THE TAXONOMY OF THE FOUR TERMINAL EXAMINATIONS OF GUIMARAS STATE COLLEGE

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ABSTRACT

Teaching the students cognitive level is the main objective of any assessment. This study aimed to identify the taxonomy of the four terminal examinations with the two-way table of specifications. A descriptive research design was used to determine the taxonomy of the four terminal examinations of teacher. The sources of data are the teachers' test questions with the table of specification. These were examined and classified according to the subject area and tallied according to each category of cognitive domain of Bloom's taxonomy. Results revealed that majority of the test question items fell under knowledge level in the general education subject areas. Moreover, almost similar numbers of test items are assigned to synthesis and evaluation. The numbers of lower-level questions were quite high compared to higher level of questions. There was a significant difference existed among subject areas in items that were under comprehension, application, analysis, and evaluation. However, no significant difference existed among subject areas with items that fell under knowledge and synthesis levels.

Keywords: *Taxonomy, Terminal Examinations, Guimaras State College, Bloom's Taxonomy*

INTRODUCTION

Background of the Study

Taxonomy simply means "classification," so the well-known taxonomy of learning objectives is an attempt to classify forms and levels of learning. It identifies three "domains" of learning each of which is organized as a series of levels or pre-requisites. It is suggested that one cannot effectively address higher levels until those below them have been covered. As well as providing a basic sequential model for dealing with topics in the curriculum, it also suggests a way of categorizing levels of learning, in terms of the expected ceiling for a given program. Thus in the Cognitive domain, training for technicians may cover knowledge, comprehension, and application, but not concern itself with analysis and above, whereas full professional training, may be expected to include this and synthesis and evaluation as well (Murphy, 1997).

It is not an uncommon situation in the most classroom that the teachers heard a complaint from the students because the test they studied for was completely or partially unrelated to the class activities they have experienced. Frequently there is both a real and perceived mismatch between content examined in class and the material assessed on at the end of the chapter/unit test. This lack of coherence leads to a test that fails to provide evidence from which teachers can make valid judgments about students' progress. One strategy teacher can use to mitigate this problem is to develop a table of specification. (Alade & Omoruyi, 2014)

Bautista (2014) describes table of specifications as a tool used by teachers to design a test or exam. The goal of the table is to organize the material covered by comparing the number of questions devoted to each. Essentially, a table of specification is a table chart that breaks down the topics that will be on a test and the number of test questions or percentage of weight each section will have on the final test grade. This

kind of table chart is usually split into two charts, and each subtopic is numbered under the main topics that are being covered for the test.

The purpose of a Table of Specifications is to identify the achievement domains being measured and to ensure that a fair and representative sample of questions appears on the test. Teachers cannot measure every topic or objective and cannot ask every question they might wish to ask. It allows the teacher to construct a test which focuses on the key areas and weights in those different areas based on their importance. It also provides the teacher with evidence that a test has content validity, that it covers what should be included. On the other hand, tables of specifications can help students at all ability levels to learn better. By providing the table to students during instruction, students can recognize more easily the main ideas, key skills, and the relationships among concepts.

Shahzad (2011) established certain guiding principles in our selection of a single classification system and how to make a product more readily understood and used. First, since the taxonomy is to be used in regard to existing educational units and programs, the major distinctions between classes should reflect, in large part. These distinctions are found in the ways teachers state their educational objectives, curricular plans, instructional material, and instructional methods. To the extent it was possible, the subdivisions of the taxonomy are intended to recognize these distinctions (Anderson &Spady, 1999). The second principle is that the taxonomy should be logically developed and internally consistent. Thus, each term should be defined and used consistently throughout the taxonomy. The third Principle is that the taxonomy should be consistent with our present understanding of psychological phenomena. Those distinctions which are psychologically untenable, even though regularly made by teachers, would be avoided. (Arends, 2001). The fourth principle is that the classification should be a purely descriptive scheme in which every type of educational goal can be represented in a relatively neutral fashion. Hence, to avoid partiality to one-view of education as opposed to another, they have attempted to make the taxonomy neutral by avoiding terms which implicitly convey value judgments and by making the taxonomy as inclusive as possible. This means that the kinds of behavioral changes emphasized by any institution, educational unit or educational philosophy can be represented in the classification. On the other hand, the taxonomy will probably include a greater variety of behavior than those emphasized by any one school, course or educational philosophy. Thus, one course might have objectives classifiable in four of the categories, another in only three of the categories, and so on (Haladyna, 1999).

