The Relationship Between Teachers' Utilization of Bloom's Cognitive Taxonomy in the Construction of Examination Questions and Assessment of Students' Academic Performance, in Public Secondary Schools, in Nandi County, Kenya

Bernard Kipkurui Yegon

Student, Moi University, School of Education, Department of Educational Psychology, P.O. Box 3900, Eldoret, Kenya

DOI: https://dx.doi.org/10.47772/IJRISS.2025.903SEDU0397

Received: 20 February 2025; Accepted: 26 February 2025; Published: 12 August 2025

ABSTRACT

A common worry among stakeholders is the academic performance of public secondary schools in comparison to private institutions. According to best practices,Bloom'sTaxonomy is widely recommended for improving academic performance. Because of this, the study set out to look at the connection between students' academic performance in public secondary schools in Nandi County, Kenya, and teachers' use of Bloom's Cognitive Taxonomy in instruction and examination. The objective of the study was to examine the relationship between teachers' utilization of Bloom's Taxonomy in the construction of examinations and assessment of students' academic performance in public secondary schools. The study adopted a pragmatic paradigm. This study was based on Bloom's Cognitive Taxonomy of objectives. An explanatory sequential design and a mixed method research strategy were employed in this study. 2055 teachers from 137 public secondary schools made up the research population. A total of 360 instructors from 30 county schools comprised the sample. Using simple random sampling, 30 county schools were chosen, and 12 Form 3 teachers teaching six chosen subjects were identified from among them. The methods employed to gather data from the examination were questionnaires and document analysis. Data was analyzed using frequencies, means, and Chi-square. The study revealed a positive relationship between the utilization of the taxonomy in setting exams and academic performance (χ^2 = 97.89 with C = 0.47). The study therefore concluded that, 86 % of teachers used Bloom's Taxonomy when developing internal examinations, and these had a significant positive relationship with academic performance of the students. The findings of this study suggest that educators should make full use of Bloom's Taxonomy and aim to incorporate all levels into examinations. This will foster a critical thinking and analytical mindset among students, ultimately leading to improved academic achievement.

Keywords: Relationships, Bloom's Taxonomy, Examination, academic performance, and public schools.

INTRODUCTION

In the realm of educational research, the construction of examinations serves as acritical facet influencing the academic paths of students. Bloom's Cognitive Taxonomy, a widely recognized framework in education, encompasses a hierarchical structure of cognitive skills, ranging from lower-order thinking skills such as remembering and understanding to higher-order skills such as applying, analyzing, evaluating, and creating. This research seeks to unravel the nuanced impact of the utilization of Bloom's Taxonomy by teachers in the formulation of examination questions, examining how the cognitive complexity of these questions correlates with the academic achievements of secondary school students in Nandi County. Nandi County, located in the expansive educational landscape of Kenya, serves as the geographic context for this investigation. The educational system in this county, like many others globally, is underpinned by the dual responsibilities of educators to effectively assess student understanding and facilitate meaningful learning experiences.

Over the years, the phases in Bloom's Cognitive Taxonomy have been frequently depicted as a series of steps, leading many educators to encourage their students 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. Based on scholarly research, students' academic success is influenced by their thinking and non-thinking characteristics, as well as the sociocultural framework in which learning takes place (Lee & Stankov, 2016; Liem & McInerney, 2018; Liem & Tan, 2019). This demonstrates that achieving student success is essential and should come first in order for any developing country to achieve its short- and long- term goals. Therefore, ascertaining the relationship between the incorporation of Bloom's Cognitive Taxonomy by teachers in the construction of exams and the subsequent academic performance of students holds paramount significance.

Hypothesis

The study hypothesized that there was no significant relationship between teachers' utilization of Bloom's Cognitive Taxonomy of educational objectives in the construction of examinations and academic performance in public secondary schools in Nandi County.

LITERATURE REVIEW

According to the accountability reform paradigm (Berliner, 2014, as cited in Singh et al., 2019), teachers' work is evaluated in terms of value-added metrics, which promise to analyze individual teacher production versus individual child and the whole class test score performance and compensate teachers accordingly. The market-driven per-formativity objective of neoliberal education policies, which places teachers' success against students' performance on high-stakes standardized national testing, is having an impact on teachers' work. Critical policy scholars describe significant degrees of fear, worry, sorrow, and loss of hope among teachers as they navigate and manage the contradictory and conflicting discourses of this policy terrain (Ball, 2016; Clarke, 2013; Singh, 2018). Due to this, education stakeholders are now required to send instructors to in-service training in order to enhance their teaching methods and raise students' academic achievement.

