Teachers' Utilization of Bloom's Cognitive Taxonomy in Examination in Public Secondary Schools in Nandi County, Kenya

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DOI: https://dx.doi.org/10.47772/IJRISS.2024.805134

Received: 05 March 2024; Revised: 13 May 2024; Accepted: 17 May 2024; Published: 19 June 2024

ABSTRACT

Stakeholders are generally concerned in how public secondary schools perform academically in contrast to private schools. The optimal application of Bloom's Taxonomy should foster increased performance. Thus, the purpose of the study was to ascertain how students' academic achievement in public secondary schools in Nandi County, Kenya, related to teachers' application of Bloom's Cognitive Taxonomy in teaching and examination. The study's goal was to find out how instructors used Bloom's Taxonomy when creating internal exams. A pragmatic paradigm was used in the investigation. The foundation of this study was Bloom's Cognitive Taxonomy. This study used an explanatory sequential design in conjunction with a mixed method research technique. The research population consisted of 2055 teachers from 137 public secondary schools. The sample size was 360 teachers from 30 county schools. 30 county schools were selected using simple random sampling, from which 12 Form 3 teachers teaching 6 selected subjects were identified. Questionnaires and document analysis were used to collect data from examination. Data was analyzed using frequencies, and means. The results showed that 86 % of the teachers utilized Bloom's Taxonomy when setting exams. The overall percentages for using Bloom's Cognitive Taxonomy in examination papers were as follows: remembering 29.4%, understanding 28.5%, applying 14.5%, analyzing 9.9%, evaluating 8.7%, and creating 8.8%. The study therefore concluded that, most teachers used Bloom's Taxonomy when developing internal tests, and recommended that all teachers should utilize Bloom's Taxonomy and maximize all the levels of it in exams so as to promote an insightful approach to learning and critical thinking experience that will enhance academic performance for the students.

Key words: Bloom's Taxonomy, Examination, and public schools.

INTRODUCTION

Remembering, understanding, applying, analyzing, evaluating, and producing are the six stages of the cognitive taxonomy of difficulty that are mapped onto the multi-tiered structure known as Bloom's Cognitive Taxonomy. Over the years, the phases have been frequently depicted as a series of steps, leading many educators to encourage their learners to "ascend to advanced level of thinking" (Forehand, 2017). Teachers can better characterize and distinguish between different phases of human cognition—thoughts, knowledge, and understanding—by using the taxonomy. Bloom's Taxonomy (2014) as cited by Forehand (2017) states that teachers frequently used Bloom's Taxonomy to stay informed or guide the setting of appraisals (examination and further assessment of learner education), syllabus (units, lessons, projects, and other educational actions), and teaching methods like questioning strategies.

Examination, according to Yuliana and Iwan (2018), is an important aspect of the educational system that has certain goals to achieve and is a continuous process that involves both the teacher and the student.

Exams are beneficial because they track a student's progress toward defined goals. Examining a student's talents or achievement in any area of their academic curriculum is referred to as an examination. According to Lumadede et al (2020), exams have a direct influence on students' academic advancement.

Objective

The objective of the study was to determine teachers' utilization of Bloom's Cognitive Taxonomy in exam construction in public secondary schools in Nandi County.

LITERATURE REVIEW

As part of the process of creating theoretical frameworks and conceptual models, a literature review is a useful tool for summarizing research findings to demonstrate evidence on a meta- level and pinpointing areas that require more investigation (Snyder, 2019).

Bloom's Taxonomy of Objectives

According to Atherton (2013), Bloom's Taxonomy is a categorization, hence the taxonomy of teaching and education seeks to classify forms and phases of learning within the framework of the behavioral paradigm. Cognitive, emotive, and psychomotor are the three identified learning domains; each is organized as a sequence of steps or requirements. It is argued that prior to addressing higher levels of taxonomy, lesser levels must be addressed. Bloom's Taxonomy provides an elementary progressive model for handling themes in educational programs and suggests a way to categorize learning levels according to the predicted maximum quantity for a given subject. For instance, in the cognitive domain, tutors may focus on teaching understanding, recalling, and applying rather than analyzing, evaluating, or creating during the training of college students. However, thorough professional training may be necessary to incorporate synthesis and evaluation as well.