This study was based on Bloom's Taxonomy. Bloom's Taxonomy organizes the goals of education into three domains. The cognitive domain relates to the intellectual part of education that is knowledge-based. The affective domain refers to the attitudinal changes that education can bring about. The psychomotor domain involves the development of mastery in motor skills. Showing a student how to factor a given polynomial focuses on the cognitive domain while motivating him or her to be open to trying out a new method of solving a differential equation addresses the affective domain. Using a meter stick or blocks to describe the concept of addition engages the psychomotor domain.

Bloom et al. develop a six-tiered scheme to describe educational goals in this domain. These are, in order of increasing sophistication: Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. In the following, it briefly describes these six levels. Knowledge includes knowledge of terminology, specific facts, and methods of dealing with these particular facts, and the universals and abstractions of a given field. The primary cognitive process involved is information retrieval; the kind of information included may be simply factual or substantially deep. Comprehension requires the skills needed to translate, interpret, and extrapolate from knowledge. It denotes a basic and simplistic level of understanding. Standard examples involve situations where students are expected to rephrase a definition or summarize a paragraph in their own words.

Application refers to implementing a relevant technique or method learned as an abstraction to a given concrete problem. For this activity to rank at a higher level than comprehension, the learner should be able to discern independently which abstraction, among several, is suitable for the given problem, and not be instructed to use a specific one.

Analysis, typically considered a critical thinking task, may be viewed as one of the higher-level objectives. It mainly involves the process of decomposing given information into its elementary parts in order to study and understand it.

Another higher-level objective, Synthesis, relates to tasks that require creativity and original thinking. More explicitly, synthesis is the putting together of parts of known facts, methods, and ideas to create a new whole. The end product of such activity could be a unique piece of communication, an action plan, or a recognized relation between the various components of the problem under study.

Bloom's Taxonomy was primarily conceptualized and presented by Dr. Benjamin Bloom at the start of 1956 (Orey, 2010). Its core purpose was to ensure that learning into higher levels of thinking, rather than a mere act or process of remembering the facts in a well defined structure. A pyramid was developed to present the learning prototype advancement. The idea of its composition was to aid the writing of learning objectives and course outcomes that are progressively moving into the complexity of learning (Rupani, 2011). The intent was to ensure that learning outcomes were designed in such a manner that enabled the teachers to gradually bring learners from acquiring subject information to its practical application in the real context and ultimately, create meaning of their own from the same (Riazi, 2010).

Statement of the problem

This study aims to identify the taxonomy of the four terminal examinations with two-way Table of Specifications of the Guimaras State College teachers for SY 2011-15. (1) What is the percentage of test items allocated to each of the levels of the cognitive domain of Bloom's Taxonomy? and (2) Is there a significant difference in the distribution of items allocated to each level of the cognitive domain when grouped according to subject areas, terminal exams, course, semester, and school year?

METHODOLOGY

This study used the descriptive research design to determine the taxonomy of the four terminal examinations of Guimaras State College teachers. According to Best (1970), this research design was appropriate for the study that would interpret conditions or situations that existed: its prevailing practices, the point of view or attitudes that were being felt or trends that were developing. It was often directed towards combining with comparison or contrast involving measurement and interpretation.