Bloom's Taxonomy of objectives

Bloom's Revised Cognitive Taxonomy is a multi-tiered approach for categorizing thought into six stages of cognitive complexity: remembering, comprehending, applying, analyzing, evaluating, and generating. Many professors have encouraged their students to climb to a higher level of thought by depicting the levels as a stairwell over the years. Bloom's Cognitive Taxonomy is hierarchical in the sense that upper levels consider each level. To put it another way, a student who is performing at the application level has mastered the content at the remembering and comprehending levels as well (Forehand, 2010; Wilson, 2016a). Bloom's Cognitive Taxonomy is a classification system for claims about what students are expected to understand as a result of educational instruction. Bloom established six levels in an orderlymanner, ranging from simple to more complicated and from concrete to abstract; mastering the next more complex skill or talent necessitates mastering the previous (Krathwohl, 2002, as cited in Cengiz & Cakir, 2016). As a result, it is a method of allowing members of diverse learning institutions to exchange test items in order to establish banks of items that all measure the same educational goal (Krathwohl, 2002 as cited in Cengiz & Cakir, 2016).

Bloom's Cognitive Taxonomy, for example, according to Bloom et al. (1956) as cited in Deal and Hegde (2013), is a description of educational objectives that has been used by educators for the construction of learning goals and the creation of assessment tools, which include exam questions. As well as other efforts to coordinate best practices with cognitive development theory over the last fifty years, and it has continued to enjoy widespread use at all levels of education in the United States and around the world since its inception (Krathwohl, 2002) as cited in Deal and Hegde (2013).

Therefore, the purpose of this study was examined the relationship between teachers' utilization of Bloom's Cognitive Taxonomy of educational objectives in the construction of examinations and students' academic performance in public secondary schools in Nandi County.This is because learners are able to think at both

low and higher levels of thinking when Bloom's Cognitive Taxonomy of objectives is used in instruction and the creation of internal examinations. This would allow people to address problems by thinking critically, analyzing, and manipulating data rather than being mechanistic. According to Krathwohl (2002) as cited in Deal and Hegde (2013) and Wilson (2016a), the six levels of Bloom's Cognitive Taxonomy are as follows: Remembering, understanding, applying, analyzing, evaluating, and creating. The first level is remembering, which entails recalling basic terminology and facts related to Mathematics, Chemistry, English, Christian Religious Education (C.R.E.), Business studies, and Computer studies. In Business Studies, for example, students were expected to understand the concepts of supply and demand, as well as the factors that shift supply and/or demand curves.

The second level of Bloom's Cognitive Taxonomy is understanding, which is achieved when the student can restate an idea or problem in his/her own words, provide an example of a concept, or extrapolate a trend in Mathematics, Chemistry, Christian Religious Education (C.R.E.), English, Business Studies, and Computer studies. In non-technical terms, the student in business studies must be able to provide a real-world example of supply and demand or explain how a market would reach equilibrium. The third level of the taxonomy is applying, which is achieved if the student can apply concepts to a new problem that embodies those concepts in a different way than originally presented in Mathematics, Chemistry, Christian Religious Education (C.R.E.), English, Business studies, and Computer studies. For example, the student in Business Studies was confronted with a description of conditions in a market and asked to determine the impact of those conditions on market allocation.

The fourth level of the taxonomy is analyzing, which requires students in Mathematics, Chemistry, English, Christian Religious Education (C.R.E.), Business Studies, and Computer Studies to break down material into its component parts and determine how they fit together. For example, in Business Studies, a student was required to identify the assumptions underlying an efficient market allocation or demonstrate an understanding of causation versus correlation when analyzing data presented in graphical form. The fifth level of Bloom's Cognitive Taxonomy is evaluating, which requires the student to critique an idea in Mathematics, Chemistry, Christian Religious Education (C.R.E.), English, Business Studies, and Computer studies. Students were able to do so if they could show that they could spot fallacious arguments and that they could evaluate hypotheses based on external evidence and internal consistency. Students in Business Studies, for example, could be given a list of characteristics of numerous market structures and asked to rate them in terms of efficiency or innovation incentives.

