able to answer this question, and they were also able to give two advantages of preserving food.

The results from question 2 were a bit disappointing. The question that was asked in the question paper under question 2 was: A generator has a resistance of 15 Ω, and it generates a current of 2 A. Using this formula, calculate the voltage that it will supply. Formula: $V = I \times R$. Some learners used the formula as specified and got the calculation wrong, and some learners did not even use the formula that was given. Another question asked them to name any two electrical components; some managed to answer this question, and some failed to do so.

Figure 2.

Hydraulics system



Question 3 seemed to challenge Grade 9 learners because the question required them to explain what a cleat and one-way valve are used for in real life, and no one got this question correct. Another question under question 2 required them to study the diagram of a hydraulics system below and answer questions.

The question was, If piston A is compressed, what happens to piston B? Unfortunately, no learner was able to answer this question. Based on the diagram, another question was:

Calculate the mechanical advantage of this hydraulic system. Another disappointment was that no learner was able to answer this question as well.

Question 4 seemed to be manageable to Grade 9 learners from School B because they were able to answer the question that asked them to give two advantages of using rim brakes rather than disc brakes on a bicycle. Another question that most learners failed to answer was: Draw a flow diagram/chart of at least five steps you will follow if you were asked to make the stair and ramp.

DISCUSSION

Based on the Bloom's taxonomy analysis of the examination from the two schools that were sampled, it indicated that teachers are not aligning with the Bloom's taxonomy. The tables above showed that Grade 9 Technology teachers do not adhere to Bloom's taxonomy cognitive levels when they set their assessments, and this is supported in the literature by Gichuhi (2014), which says Bloom's taxonomy cognitive levels help teachers to have a balance of all the cognitive levels, as this is important when setting an assessment to ensure that all learners stand a better chance to perform better in the assessment since not all learners have the same intellectual capacity. From the tables above, it was evident that teachers rely heavily on lower-order questions, which was the common practice found in the analysis of the assessment of Pakistan, as the findings revealed that a staggering 74% of questions were lower-order.

As mentioned by Gul et al. (2020), learners are performing poorly because teachers are failing to apply Bloom's taxonomy when setting examinations. The same is echoed by Nkosi (2020), that teachers are failing to incorporate Bloom's taxonomy. This shows the importance of applying Bloom's taxonomy to avoid setting learners up for failure. As shown in the literature section above, the low, middle and high order cognitive levels in Technology should be 30%, 40% and 30%, respectively, which is something that Technology teachers could not do.

Based on the learners' diagnostic findings above, it was evident that most learners found it difficult to respond to questions related to electrical components. This finding aligns with a study by Selkrig and Keamy (2017), which indicates that learners in Technology struggle with understanding electrical components. This is further corroborated by Ndlovu and Gumbo (2018), who state that electronic systems and control have been identified as the challenging topic in Technology. According to Selkrig and Keamy (2017), learners also struggle to explain components of a circuit. Learners also struggle with the definitions of terms used in the Grade 9 Technology electrical section. Learners' incapacity to differentiate amongst the meanings of the different electric components is their main source of difficulty. The above is supported by Selkrig and Keamy (2017), who state that Grade 9 learners find it difficult to provide even a rudimentary explanation of a capacitor in an electric circuit.

IMPLICATIONS OF THE FINDINGS

When assessment is not aligned to Bloom's Taxonomy, as seen in the Grade 9 assessments analysed in this paper, it has negative implications for teaching and learning overall. For example, in both schools the analysis revealed that lower-order questions were the most set questions, which limits their cognitive development and ability to engage in critical, creative, and analytical thinking. Assessment being misaligned will result in unbalanced learning outcomes. Furthermore, the implication is that Technology is a subject that relies heavily on a high order level of thinking, such as the application of skills like analysing the drawings and synthesising the problem scenarios. Isometric drawing also requires a high level of visualisation skill, which can be obtained through engaging with higher questions. Also, Technology prepares learners for the real world, so if they are not tested on all cognitive levels in a proper manner, learners will lack the much-needed skills to survive in the real world. As a result, assessments that do not conform to the full range of Bloom's cognitive levels limit learners' opportunities for meaningful growth and struggle in technology-related subjects in the Further Education and Training phase.

CONCLUSION

The cognitive levels analysis for the Technology examination from School A showed that lower order was 35%, middle order was 35%, and high order was 30%. And in School B the analysis showed that low order was 42%, the middle order was 20%, and high order was 38%. These findings therefore allow us to conclude that Grade 9 Technology teachers are not conforming to Bloom's taxonomy when setting examinations which put learners at a disadvantage; hence, learners are performing poorly in Technology. This is because they are subjected to examinations that are not of quality standards which are outlined by DBE in the CAPS document for Grade 9 Technology.

The findings further showed that learners from both schools are struggling with the electrical/electronic systems and control, which is the major section in the Technology paper. This therefore shows that the source of Grade 9 learners' poor performance lies in the electrical systems and control topic.

In conclusion, the findings revealed that Grade 9 teachers are not aligning their assessment to Bloom's cognitive levels as prescribed by the Department of Basic Education, which contributes to Grade 9's poor performance. The poor performance in Grade 9 is also contributed to by learners' struggles in sections like electrical systems and controls, which contribute to a substantial amount of percentage in their examination.

Limitations and Future Research

This study was conducted in two schools, which means that the results cannot be generalised across all Technology teachers across the globe. Therefore, future research should be conducted on many Grade 9 Technology teachers.

Additionally, future studies should also investigate why Grade 9 Technology teachers fail to align their assessments with Bloom's Taxonomy by looking at potential factors such as inadequate teacher training, limited awareness, or structural challenges within the educational system.

Recommendations

The above findings indicated that Grade 9 Technology teachers are not conforming to cognitive development levels (Bloom's taxonomy) when setting examination papers that impact learners' performance negatively, as the examination papers are balanced. Therefore, this study recommends that Grade 9 Technology teachers should be subjected to developmental programmes aimed at capacitating them on how to set balanced examination papers. This study further recommends that Grade 9 examinations should be set by the department of basic education to ensure that learners write a balanced examination paper.

The findings above also showed that learners are struggling with electrical systems and control topics; therefore, teachers should be subjected to workshops on how to teach this topic properly so that learners' performance in this topic can be improved.

Based on the findings, this study recommends that greater attention be given to addressing potential factors that hinder teachers' ability to align assessment tasks with Bloom's Taxonomy. These include improving teacher training programmes to ensure educators are well-equipped with the necessary skills, increasing awareness and understanding of Bloom's Taxonomy through continuous professional development, and addressing structural challenges within the education system—such as high workloads, limited resources, and rigid curriculum requirements—that may limit teachers' capacity to implement effective assessment strategies.

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