The materials used were the teachers' Table of Specifications during the conduct of the four terminal examinations of Guimaras State College. The sample size was determined using the Slovin's equation (1960) because the population was too large to be managed by the researcher. Apart from the survey questions, secondary data were used in this study composed of the two-way table of specifications submitted by the teachers during the conduct of four terminal examinations for SY 2011-15. These were examined and classified according to the subject area and tallied according to each category/level of the cognitive domain of Bloom's Taxonomy. Mean, and frequency distribution were used to determine the allocation of the taxonomy used by the teachers. Inferential statistics such as T-test and ANOVA were also used. The data were tabulated and analyzed through Microsoft Excel and SPSS program.

RESULTS AND DISCUSSION

Figure 1 presents the distributions of the questions according to categories in the cognitive domain of Bloom's taxonomy. The 488 test questionnaires containing at least 50 test items were evaluated using documentary analysis method. Results revealed that out of the 50-item test, knowledge level got the highest mean for general subjects, professional subjects and specialization /major subjects with means of 30.41, 28.72 and 30.15, respectively. Comprehension, Application and Analysis levels got means with double digit below 15 but much lower than the knowledge level. The levels with the least means were synthesis

and evaluation levels. This reveals that the majority of the test questions are apportioned to knowledge level in all subject areas. Moreover, it is seen that almost similar number of test items are assigned to comprehension, application and analysis levels, and only limited test items are assigned to synthesis and evaluation. This implies that the numbers of lower-level questions were quite high compared to higher-level questions.

The taxonomy is hierarchical; each level is subsumed by the higher levels. In other words, a student functioning at the application level has also mastered the material at the knowledge and comprehension levels (Forehand, 2005).

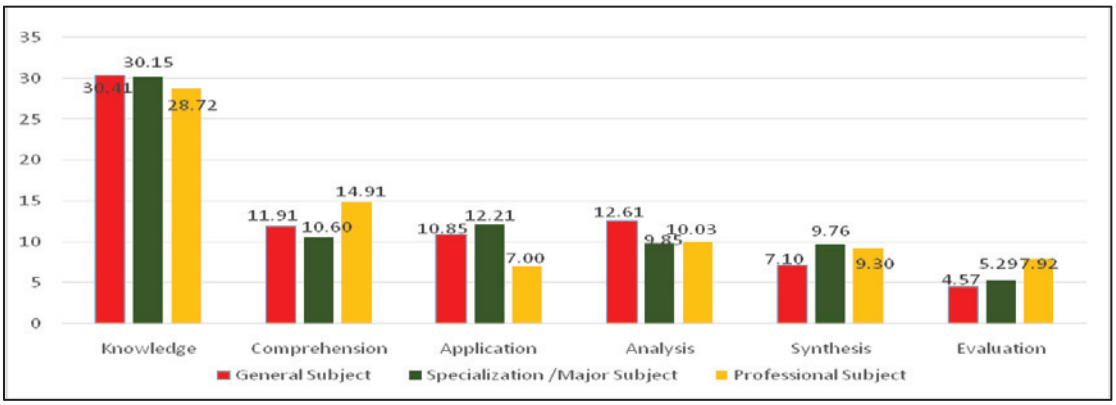

Figure 1.Item Distribution in Bloom's Taxonomy Cognitive Domain as to Subject Areas

Figure 2 shows the distribution of Bloom's Taxonomy of Cognitive Domain when categorized as to four terminal exams. The same results were noted when the examinations were categorized as to Blooms Taxonomy Cognitive domain alone (Figure 1) wherein the knowledge level dominated the whole types of exam whether under general, professional or specialization/major subjects. The average items in the tests that fall under the knowledge level when categorized as to Preliminary, Midterm, Pre-final and Final examinations got an average or mean of 28.88,31.01, 27.18 and 30.59, respectively (Figure 2). These results revealed that majority of the test items fall under knowledge level and the least number of items fall under evaluation level. It was found out that test items in comprehension, application and analysis levels were almost the same in number. Furthermore, results also revealed that the means in midterm and final exams were higher compared to Prelim and Pre-final exam in all levels. This implies that the teachers' made test questions were more on measuring their remembering skills, a portion for understanding, applying and analyzing, and less for evaluation.