Finally, Bloom's Cognitive Taxonomy's sixth level, creating, asks the learner to reorganize elements of knowledge in a new way or construct a new theory to explain a set of facts. For example, a Business Studies student was given the task of developing a hypothesis to explain what would happen to aggregate output if private investment declined.

At all stages of education, examinations are an important component of the teaching-learning process. The primary goal of the classroom examination principle is to improve learning. Because evaluation is such an important part of a student's future, there is no doubt that any test system will influence what students learn and how they learn it. As a result, the assessment established how teachers educate and what they teach. Teachers can assess the value or success of a learning experience by examining it in order to achieve the desired goal (Tanalola, Fattahb, Sulong, & Mamat, 2017). One of the most prevalent methods of evaluating learners' knowledge gain is to examine them. The outcomes of an examination can be utilized to help students improve their cognitive abilities and behaviour. A written examination is used to assess a student's academic achievement, and it is a common and ubiquitous instrument in the educational field. The questions on the examination paper play a big role in determining a student's competence, and a good examination paper should have a range of difficulty levels to test students' different skills. This aligns with the examination's goal of classifying students into three categories: good, average, and poor. Bloom's cognitive taxonomy (Tanalola, Fattahb, Sulong, & Mamat, 2017) is one technique to demonstrate this. As a result, in public secondary schools in Nandi County, Kenya, this study looked at the relationship between instructors' use of Bloom's Cognitive Taxonomy in examination and students' academic performance.

Examinations primarily access mid to low level cognition such as recollection and application, according to Gates and Pugh (2021), whereas competencies required by employers tend to demand higher-level cognition

such as synthesis and creation, which are not as typically examined by examinations. They also suggested that in formal examinations, careful question design employing distinct quantifiable verbs from Bloom's Cognitive Taxonomy should be employed to support the development of higher-level meta-cognitive skills.

Examinations that mostly consist on recalling questions encourage students to spend more time memorizing, resulting in superficial learning and cramming of content (Momsen et al., 2013 in Gates & Pugh, 2021). Furthermore, according to Scully (2017), there have been recurrent requests for the establishment of both curriculum and assessment models that prioritize higher-order thinking rather than simply recall of information throughout schooling, certification, and licensure. Bloom's Taxonomy of educational objectives, which outlines six increasingly mental processes in which a learner might engage, is associated with higher-order thinking.

Assessment give both evaluative and instructional information about the learner. Research findings indicated that the best assessment is one that has been matched to higher-order thinking skills, because students who experience assessments that require higher-order thinking are much more likely to embrace purposeful, comprehensive approach to their studies rather than relying on surface-level or routine learning strategies. Furthermore, these exams enable teachers to provide more extensive and precise feedback, which can help to stimulate and steer intellectual development (Jensen et al., 2014; Leung, Mok & Wong, 2008; Momsen et al., 2010 in Scully, 2017). It would also close the perceived gap between what students learn and what employers appreciate, because students would have gained the following skills: creativity, collaborative problem-solving, and critical thinking, all of which can be matched with the higher levels of Bloom's Cognitive Taxonomies (Scully, 2017).

Taxonomies are created to provide a framework for organizing a sequence of events along a common structure. Based on their underlying grammatical structure and origin, languages can be classed as English, Germanic, Romantic, and so on. Bloom's Cognitive Taxonomy of Objectives gives teachers a place to start when creating course teaching objectives. There are a variety of reasons why a teacher might desire to employ Bloom's Cognitive Taxonomy in the classroom (Anderson, Krathwohl & Bloom, 2001, as cited in Kin et al., 2021; Zapalska et al., 2018). It can be used primarily to improve one's comprehension of the educational process. Teachers can see and understand how lower-level abilities lead to higher-order thinking, such as retaining data and comprehending past difficulties, which helps a student to apply their knowledge to comparable challenges. This knowledge can aid in the prioritization of material and the arrangement of lessons in order to maximize class time. Lower-level abilities (for example, memorizing factual knowledge) can be developed before higher-level skills (for example, relationship analysis) are taught (Anderson, Krathwohl & Bloom, 2001, as cited in Wei & Ou, 2019). Educators nowadays are typically confronted with a bewildering mix of standards and curriculum requirements. Bloom's Cognitive Taxonomy of objectives provides a framework for breaking down these criteria into manageable chunks that may be used to guide day-to-day lesson planning and easily contrasted to their own class goals. Different evaluation approaches are required for different levels, just as different instructional delivery methods are required for different levels (Masapanta-Carrión & Velázquez-Iturbide, 2018). As a result, the researcher conducted this investigation into the relationship between instructors' use of Bloom's Cognitive Taxonomy of objectives in examinations and students' academic performance in public secondary schools in Nandi County.