Internal exams give teachers crucial information that they can use to make judgments regarding their students' instruction and academic achievement. A checklist is useful for guiding instructors through the test creation decision-making process and validating teachers' evaluations based on tests created for classroom use. The subject discussed in class and the material tested at the end of a chapter or unit assessment are both genuine and considered to be out of harmony. This lack of coherence results in a test that does not offer teachers with sufficient evidence to make reliable assessments of students' development (academic achievement) (Brookhart, 1999, as cited by Fives & DiDonato-Barnes, 2013). Developing a Table of Specifications (TOS) based on Bloom's Taxonomy of goals may be one technique teachers can use to alleviate this challenge.

Cognitive Domain.

According to Forehand, 2010 & Atherton (2013), Bloom's Cognitive Taxonomy divides thought into six stages of complexity, with each level being absorbed by the subsequent higher level. Therefore, it offers a way to make it easier for students from different educational institutions to interchange test items in order to build banks of items that all measure the same educational objective (Krathwohl, 2002 as cited in Cengiz & Cakir, 2016).

As expressed by Cakir and Cengiz (2016), the objective is to enhance the sharing of ideas and educational materials between test developers and researchers and curriculum designers. Bloom (1956) as cited in Cakir and Cengiz (2016) states this as the purpose. There have been 22 translations of Bloom's Cognitive Taxonomy since its initial publication in 1956. It is currently widely utilized in educational research (Davidson & Baldwin, 2005, as referenced in Cengiz & Cakir, 2016).

Utilization of Bloom's Taxonomy in Examinations

Teachers utilize questions to guide their students' thinking and increase their level of comprehension when educating and assessing them. As a result, questioning is a vital and effective educational strategy for teachers. This expertise is beneficial to both new and veteran teachers. This means that different types of questions are suited for various teaching methods (Walsh & Sattes, 2005; Pagliaro, 2011 in Bibi, Butt & Reba, 2020). As a result, one of the markers of a successful teacher is the ability to ask good questions, and another crucial aspect for these teachers is to fit the questions to the students' abilities and the pedagogy they use. This would make it easier for all types of learners to answer to questions (Bibi, Butt & Reba, 2020).

Bloom's Taxonomy (1956 in Agarwal, 2019) is the sole method of defining educational objectives and offering a cluster for recognizing diverse classroom questions and thoughts that has been proven to be beneficial. This taxonomy is divided into six levels: remembering, understanding, applying, analyzing, creating, and evaluating, with verbs used to establish questions and objectives for teaching and assessment at each level. Teachers who are knowledgeable can frame questions for each student to engage them in different types of thinking processes. The many forms of questions might be related to a learner's intellectual talents and demands. There are two types of set questions: closed-ended and open-ended. Divergent or open-ended questions urge a full or comprehensive response, whereas convergent (closed-ended) inquiries necessitate a short or limited response.

Bloom's Taxonomy has a distinct advantage over all other methods of exam design in that it allows for both convergent and divergent inquiry. To foster active engagement and motivate learner participation in teaching and learning, a qualified teacher might construct closed or divergent questions. However, Tritapoe (2010 in Bibi, Butt, & Reba, 2020) stated that there is a lack of passion and drive for students in a number of classrooms when the instructor is active in teaching the topic, and the main rationale was that the teachers lack skill in questioning.

A study by Lalogiroth and Tatipang (2020) found that the test items covered remembering, understanding, applying, and analyzing levels, with the dominant Bloom's Revised Taxonomy cognitive domains of remembering and understanding levels being used in the test questions of the 2015/2016 English National Exam for senior high school level. In the exam questions, there were no questions about evaluating and creating levels. It signifies that question items for the 2015/2016 English National Exam for senior high school level were created using Bloom's Revised Taxonomy's cognitive domain. The outcomes of the research by Köksal and Ulum (2018) also showed that the studied exam papers lacked the higher-level cognitive skills included in Bloom's Taxonomy, and they suggested how exam papers currently being produced or would be composed should refer to Bloom's taxonomy.

Significance of Bloom's Cognitive Taxonomy in Examination

Internal exams offer teachers with critical information that they can use to make judgments regarding their teaching and students' academic achievement. Instructors can use a table of test specifications to help structure the exam building decision-making process and increase the quality of teachers' evaluations based on tests created for classroom use. Between the subject examined in class and the material scored on an end of chapter or unit examination, there are commonly both real and perceived mismatches. Because there is a lack of coherence in the examination, teachers are unable to make reliable assessments of students' academic performance (Fives & DiDonato-Barnes, 2013; Stronge, 2018). Developing a Table of Specifications based on Bloom's Taxonomy of goals may be one technique teachers might use to alleviate this challenge. Teachers who understand the intent of Bloom's Cognitive Taxonomy of Objectives, which is to increase the validity of a teacher's ratings based on a particular assessment, can adjust the table of specifications to best suit their needs. The building of internal examinations in public secondary schools in Nandi County, Kenya, is the subject of this study. Validity refers to the degree to which teacher evaluations

or assessments of learners may be relied upon depending on the quality of data gathered (Wolming & Wilkstrom, 2010, Reeves & Marbach-Ad, 2016).