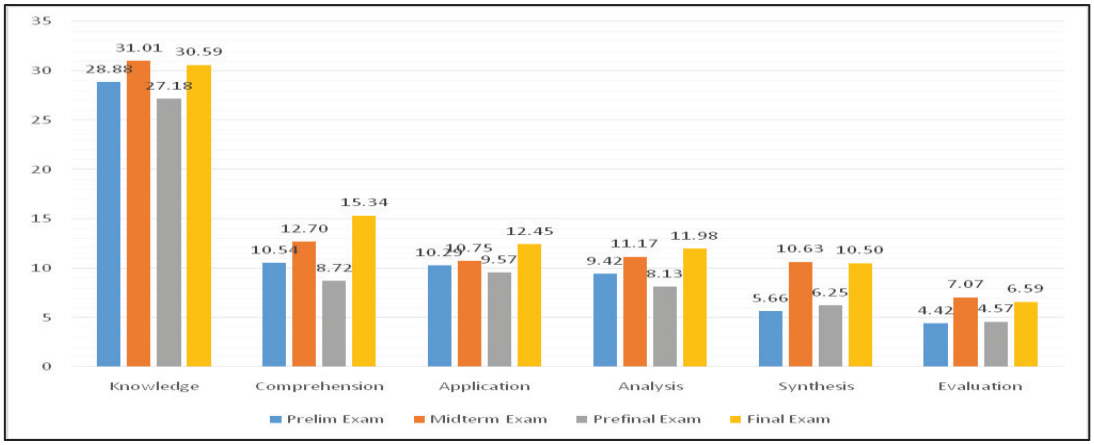

Figure 2.Item Distribution in Bloom's Taxonomy Cognitive Domain as to Terminal Exams

Figure 3 explains results of the distribution of items in the test questions of the faculty when categorized as to department. As with previous results, the most number of items found in the faculty examination were on Knowledge domain and the rest got minimal numbers. Cursory analysis of the individual results, the College of Hotel and Restaurant Management faculty got most number of test items under knowledge domain (M=33.83), followed by the faculty members coming from the Industrial Technology (M= 32.60)and Teacher education faculty with mean of M= 30.24. On the other hand faculty members under Information Technology have more items in the synthesis, application and evaluation domain. This distribution of test items reveals that majority of the test questions fall under knowledge level in all courses and the least number of items fall under Evaluation Level.