According to a study by Setiyana and Muna (2019), remembering (45 percent) was the most commonly used level of Bloom's Cognitive Taxonomy, followed by understanding (42 percent), applying (11 percent), and analyzing (2%), with none of the levels of evaluating or creating being used in the test items. To summarize, the usage of Bloom's Taxonomy in test items is still prone to lower-order thinking, which manifests itself in students' weak skilled thinking abilities. According to Kozikolu (2018), more than half of the objectives in the 8th grade English curriculum are at the apply level, half of the objectives are for procedural knowledge, and 23% of the objectives are for higher order thinking skills such as analyzing, evaluating, and creating, in an examination of alignment between national assessment and English curriculum objectives using revised Bloom's Taxonomy. The bulk of English course questions on the national test were geared toward lower-order thinking skills, and there was no correlation between the English curriculum's objectives and the national examination's English course questions. Internal examinations in Nandi County, Kenya, could also be hampered by this.

METHODOLOGY

An approach to the world taken in this study was pragmatic philosophy. This study used mixed methods research approach to integrate and synergize multiple data sources. This helps researchers to study and seek a broad view of the study by allowing them 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 et al., 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 third year class secondary schools 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, percentages, and Chi square.

RESULTS AND DISCUSSIONS

The research objective was to investigate the relationship between teachers' utilization of Bloom's Cognitive Taxonomy in the construction of examinations and students' academic performance in public secondary schools in Nandi County, Kenya. The Chi Square (χ^2) was utilized to compute the relationship between teachers' utilization of Bloom's Cognitive Taxonomy in the construction of exams and students' academic performance in public secondary schools in Nandi County, Kenya by testing the following null hypothesis:

H_{O1}: There is no significant relationship between teachers' utilization of Bloom's Cognitive Taxonomy in the construction of exams and students' academic performance in public secondary schools in Nandi County.

The respondents were asked to indicate teachers' utilization of Bloom's Cognitive Taxonomy in the construction of examinations, and the following results were obtained: $\chi^2 = 97.989$, p = 0.001, N = 355 and degree of freedom equals to 11 at a significant level of 0.05, which means the null hypothesis is rejected. This shows that there exists a significant relationship between teachers' utilization of Bloom's Cognitive Taxonomy in the construction of and students' academic performance with a contingency coefficient (C) of 0.47. Hence, the association between teachers' utilization of Bloom's Cognitive Taxonomy in exam construction and students' academic performance is weak but significant. It accounts for very little (about 11.5%) of improved academic performance.

The results displayed in Table 1 show evidences or indications of teachers' utilization of the Bloom's Cognitive Taxonomy in the examination question papers and the students' academic performance.

Table 1 The Relationship betweenUtilization of Bloom's Cognitive Taxonomy in examination and students' academics performance

Students' Academic performance		Levels of Bloom's Cognitive Taxonomy						
		Remembering	Understanding	Analysing	Applying	Evaluating	Creating	Total
Low	F	75	51	178	231	220	258	1013
	P	21	14	50	65	62	73	47
Average	F	105	115	107	82	67	72	548
	P	30	33	30	23	19	20	26
High	F	175	189	70	42	68	25	569
	P	49	53	20	12	19	7	27
Total	F	355	355	355	355	355	355	2130
	P	100	100	100	100	100	100	100