METHODOLOGY

An approach to the world taken in this study was pragmatic philosophy. According to Kelly and Cordeiro (2020), the first step in doing research is for the researcher to create study schedules that are based on the participants' familiarities. This will guarantee the study's practicability and relevance. This study integrated quantitative and qualitative methods through the use of a mixed method research approach. The research scientist used a mixed method approach because it can integrate and synergize multiple data sources, which helps researchers study and seek a broad view of the study by allowing researchers to view the data from multiple perspectives (Poth & Munce, 2020; Shorten & Smith, 2017). This approach provides rich insights into the relationship between teachers' use of Bloom's Cognitive Taxonomy in teaching and students' academic performance that cannot be fully understood by using only qualitative or quantitative methods. In order to build on the quantitative findings of the first phase, the researcher used an explanatory sequential design in which he collected and assessed quantitative data. A qualitative phase was then conducted based on the quantitative findings (Dawadi, Shrestha & Giri, 2021). The researcher synthesized and interpreted the quantitative data, then proceeded to study the qualitative data, integrated the findings, and ultimately arrived at a conclusion (Creswell & Plano, 2018). The research population consisted of 2055 teachers from 137 public secondary schools. The sample size was 360 teachers from 30 county schools. 30 county schools were selected using simple random sampling, from which 12 Form 3 teachers teaching 6 selected subjects were identified. A follow-up explanation model was considered to purposively select 60 teachers from 360 teachers to collect data for the qualitative phase. Two instruments were used to collect data that is the teachers' questionnaire and document analysis, that is, examination papers for collecting quantitative data. Data was analyzed using frequency and means as per the objectives of the study.

RESULTS AND DISCUSSIONS

The research objective was to determine teachers' utilization of Bloom's Cognitive Taxonomy in the examinations in county public secondary schools in Nandi County. To achieve this, two teachers in each of the six selected teaching subjects in each of the 30 schools were given questionnaires to fill out, of which 355 were returned. In addition, form three end of year examination question papers were analyzed per subject in each of the six selected teaching subjects from each of the 30 schools selected. Additionally, the study focused on the general utilization of the Bloom's Cognitive Taxonomy by teachers as well as an analysis of the utilization per each level of the Bloom's Cognitive Taxonomy. The results are as presented below.

Teachers' Utilization of Bloom's Cognitive Taxonomy in Examination

The results are generally shown in Table 1, which generally shows that 307 teachers (86%) utilized Bloom's Cognitive Taxonomy in the construction of the examination, whereas only 14% of teachers did not utilize it. This shows that teachers utilized Bloom's Cognitive Taxonomy in constructing exams since the majority (86%) of respondents accepted that they utilized it in constructing exams. This echoed Adams' (2015b) claim that the taxonomy is advantageous in two respects. To begin with, tutors who use the taxonomy are encouraged to think about teaching objectives in behavioural terms, concentrating on what the student can do as a result of the lesson. A teaching objective expressed with action verbs will be the most effective way to assess the skills and knowledge given. Second, analyzing instructional goals using Bloom's taxonomy highlights the need to include learning objectives that require higher levels of cognitive skills, resulting in deeper learning and the transfer of information and skills to a broader range of tasks and settings.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue V May 2024

However, in terms of different teaching subjects under study, Table 1 shows that 75% of Mathematics teachers utilized Bloom's Cognitive Taxonomy for constructing exams, while 25% of them did not utilize Bloom's Cognitive Taxonomy in the construction of examinations. This was in line with a study by Radmehr and Drake (2018), who found using the two frameworks helps develop questions that aim to broaden students' thoughts and a variety of cognitive processes, including constructive ones, than traditional questions do when they use Bloom's Taxonomy (Anderson et al., 2001 as stated by Zapalska et al., 2018) in conjunction with Efklides's metacognition framework (Efklides, 2006, 2008 as refereced in Radmehr & Drake, 2019) to design questions to address the different Bloom's Taxonomy cognitive processes and knowledge types in senior secondary schools.