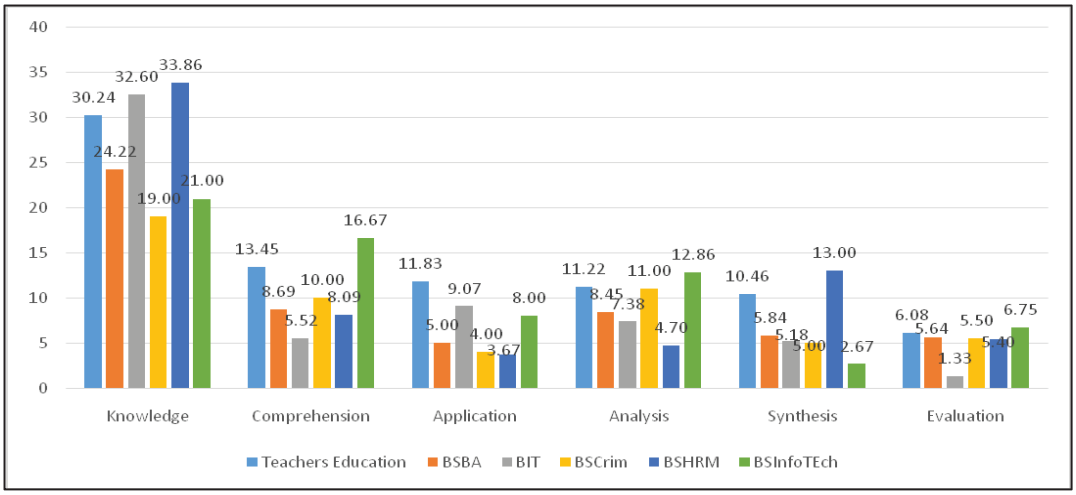

Figure 3.Item Distribution in Bloom's Taxonomy Cognitive Domain as to Course

Figure 4 presents the distribution of items as to semester. It shows that knowledge level has the highest items apportioned with means: 1st Semester (30.46); 2nd Semester (28.98). In Comprehension Level: 1st Semester (12.51); 2nd Semester (11.87), Application Level: 1st Semester (10.49); 2nd Semester (11.28). Analysis Level: 1st Semester (10.79); 2nd Semester (10.14). Synthesis Level: 1st Semester (9.28); 2nd Semester (8.59). Evaluation Level: 1st Semester (5.59); 2nd Semester (6.25) with the least apportioned items. It was observed that the means of Comprehension, Application, and Analysis were almost the same which reveal that between 10-12 items were allocated in these levels. This implies that although Knowledge, Comprehension, and Application Levels measure lower-order thinking skills as they were dominantly revealed, a proportion of Analysis, Synthesis and Evaluation Levels belonged to higher-order thinking skills and were also given importance.

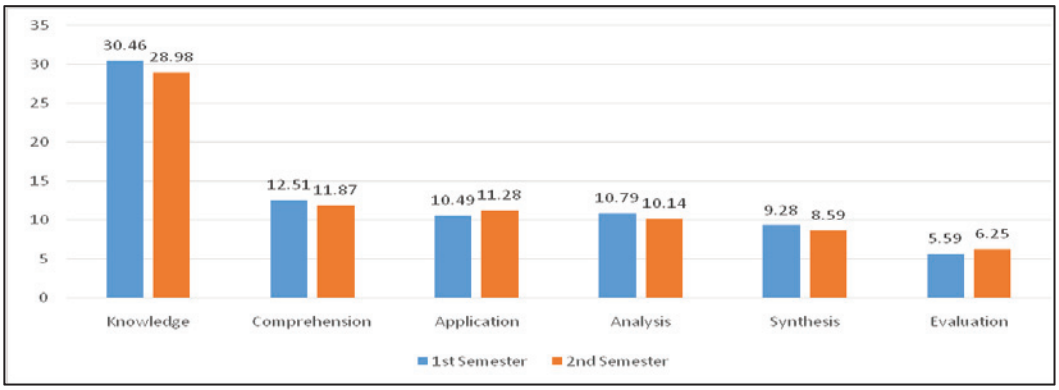

Figure 4. Item Distribution in Bloom's Taxonomy Cognitive Domain as to Semester

Figure 5 presents the distribution of test items as to School Year. Results showed that across the years the cognitive domain, knowledge level type of test questions still dominated the examinations prepared by the GSC faculty members. It was found out that the consistently most number of items were in Knowledge Level and the least number of items were in Evaluation Level all throughout the years from SY 2011-15.

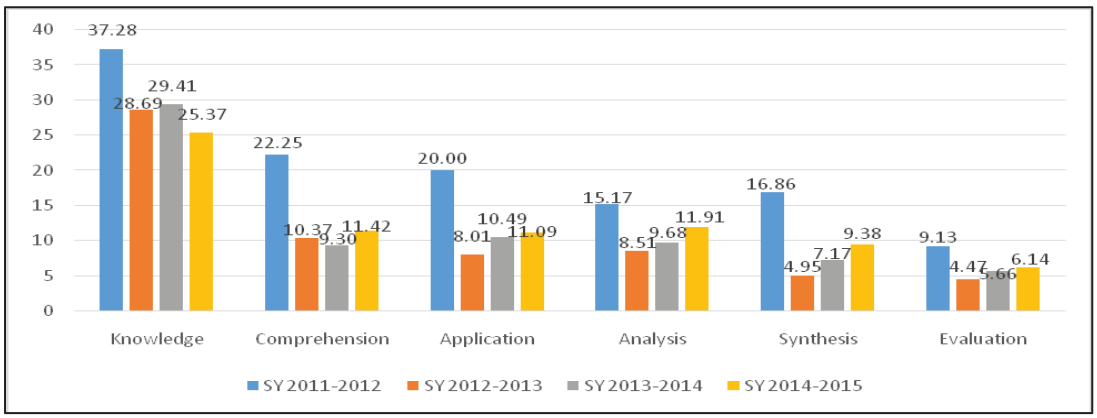

Figure 5. Item Distribution in Bloom's Taxonomy Cognitive Domain as to School Year