On aggregate, 47% of the students scored low, 26% scored average, and 27% scored high when teachers utilized Bloom's Cognitive Taxonomy in examinations. This shows that most (above 53 percent scored average and above) of the students perform well when teachers utilize Bloom's Cognitive Taxonomy in examinations. Table 1 also shows that the association between teachers' utilization of Bloom's Cognitive Taxonomy in the examination and students' academic performance is significant (χ^2 = 495.61, degree of freedom = 10 at a significance level of 0.05) but weak since the contingency coefficient (C) equals to 0.76. Hence, the utilization of Bloom's Cognitive Taxonomy in examinations is less (about 18.36%) and contributes little towards improvement in students' academic performance. As a result, Bloom's Cognitive Taxonomy can be used as a checklist to ensure that all levels of a domain have been assessed and that assessment techniques are aligned with the correct courses and procedures. In this approach, the taxonomy assists teachers in maintaining consistency among assessment techniques, content, and instructional materials, as well as identifying weak areas (Anderson, Krathwohl, & Bloom, 2001, as cited in Zapalska et al., 2018).

Moreover, the results in Table 2 show that when teachers utilized a balanced level of Bloom's Cognitive Taxonomy in the construction of examinations, 40% of students scored below average, 49% scored average, and 11% of students scored above average. This implies 60% of students scored average and above average in academic performance when teachers utilized a balanced Bloom's Cognitive Taxonomy in constructing exams, while 40% scored below average in academic performance. However, when teachers' utilization of Bloom's Cognitive Taxonomy was ambivalent, 49% of students scored below average, 40% scored average, and 11% scored above average in academic performance. This means that when teachers utilized Bloom's Cognitive Taxonomy in constructing examinations at an average in each stage of Bloom's Cognitive Taxonomy, 51% of students scored average and above, while 49% of students scored below average. This was in contrast to the findings by Sivaraman and Krishna (2015), who believed that using Bloom's Taxonomy allowed teachers to create well-balanced examination papers that tested many cognitive skills without favoring either a difficult or easy paper perception.

Table 2 Comparison of students' academic performance and teachers' utilization oof different levels of Bloom's Cognitive Taxonomy in examinations

Utilization of Bloom's Cognitive Taxonomy in exams	Students Academic performance							
	Below average		Average		Above average		Total	
	F	P	F	P	F	P	F	P
Balanced	4157	40	5159	49	1107	11	10423	100
Ambivalent	2411	49	1998	40	526	11	4935	100
Total	6568	43	7157	47	1633	10	15358	100

The grand conclusion of this objective is as shown in Table 2 where the association between teachers' utilization of Bloom's Cognitive Taxonomy in the examination and students' academic performance is significant since $\chi 2$ = 121.262, critical value = 5.791, and degree of freedom, df = 2, N = 15358 at a significance level of 0.05, although weak (Contingency coefficient, C = 0.09). It accounts for very little (about 2.17%) towards improvement in students' academic performance.

CONCLUSION AND RECOMMENDATION

The findings showed that the association between teachers' utilization of Bloom's Cognitive Taxonomy in the examination and students' academic performance was significant although weak and contributed for very little (about 2.17 percent) towards improvement in students' academic performance. The results for all the subjects under study also showed that there was a significant relationship between teachers' utilization of Bloom's Cognitive Taxonomy in construction of examinations and students' academic performance since a high or balanced value was scored. Therefore, teachers should continue utilizing Bloom's Cognitive Taxonomy in setting examinations 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 examinations unlike the case now.