Furthermore, Table 1 revealed that 93% of English teachers, Christian Religious Education teachers and Chemistry teachers utilized Bloom's Cognitive Taxonomy when constructing examinations ,while 7% did not utilize it in both subjects this was similar to studies by Alzu'bi, (2014), which found that the English questions included in general secondary examinations utilized Bloom's Cognitive Taxonomy but emphasize low-order thinking levels and according to Cook, Kennedy, and McGuire (2013) Chemistry teachers utilized Bloom's Cognitive Taxonomy in examination but biased to lower ordered thinking examinations in external and mark-based examinations whereas Castelli (2015) supported utilization of Bloom's Taxonomy in Christian Religious Education with a recommendation that instructors should not limit the utilization on the lower level but utilize higher order too for maximum understanding of skills in examination.

Response from Business studies showed that 88% of Business studies teachers utilized Bloom's Cognitive Taxonomy to construct exams while 12% of teachers did not utilize it as shown in Table 10. This was similar to a study by Tyran (2010 as cited by Suud, Chaer,& Setiawan, 2020) who said utilization of Bloom's Cognitive Taxonomy is worthwhile for instructors in teaching, learning and assessing designs in spreadsheets. In Computer Studies 75% of respondents utilized Bloom's Cognitive Taxonomy to construct examinations while 25% of the respondents did not utilize Bloom's Cognitive Taxonomy to construct exams. This was similar to studies by Masapanta-Carrión, and Velázquez-Iturbide (2018) which says teachers utilized mostly Bloom's Cognitive Taxonomy in programming education and assessing student's performance. This showed that teachers utilized Bloom's Cognitive Taxonomy in constructing exams in Mathematics, English, and Chemistry, Christian Religious Education, Business studies and Computer studies since all of them scored above 75% in their responses. Thus, the study found out that majority of teachers (86%) in public secondary schools in Nandi County viewed Bloom's Cognitive Taxonomy as an important tool in exam construction.

Table 1: Teachers' Utilization of Bloom's Cognitive Taxonomy in Examination

Subjects	**Yes**		**No**		**Total**	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Mathematics	45	75	15	25	60	100
Chemistry	56	93	4	7	60	100
English	56	93	4	7	60	100
C. R. E.	56	93	4	7	60	100
Business studies	53	88	7	12	60	100
Computer studies	41	75	14	25	55	100
Total	307	86	48	14	355	100

Teachers' Utilization of Different Levels of Bloom's Cognitive Taxonomy in Examination

The following are responses to teachers' utilization of different levels of statements from Bloom's Cognitive

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue V May 2024

Taxonomy in exam construction, as shown in Table 2. The aggregate score (BCTI = 4.5) indicates that all the teachers for all the subjects strongly agreed that they required students to remember what had been taught. It is only in Chemistry that teachers on average agreed (BCTI = 4.2), but in all the other subjects they strongly agreed since the Bloom's Cognitive Taxonomy Index (BCTI) was equal to or greater than 4.5.

However, generally all the teachers agreed (Bloom's Cognitive Taxonomy Index, BCTI = 4.4) that they expected students to understand information in their own words. In respect to specific subjects, Chemistry, English, and Business Studies teachers strongly agreed since Bloom's Cognitive Taxonomy Index was greater than 4.5 (BCTI $\geq$ 4.5) and Mathematics, Christian Religious Education, and Computer Studies agreed (3.5 $\leq$ BCTI $\leq$ 4.4) that learners should understand information in their own words. This result was similar to studies by Jideani & Jideani (2012), which say "the cognitive weight in the examination was larger for comprehending (1.781) and remembering (0.787) than conceptual (1.416) information."

The results in Table 11 show that, in general perspective, all teachers, regardless of their teaching subjects, strongly agreed that learners should apply knowledge to new situations (Bloom's Cognitive Taxonomy Index, BCTI = 4.5). However, Mathematics, Chemistry, and Computer Studies (3.5 $\leq$ BCTI $\leq$ 4.4) agreed that they required students to utilize the knowledge taught to apply it in new situations.