Data in table 1 presents the difference of Bloom's Taxonomy Cognitive Domain as to subject areas. ANOVA results show that there were no significant differences existed among subject areas on the items that were under knowledge level (F=.459, sig.= .632), and synthesis level (F=.784, sig. = .459)set at .05 level of significance. However, there were a significant differences existed among subject areas under comprehension (F=6.150, sig. = .002), application (F=4.371, sig. = .014), analysis (F = 4.417, sig.=.013) , and evaluation level (F=7.823, sig.=.001)set at .05 level of significance. This means that the subject areas with items under knowledge and synthesis do not differ to each other. Further, using the post hoc analysis; those under comprehension and application levels, the specialization/major subjects, and professional subjects differ from each other but do not differ to general subjects. In analysis level, all subject areas differ to each other. Lastly, for the synthesis level, only general subjects and professional subjects differ from each other, but they do not differ in specialization/major subjects.

Table 1.Differences of Subject Areas in Bloom's Taxonomy Cognitive Domain

		Sum of Squares	df	Mean Square	F	Sig.	Interpretation
	Between Groups	220.05	2	110.02	.459	.632	Not Significant
Knowledge	Within Groups	110644.13	462	239.49			
	Total	110864.18	464				
	Between Groups	1407.29	2	703.65	6.150*	.002	Significant
Comprehension	Within Groups	44507.64	389	114.42			
	Total	45914.94	391				
	Between Groups	1059.08	2	529.54	4.371*	.014	Significant
Application	Within Groups	31982.99	264	121.15			
	Total	33042.08	266				
	Between Groups	494.96	2	247.48	4.417*	.013	Significant
Analysis	Within Groups	22299.29	398	56.03			
	Total	22794.24	400				
	Between Groups	146.42	2	73.21	.784	.459	Not Significant
Synthesis	Within Groups	12040.39	129	93.34			
	Total	12186.81	131				
	Between Groups	318.70	2	159.35	7.823*	.001	Significant
Evaluation	Within Groups	3646.30	179	20.37			
	Total	3965.00	181				

$p<.05$ level of significance

Table 2 shows the data in terms of terminal examinations. ANOVA results show that there were no significant differences that existed among terminal examinations from those items which belonged to knowledge (F=1.171, sig. = .320), application (F=.638, sig. = .591), and synthesis (F=2.436, sig. = .068) level set at .05 level of significance. However, those items under comprehension (F = 5.397, sig. = .001), analysis (F = 4.246, sig. = .006) and evaluation (F = 4.145, sig. = .007) showed significant difference among terminal examinations set at .05 level of significance. This means that there is no evidence to prove that terminal examinations varied with each other when items were under knowledge, application and synthesis levels. Further, it was seen that terminal examinations with items under comprehension and analysis levels vary, specifically, in the midterm, pre-final, and final examinations but prelim exams do not vary among them. On the other hand, those items which belonged to the evaluation level, the terminal examinations that vary were prelim, midterm and final but the pre-final exam does not vary with the rest of them.