REFERENCE

1. Ball, S. J. (2016). Subjectivity as a site of struggle: Refusing neoliberalism? British Journal of Sociology of Education, 37(8), 1–18. doi:10.1080/01425692.2015.1044072.
2. Cengiz, O. and Cakir, H. (2016). Turkish Fathers' Language Utilize In The Context of Toy Play. European Scientific Journal, ESJ, 12(8),430.
3. Clarke, M. (2013). Terror/enjoyment: Performativity, resistance and the teacher's psyche. London Review of Education, 11(3), 229–239.
4. Creswell, J. W., & Creswell, J. D. (2018). Research Design: Qualitative, Quantitative and Mixed Methods Approaches (5th ed.).
5. Deal , J. & Hegde, S. A. (2013). Seinfeld and Economics: How to Achieve the Revised Bloom's Taxonomy in an Introductory Economics Class, Volume 25, International Journal of Teaching and Learning in Higher Education. http://www.isetl.org/ijtlhe/ ISSN 1812- 9129.
6. Forehand, M. (2017). Ch. 8 Bloom's Taxonomy. Instructional Methods, Strategies and Technologies to Meet the Needs of All Learners.
7. Forehand, M. (2010). Bloom's taxonomy. Emerging perspectives on learning, teaching, and Technology. http://projects.coe.uga.edu/epltt/index.php?title=Bloom%27s_Taxonomy Evaluation, 18(3), 1-7.
8. Gates, J., & Pugh, S. L. (2021). The Application of Bloom's Taxonomy to Higher Education Examination Questions in Physics. New Directions in the Teaching of Physical Sciences, 16(16).
9. Kelly, L. & Cordeiro, M. (2020, July 1). Three Principles of Pragmatism for Research onOrganizationa Processes. Methodological Innovations. doi.org/10.1177/2059799120937242
10. Kin, C.; Tsang, C.Y.J.; Zhang, L.W.; Chan, S.K.Y. (2021). A Nurse-Led Education Program for Pneumoconiosis Caregivers at the Community Level. Int. J. Environ. Res. Public Health, 18, 1092.
11. Kozikoğlu, İ. (2018). The examination of alignment between national assessment and English curriculum objectives using revised Bloom's Taxonomy. Educational Research Quarterly, 41(4), 50-77.
12. Lee, J., & Stankov, L. (2016). Non-cognitive psychological processes and academic achievement.
13. Liem, G. A. D., & McInerney, D. M. (Eds.). (2018). Big theories revisited 2. Charlotte, NC: Information Age Publishing.
14. Liem, G. A. D., & Tan, S. H. (Eds.). (2019). Asian education miracles: In search of sociocultural and psychological explanations.
15. Masapanta-Carrión, S., & Velázquez-Iturbide, J. Á. (2018). A systematic review of the utilize of Bloom's taxonomy in Computer Science education. In Proceedings of the 49th acm technical symposium on computer science education (pp. 441-446).
16. Poth, C., & Munce, S. E. P. (2020). Commentary—Preparing today's researchers for a yet unknown tomorrow: Promising practices for a synergistic and sustainable mentoring approach to mixed methods research learning. International Journal of Multiple Research Approaches, 12(1), 56-64. doi:10.29034/ijmra.v12n1commentary
17. Scully, D. (2017). Constructing multiple-choice items to measure higher-order thinking. Practical Assessment, Research, and Evaluation, 22(1), 4
18. Setiyana, R., & Muna, H. (2019). Evaluating Bloom's Taxonomy in Test Items. Proceedings of EEIC, 2, 79-83.
19. Singh P, Allen J, & Rowan L, (2019). Quality teaching: standards, professionalism, practices, Asia-Pacific Journal of Teacher Education, 47:1, 1-4, DOI: 10.1080/1359866X.2019.1557925
20. Singh, P. (2018). Performativity, affectivity and pedagogic identities. European Educational Research Journal, 17(4), 489–506.
21. Sivaraman, S. I., & Krishna, D. (2015). Blooms Taxonomy–application in exam papers assessment. Chemical Engineering (VITU), 12(12), 32.
22. Tanalola, H. S., Fattahb, S., Sulong, S. R., & Mamat, M. (2017). Mining Exam Question based on Bloom's Taxonomy. School of Engineering and Information Technology, University Malaysia, 424-427.

23. Wei, B., & Ou, Y. (2019). A comparative analysis of junior high school science curriculum standards in Mainland China, Taiwan, Hong Kong, and Macao: Based on revised Bloom's taxonomy. International Journal of Science and Mathematics Education, 17(8), 1459-1474.
24. Wilson, L. O. (2016a). Anderson and Krathwohl–Bloom's taxonomy revised. Understanding the New Version of Bloom's Taxonomy.
25. Zapalska, A. M., Nowduri, S., Imbriale, P., Wroblewski, B., & Glinski, M. (2018). A Framework for Critical Thinking Skills Development Across Business Curriculum Using the st 21 Century Bloom's Taxonomy. Interdisciplinary Education and Psychology, 2(2), 2.