In addition, the results in Table 11 indicate that normally, all teachers' inferences to all teaching subjects agree that students should analyze knowledge into parts and show relationships (3.5 $\leq$ BCTI $\leq$ 4.4). However, in contrast, on aggregate, all the teachers are undecided as to whether students should base their evaluations on a given criteria or standard (Bloom's Cognitive Taxonomy Index, BCTI = 3.3) except in Business studies, where the teachers agreed with the claim (Bloom's Cognitive Taxonomy Index, BCTI = 3.5). Also, the results in Table 11 show that, in overall all teachers were undecided (Bloom's Cognitive Taxonomy Index, BCTI = 2.7) on whether students should be expected to create knowledge and create new relationships for new situations. However, specifically Christian Religious Education teachers disagree (Bloom's Cognitive Taxonomy Index, BCTI = 2.4) with this expectation. Hence, the utilization of Bloom's Cognitive Taxonomy was high or balanced since the results gave an overall Bloom's Cognitive Taxonomy Index (BCTI) of 3.88.

Generally, all the teachers agreed (BCTI = 3.88) that they utilize statements from Bloom's Cognitive Taxonomy in exam construction. The findings of this study are consistent with those of other investigations. Professionals who train or instruct others, for example, can use Bloom's Cognitive Taxonomy to create teaching objectives that characterize the skills and abilities they want their students to master and display, according to Adams (2015a). Bloom's Cognitive Taxonomy distinguishes between cognitive skill levels and emphasizes educational objectives that necessitate higher levels of cognitive skills and, as a result, lead to deeper learning and transfer of knowledge and skills to a wider range of tasks and settings. Likewise, "Revised Bloom's Taxonomy provides an assessment framework that can be used to aid instructors in extending beyond factual knowledge and understanding to incorporate academic skills such as application, analysis, evaluation, and creation," according to Jideani & Jideani (2012).

Table 2: Teachers' utilization of different levels of Bloom's Cognitive Taxonomy in Examination

Bloom's Cognitive Taxonomy Index, BCTI							
	Levell of Bloom's Cognitive Taxonomy						
Subjects	**Remembering**	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creation**	**Average**
Mathematics	4.6	4.4	4.4	4.1	3.2	2.5	3.87
Chemistry	4.2	4.5	4.4	3.7	3.2	2.6	3.93
English	4.6	5.0	4.5	4.1	3.2	2.5	3.98

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue V May 2024

C. R. E.	4.6	4.3	4.7	3.8	3.3	2.4	**3.85**
Business	4.5	4.5	4.6	3.6	3.5	2.9	**3.93**
Computer	4.5	4.1	4.2	3.8	3.1	2.8	**3.75**
Total BCTI	4.5	4.4	4.5	3.9	3.3	2.7	**3.88**
Percentage	**75**	**73**	**75**	**65**	**55**	**45**	**65**

Utilization of Verbs at Different Levels of Bloom's Cognitive Taxonomy in Exams

Further, teachers were asked to indicate how frequently they utilize verbs at different levels of Bloom's Cognitive Taxonomy in the examination, and the following were the results of their responses.

Generally, the results in Table 3 show that all teachers indicated that they often (Bloom's Cognitive Taxonomy Index, BCTI = 4.1) utilize terms focusing on remembering in the construction of exams. However, it is only the Christian Religious Education teachers who very often (Bloom's Cognitive Taxonomy Index, BCTI = 4.6) utilize terms categorized as depicting remembering in examination construction. It was noted that on the aggregate scale, all teachers very often (Bloom's Cognitive Taxonomy Index, BCTI = 4.5) utilize terms at the cognitive level of understanding in examination construction. For specific subjects, Mathematics, Chemistry, and Computer studies often utilize the terms ($3.5 \leq BCTI \leq 4.1$), and English, Christian Religious Education, and Business Studies teachers very often utilize the terms at the understanding stage of Bloom's Cognitive Taxonomy level. Also, all the teachers for all the subjects generally often (Bloom's Cognitive Taxonomy Index, BCTI = 3.8) utilize terms at the cognitive level of applying them in exam construction.

The overall index shows that all the teachers rarely utilize terms focusing on the analyzing, evaluating, and creating levels of Bloom's Cognitive Taxonomy in exam construction (Bloom's Cognitive Taxonomy Index, $2.9 \leq BCTI \geq 3.3$). It is only Christian Religious Education and Chemistry who often utilize terms at the analytical level of cognition in exam construction (Bloom's Cognitive Taxonomy Index; $3.5 \leq BCTI \geq 4.0$) as shown in Table 3. However, in mathematics, teachers very rarely (Bloom's Cognitive Taxonomy Index, BCTI = 2.4) utilize terms at the level of creating of Bloom's Cognitive Taxonomy in exam construction.