Table 2.Differences of Terminal Examinations in Bloom's Taxonomy Cognitive Domain

		Sum of Squares	df	Mean Square	F	Sig.	Interpretation
	Between Groups	838.47	3	279.49	1.171	0.320	Not Significant
Knowledge	Within Groups	110025.71	461	238.67			
	Total	110864.18	464				
	Between Groups	1839.26	3	613.09	5.397*	0.001	Significant
Comprehension	Within Groups	44075.68	388	113.60			
	Total	45914.94	391				
	Between Groups	238.66	3	79.55	0.638	0.591	Not Significant
Application	Within Groups	32803.42	263	124.73			
	Total	33042.08	266				
	Between Groups	708.69	3	236.23	4.246*	0.006	Significant
Analysis	Within Groups	22085.56	397	55.63			
	Total	22794.24	400				
	Between Groups	658.25	3	219.42	2.436	0.068	Not Significant
Synthesis	Within Groups	11528.56	128	90.07			
	Total	12186.81	131				
	Between Groups	258.91	3	86.31	4.145*	0.007	Significant
Evaluation	Within Groups	3706.08	178	20.82			
	Total	3965.00	181				

**p<.05 level of significance*

Data in table 3 presents the differences in the domain of the test items when categorized according to courses. Results revealed that there were no significant differences existed among courses with which their test items were under application (F=2.117 sig. = 0.64), synthesis (F=1.697, sig. =.140) and evaluation levels (F=1.244, sig. = .291), while those under knowledge (F=2.382, sig. = .038), comprehension (F=4.637, sig. =.000), and analysis (3.694, sig. = .003) showed significant differences set at .05 level of significance. This means that all test items of all courses that were interpreted are similar as to application, synthesis and evaluation levels. However, the items vary in knowledge, comprehension and analysis levels, in which BSBA course varies only in BIT, HRM, and Teachers education courses and the rest of courses have no variations that occurred specifically in knowledge levels. Incomprehension level, the BIT course varies with BSInfo Tech and BSBA courses. Likewise, Teacher education course varies with BSHRM. The rest of the courses were the same. In application level, BIT course varies with Teacher Education and BSBA course while HRM varies with InfoTech and BSCrim varies with Teacher Education course, but other courses not mentioned did not vary at all.

Table 3.Differences of Courses in Bloom's Taxonomy Cognitive Domain

		Sum of Squares	Df	Mean Square	F	Sig.	Interpretation
	Between Groups	2803.40	5	560.68	2.382*	0.038	Significant
Knowledge	Within Groups	108060.78	459	235.43			
	Total	110864.18	464				
	Between Groups	2601.63	5	520.33	4.637*	0.000	Significant
Comprehension	Within Groups	43313.31	386	112.21			
	Total	45914.94	391				
	Between Groups	1287.67	5	257.53	2.117	0.064	Not Significant
Application	Within Groups	31754.41	261	121.66			
	Total	33042.08	266				
	Between Groups	1018.25	5	203.65	3.694*	0.003	Significant
Analysis	Within Groups	21776.00	395	55.13			
	Total	22794.24	400				
	Between Groups	768.83	5	153.77	1.697	0.140	Not Significant
Synthesis	Within Groups	11417.99	126	90.62			
	Total	12186.81	131				
	Between Groups	135.32	5	27.06	1.244	0.291	Not Significant
Evaluation	Within Groups	3829.68	176	21.76			
	Total	3965.00	181				

**p<.05 level of significance*

Data in table 4 presents the differences as to semesters in Bloom's taxonomy cognitive domain. Results showed that there were no significant differences that existed among the semesters as to all levels of items. This means that their test items under knowledge (F=1.062, sig. = .303), comprehension (F=.335, sig. = .563), application (F=.330, sig. = .566), analysis, (F=.742, sig. = .389), synthesis (F = .168, sig. = .683) and evaluation (F=.862, sig. = .354) were the same no matter if their test questions belonged to first or second semesters. In addition, the number of items apportioned in each level from the first semester to the second semester was the same.