The grand overall with a Bloom's Cognitive Taxonomy Index (BCTI) of 3.63 indicates that the secondary school teachers' oftenly utilized the verbs from the different levels of Bloom's Cognitive Taxonomy in exam construction. Each level of Bloom's Cognitive Taxonomy scored the following Bloom's Cognitive Taxonomy Index (BCTI): remembering scored 4.1, understanding 4.5, applying 3.8, analysis 3.3, evaluation 3.2, and creation 2.9, as shown in Table 12. This was similar to recommendations made by Cullinane (2010 as cited by Rozien and Retnawati, 2019), which postulated that while designing class tests, teachers should utilize the Bloom's Cognitive Taxonomy verbs as a lead and source to help the encouragement of critical thinking among their students.

Generally, exams using a marks-based system tended to encourage lower-order thinking, with lower-order thinking problems receiving a larger share of the marks (Fensham & Bellocchi, 2013). This shows that well-designed multiple-choice exams based on Bloom's taxonomy could be a feasible and successful alternative to essay exams for assessing a wide group of students' critical-thinking skills (Kim, Patel, Uchizono, and Beck, 2012, as cited in Zaidi, Grob, Monrad, Kurtz, Tai, Ahmed,… & Santen, 2018). According to Cullinane (2010 as referenced in Sarah, 2019), in order for the various tasks to have a favorable influence on students, they must use and utilize a combination of all of the levels.

Table 3: Utilization of Verbs at Different Levels of Bloom's Cognitive Taxonomy in Examination

BLOOM'S COGNITIVE TAXONOMY INDEX, BCTI							
	Levels of Bloom's Cognitive Taxonomy						
Subjects	**Remembering**	**Understanding**	**Applying**	**Analyzing**	**Evaluating**	**Creation**	**Average**
Mathematics	3.8	3.9	3.7	2.9	3.0	2.4	**3.28**
Chemistry	3.8	4.3	3.6	3.7	3.1	3.4	**3.65**
English	4.1	4.8	4.2	3.4	3.4	2.9	**3.80**
C. R. E.	4.6	4.6	3.6	3.6	3.2	3.2	**3.80**
Business	4.3	4.7	3.7	3.2	3.2	2.9	**3.67**
Computer	3.9	4.1	4.1	2.8	2.9	2.6	**3.40**
Total BCTI	**4.1**	**4.5**	**3.8**	**3.3**	**3.2**	**2.9**	**3.63**
Percentage	**68**	**75**	**63**	**55**	**53**	**48**	**61**

Utilization of Bloom's Cognitive Taxonomy in Examination papers

The researcher also collected two question papers from Mathematics, Business studies, Computer Studies, and Christian Religious Education and three question papers each in English and Chemistry so as to analyze the utilization of Bloom's Cognitive Taxonomy in examinations, and the results were recorded in a check list. The following results were obtained from the checklist:

The results showed that in all selected subjects, namely Mathematics, Chemistry, English, Christian Religious Education (C.R.E.), Business studies, and Computer studies exams, Bloom's Cognitive Taxonomy was utilized as shown by the frequencies and percentages of each level in Table 4. For instance, in the mathematics examination, the percentages were as follows: remembering 28%, comprehending 19%, applying 27%, analyzing 7%, evaluating 11%, and creating 8%. This shows that the bulk of the questions set were in the lower levels of Bloom's Cognitive Taxonomy that is remembering, understanding, and applying, and a few questions were in the higher order category that is analyzing, evaluating, and creating. According to a study by Darlington (2013), the preponderance of the mathematics examinations in schools are at the lower level of Bloom's Taxonomy compared to undergraduate mathematics examinations. According to other researcher show that utilization of the Mathematical Assessment Task Hierarchy taxonomy revealed A-level Mathematics and Further Mathematics questions hub on requiring students to demonstrate a routine use of procedures in the secondary- tertiary level, whereas those students in first-year undergraduate mathematics were primarily expected to be able to draw conclusions, justify their answers, and develop conjectures (Darlington, 2014).

However, in the chemistry examination, the percentages were as follows: remembering 28%, understanding 32%, applying 14%, analyzing 11 percent, evaluating terms were utilized in eight percent of the items, and creating six percent of the items. This showed that the best part of the questions set were in the lower levels of Bloom's Cognitive Taxonomy that is remembering, understanding and applying, and a few questions were in the higher order category that is analyzing, evaluating and creating. The findings of this study agreed with those of Upahi, Issa, and Oyelekan (2015), who found that lower-order cognitive skills (LOCS) and factual knowledge were required in roughly 80 percent and 44 percent of the questions, respectively. There was also no question in the high-order cognitive abilities evaluation category, and none of the questions required students to apply metacognitive knowledge, according to the findings. They came to the conclusion that the chemistry questions were not as cognitively demanding as they could have been, and they suggested that the exam reflect the dual perspective of Bloom's Cognitive Taxonomy of cognitive

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue V May 2024

process skills and knowledge aspects in examination questions.

The analysis from the English examination showed that 30% of questions set were on remembering, 31% were on understanding, ten percent were on applying, 11% were on analyzing, eight percent were on evaluating, and nine percent of the questions set were on creating, as shown in Table 4 above. This implied that the bulk of the questions set were in the lower order of Bloom's Cognitive Taxonomy that is remembering, understanding and applying, and a few questions were in the higher order category that is analyzing, evaluating and creating. This conclusion was in line with Kamlasi's research (2018). His findings revealed that the majority of the questions on the English exam were at the lower level of Blooms Taxonomy, with only a few at the higher level; for example, according to Kamlasi (2018), "the mass of the questions on the English exam were at the lower level of Blooms Taxonomy and very few were at the higher order of taxonomy." "Remembering taxonomy resulted in 22 items, or 44% of the total. Understanding Taxonomy presented two items, accounting for four percent of the total. The use of applying taxonomy resulted in the creation of 21 items, or 42 percent of the total. Taxonomy analysis yielded five elements, or 10% of the total. Because no item was found in both the evaluating and creating taxonomies, the developing stage of the taxonomy was not usedto question the students in the English test. According to the conclusions of this study, when creating examination items, teachers should use Bloom's taxonomy."

Furthermore, in the Christian Religious Education (C.R.E.) examination, the responses were as follows: As shown in Table 4, 34% of the questions set were on remembering, 38% on understanding, five percent were on applying, ten percent were on analyzing, five percent were on evaluating, and eight percent of the questions set were on creating. This demonstrated that the bulk of the questions set were in the lower order of Bloom's Cognitive Taxonomy that is remembering, understanding, and applying, and a few questions were in the higher order category that is analyzing, evaluating, and creating. The data revealed that secondary school teachers do not appropriately apply Bloom's cognitive levels in the construction of their assessment items, according to Gichuhi (2014). It also indicated that while creating assessment items, teachers do not make enough use of action verbs. The results were consistent across all types of schools. As a result, the findings suggest that teacher training and retraining in examination construction could aid in the improvement of teacher-made tests for effective learning assessment.

Furthermore, the Business Studies examination illustrated that 28% of the questions set were on remembering, 30% on understanding, 16 percent were on applying, ten percent were on analyzing, nine percent were on evaluating, and seven percent of the questions set were on creating, as shown in Table 4. This also proved that the majority of the questions set were in the lower order of Bloom's Cognitive Taxonomy that is, remembering, understanding, and applying, and a few questions were in the higher order category, that is, analyzing, evaluating, and creating.

Moreover, in the computer studies examination, the percentages were as follows: remembering 29%, understanding 23%, applying 14%, analyzing nine percent, evaluating 11%, and creating 14%. This explains that the greater part of the questions set were in the lower levels of Bloom's Cognitive Taxonomy that is remembering, understanding, and applying, and a few questions were in the higher order category that is analyzing, evaluating, and creating.

However, in conclusion, the overall percentages for utilization of Bloom's Cognitive Taxonomy in the examination were as follows: remembering 29.4%, understanding 28.5%, applying 14.5%, analyzing nine points nine percent, evaluating eight points seven percent, and creating eight points eight percent. This shows that there was utilization of Bloom's Cognitive Taxonomy in the examination, though the majority of the questions set were in the lower levels of Bloom's Cognitive Taxonomy that is remembering, understanding, and applying, and a few questions were in the higher order category that is analyzing, evaluating, and creating.