Table 4.Differences of Semesters in Bloom's Taxonomy Cognitive Domain

		Sum of Squares	Df	Mean Square	F	Sig.	Interpretation
	Between Groups	253.69	1	253.691	253.69	.303	Not Significant
Knowledge	Within Groups	110610.49	463	238.900	238.90		
	Total	110864.18	464				
	Between Groups	39.37	1	39.370	39.37	.563	Not Significant
Comprehension	Within Groups	45875.57	390	117.630	117.63		
	Total	45914.94	391				
	Between Groups	41.07	1	41.069	41.07	.566	Not Significant
Application	Within Groups	33001.01	265	124.532	124.53		
	Total	33042.08	266				
	Between Groups	42.34	1	42.335	42.34	.389	Not Significant
Analysis	Within Groups	22751.91	399	57.022	57.02		
	Total	22794.24	400				
	Between Groups	15.69	1	15.690	15.69	.683	Not Significant
Synthesis	Within Groups	12171.12	130	93.624			
	Total	12186.81	131				
	Between Groups	18.90	1	18.904	.862	.354	Not Significant
Evaluation	Within Groups	3946.09	180	21.923			
	Total	3965.00	181				

**p<.05 level of significance*

In table 5, as to the differences of the school year category, results revealed that there is a high significant difference existed among school year all throughout in all levels of items. This means in knowledge (F=8.973, sig. = 000), comprehension (F=28.472, sig. = .000), application (F=10.512, sig. = .000), analysis, (F=13.951, sig. = .000), synthesis (F = 11.758 sig. = .000) and evaluation (F=5.684, sig.= .001) levels vary every school year.

Likewise, the number of items distributed in each level in every semester varies. The evidence was enough to prove that teachers' preparation of exams as to item categorization using Bloom's taxonomy cognitive domain varies every year. This implies that although it is seen that most items measured lower-order thinking skills, yet they gradually generated items that measure higher-order skills.

Table 5.Differences of School Year in Bloom's Taxonomy Cognitive Domain

		Sum of Squares	df	Mean Square	F	Sig.	Interpretation
	Between Groups	6126.37	3	2042.12	8.973*	.000	Significant
Knowledge	Within Groups	104691.56	460	227.59			
	Total	110817.93	463				
	Between Groups	8296.70	3	2765.57	28.472*	.000	Significant
Comprehension	Within Groups	37590.74	387	97.13			
	Total	45887.44	390				
	Between Groups	3541.51	3	1180.50	10.512*	.000	Significant
Application	Within Groups	29422.15	262	112.30			
	Total	32963.65	265				
	Between Groups	2171.95	3	723.98	13.951*	.000	Significant
Analysis	Within Groups	20549.80	396	51.89			
	Total	22721.75	399				
	Between Groups	2632.86	3	877.62	11.758*	.000	Significant
Synthesis	Within Groups	9553.95	128	74.64			
	Total	12186.81	131				
	Between Groups	346.36	3	115.45	5.684*	.001	Significant
Evaluation	Within Groups	3594.97	177	20.31			
	Total	3941.33	180				

**p<.05 level of significance*

CONCLUSIONS

Based on the results of the study, the faculty members of GSC prepares majority of the items in the examination under knowledge level in spite of the different categories it was subjected to such as subjects areas, terminal examinations, semester and school year. Bloom's Taxonomy as to subject areas revealed that majority of the test questions apportioned to the knowledge level in all subject areas. The numbers of lower-level questions were quite high compared to higher level of questions. As to terminal exams, Midterm and Final exams were higher compared to Prelim & Pre-final examination in all levels. The teacher's made test questions were more on measuring their remembering skills. As to courses, most of the test questions fall under knowledge level in all courses and the least number of items fall under evaluation level. As semester, comprehension, application and analysis were almost the same. As to school year, most of the number of items was in knowledge level and the least number of items were in evaluation level. Significant differences existed among subject areas in items that were under comprehension, application, analysis, and evaluation. As to terminal examination, there were significant differences existed among terminal examinations in the comprehension, analysis, and evaluation level. In terms of course, there were significant differences existed among courses in knowledge, comprehension, and analysis levels, but no significant differences in application, synthesis, and evaluation. As to semesters, there were no significant differences existed between two semesters in all levels. However, when it comes to the school year, results show that there were significant differences existed between the school year in all levels of the test item.

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