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS |Volume VIII Issue V May 2024

The data demonstrated that secondary school teachers do not make proper use of Bloom's cognitive levels when generating exam items. It was also shown that when constructing examination items, teachers do not make enough use of action verbs. This was similar to studies by Chandio, Pandhiani, and Iqbal (2016), who acknowledge the utilization of Bloom's Cognitive Taxonomy in exams, but the only challenge is that questions are set mostly at a lower level of thinking, whereas higher order thinking is neglected. Assessment systems, according to Chandio et al. (2016), can help to improve the teaching-learning process at the school and college level. Bloom's Taxonomy has succinctly proposed six stages/domains of learning, beginning with the lower degrees of learning, such as remembering, understanding, and applying, and progressing to the higher domains of learning, such as analyzing, evaluating, and creating, which, when implemented, greatly improve both the teaching-learning process and assessment practices. The results of this study show that question papers, whether objective or subjective, have a disproportionate bias towards the lower domains, which promote cramming and memorizing, while the higher domains of learning, such as analysis, assessment, and creativity, receive less attention. Thus, the teaching-learning process in public sector schools and colleges in Sindh can be improved to a significant degree and level by transcending the examination/assessment pattern from the lower level domains of remembering, understanding, and applying to the higher level domains of analyzing, evaluating, and creating.

Table 4: Teachers' utilization of Bloom's Cognitive Taxonomy in Examination

		Subjects						
Levels of Bloom's Cognitive Taxonomy		**Mathematics**	**Chemistry**	**English**	**C. R. E.**	**Business**	**Computer**	**Total**
Remembering	F	100	90	107	110	87	103	597
	%	28	28	30	34	28	29	29.4
Understanding	F	67	105	112	120	95	80	579
	%	19	32	31	38	30	23	28.5
Applying	F	98	45	37	16	53	48	297
	%	27	14	10	5	16	14	14.6
Analyzing	F	25	39	40	35	30	33	202
	%	7	11	11	10	10	9	9.9
Evaluating	F	41	27	28	15	27	39	177
	%	11	8	8	5	9	11	8.7
Creating	F	29	21	33	24	22	50	179
	%	8	6	9	8	7	14	8.8
Total	F	360	327	357	320	314	353	2031
	%	100	100	100	100	100	100	100

However, at the conclusion of the second research objective, it was observed that the researcher's observation and the respondents' perspective indicated a great significant difference. This is because the results in Tables 2 and 3 shows that each level of Bloom's Cognitive Taxonomy scored a higher percentage compared to the results obtained in Table 4. For instance, in Table 2, remembering scored 75%, understanding 73%, applying 75%, analyzing 65%, evaluation 55%, and creation 45%, whereas the scores in Table 4 were as follows: remembering 29.4%, understanding 28.5%, applying 14.5%, analyzing 9.9%, evaluating 8.7%, and creating 8.8%. However, both results confirmed that there was utilization of Bloom's Cognitive Taxonomy in the examination.

These findings matched those of Folasayo, (2021), who discovered that while Nigerian instructors were professionally prepared, they did not employ Bloom's cognitive taxonomy of educational objectives in the development of the items used to evaluate students' academic achievement. When assessing the learners' learning outcomes, the majority of teachers simply looked at the remembering level of Bloom's cognitive taxonomy. In the creation of the test items, other levels were virtually ignored. This meant that instructors' assessments were insufficient in creating flawless learning results, and that teachers who failed to include Bloom's cognitive taxonomy into their students' evaluations lacked the necessary teaching perspectives. The types of activities and skills obtained by their students were reflected in the deficiencies in science teachers' usage of Bloom's cognitive taxonomy. Students excelled in remembering verbs from the taxonomy, but they struggled with the rest of Bloom's Cognitive Taxonomy levels and verbs (Riazi, 2010, Rupani, 2011, Kolb, 2014, Irfan and Shelina, 2016, and Mwakamele, 2017 as stated in Folasayo, 2021).

CONCLUSION AND RECOMMENDATIONS

The study findings showed that all the teachers agreed that they utilized Bloom's Cognitive Taxonomy in the setting of exams at different levels of the taxonomy. However, the analysis of examination papers in all the six subjects under study also illustrated that teachers utilized Bloom's Cognitive Taxonomy in examinations. It was also observed that the researcher's observation and the respondents' perspective demonstrated a significant difference because both results indicated a great difference in percentages. This implies that practically most teachers do not exhaust the full utilization of Bloom's Cognitive Taxonomy in setting exams, as demonstrated by the qualitative results of the research. Hence, teachers should continue utilizing Bloom's Cognitive Taxonomy in setting exams across all the subjects equally and both the lower order category and higher order category of Bloom's Cognitive Taxonomy should be utilized so exhaustively so that it enables the learners to understand their teaching and excel in exams, unlike the case now.

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