

Integration of Table of Specification (ToS) in Academic Teaching and Evaluation

Shabnum Gul¹

¹Saidu Teaching Hospital, Saidu Sharif Swat
dew.frozen.flame@gmail.com

Abstract:

Table of specification, sometimes referred to as test blue print, is a table that helps teachers align objectives, instruction and assessment. It is possible scope which laid emphasis of the test and relates other objectives to the content in order to ensure a balanced test items (Gregory 2006). Gronlund and Linn (2000) assert that table of specification may be referred to as content of a course or curriculum that can be broadly defined to include both subject matter content and instructional objectives. The purpose of developing a table of specification (test map, test grid, test blue print) is to ensure that the test serves its intended purpose by representatively sampling the intended learning outcomes and instructional content. It helps instructor to evaluate the different aspects of learning according to blooms taxonomy according to difficulty level for the content.

Keywords:

Table of Specification, Align Objectives, Test Blue Print, Blooms Taxonomy.

Introduction:

Some time students felt that the test that they studied for are partially or completely unrelated to the content that they have studied in the class for the subject. Being a teacher we usually heard such kind of complaints from our students. This is usually common in an academic setting. Most of the time there is a perceived and real difference between the content taught in the class and content assessed at the end as an exam. This kind of difference misleads the teacher to evaluate and judge the students' progress. One of the possible solutions to mitigate this problem is the integration of Table of Specification (TOS) in educational administration and evaluation. In this paper steps are being described for making and implementing the TOS.

Bloom's Taxonomy and Table of Specification

The first step for developing a table of specifications is to define the specific learning outcomes (course and unit objectives, etc), specify behaviors that students should be able to perform on completion of instruction.

Bloom's taxonomy is frequently is used as a guide for developing and leveling general instructional and specific learning outcomes (Bloom, 1956). Although the cognitive components of the affective and psychomotor domains can be tested using classroom tests, tests are most often used to determine achievement of outcomes in the six levels of the cognitive domain (Table 01).

Table 01: Actions Verb for different Cognitive Levels

Cognitive Level	Action Verbs
Knowledge	Define, Identify, List
Comprehension	Describe, explain, Summarize
Application	Apply, demonstrate, use
Analysis	Compare, contrast, Differentiate
Synthesis	Construct, develop, formulate
Evaluation	Critique, evaluate, judge

Distribution of Content

The second step in developing a table of specifications involves determining the instructional content to be evaluated and the weight to be assigned to each area. This can be accomplished by developing a content outline and using the amount of time spent teaching the material as an indicator for weighting (Table 02). Following is an example on content out line and teaching time on pharmacology topics to nursing students.

Table 02: Content Outline and Relative Teaching Time

Content	Session	Teaching time%	No. Of items/section
I. Antipsychotic Agents	6	30	13
II. Antianxiety agents	5	25	12
III. Antidepressant agents	4	20	10
IV. Antimanic agents	3	12.5	10
V. Antiparkinson agents	2	12.5	5
TOTALS	20	100	50

Teaching Time and Number of Items:

In the above table the teaching time and number of items has been defined, that can easily give an idea to the teacher that how much time he/she has to spend on a given content as per total time allocated. Moreover, the item in each section has also mentioned.

Finally, a two-way grid is developed, with content areas being listed down the left side and learning outcomes listed down the left side and learning outcomes listed across the top of the grid (Table 03). Each cell is assigned a number of questions based on the weighting of content and cognitive level of learning outcomes.

Table 03: Two Way Table of Specification

Outcomes/content	Knowledge 50%	Comprehension 20%	Application 20%	Total
I. Antipsychotic Agents	6	4	3	13
II. Antianxiety agents	6	4	2	12
III. Antidepressant agents	5	3	2	10
IV. Antimanic agents	5	3	2	10
V. Antiparkinson agents	3	1	1	5
TOTALS	25	15	10	50

Instructional Objectives for each Content:

Furthermore, each content is classified into knowledge, comprehension, and application with different percentage. Teacher usually used different methods to teach and evaluate each content according to the blooms taxonomy domain (Table 04). For example, the teacher may use to evaluate the knowledge domain in terms of MCQs, definitions, etc. Similarly, the comprehension and application domain can be evaluated through matching items, short essays, subjective questions, and practical exams (Kubiszyn & Borich 2003).

Theory into Practice:

Kubiszyn and Borich (2003) stated that each of the content objective must be taught and evaluated separately according to domains of Bloom's Taxonomy. Author has mentioned an example that if a teacher has to teach and evaluate the health assessment skill of a student. Then the teacher must have to use practical demonstration and assessment skills. Additionally, if a teacher has to know the application of theory skills into practice than the case studies are usually the best techniques for the integration of theory into practice.

Table 04: Instructional Objective for Each Content

Content	Remember	Comprehend	Apply	Analyze	Evaluate	Create
1.1 Identify definitions	X					
2.1 Select explanations		X				
2.2 Identify Classification		X				
3.1 Adverse reactions			X			
3.2 Select Best Drug			X			
4.1 Analyze Adverse effects				X		
4.2 Compare evidence				X		
5.1 Evaluate objectives					X	
6.1 Construct TOS						X
7.1 Create a Test						X

In addition, the 'X' in the Table 04, is removed when the teacher formulate the questions for evaluation for example the multiple choice questions relevant to the weightage of each objective according to the blooms taxonomy. So the 'X' will be removed and will be replaced by the numbers according to the weightage of the content that has been taught and now to be evaluated.

Table 05 is a comprehensive example of TOS for the class of pharmacology Generic BScN 3rd semester students (Table 05). The teacher must formulate this table in the starting of the subject or content that need to be taught. The table contains the details of the contents and the time allocated to teach each topic or content. The total items that need to be covered in each content has further divided into knowledge, comprehension, and application as mentioned in the table. The teacher gets a snapshot of the whole subject from the table 05. Teacher can also understand the flow of the content according to the domains of blooms taxonomy.

Discussion

A well constructed test blue print or table of specification will help to improve the validity of teacher evaluations based on a given assessment. Thus, validity is the degree to which the evaluations or judgment we make as teachers about our students can be trusted based on the quality of evidence we gathered (Wolming and Wilkstron, 2010).

In addition, when constructing a test, teacher must look the test measure as a representative tool for the content the cognitive level that the material was taught. This will help in a long-term that the teacher made test will be much more relevant to the decisions that the teacher made everyday regarding their students. The TOS help critically in construction of test tools in the production of appropriate test, in relation to the objectives to both teachers and students (Gronlund 2006). Finally, it will help the teacher to adopt appropriate teaching strategy.

Conclusion and Recommendations

In conclusion, it is imperative to address the following recommendations, which will help the test developers, teachers, and students to develop good TOS and test blueprints. Teacher must be critical in contracting valid test blue print TOS that will help the teacher in evaluating the

students truly. Teacher must be sure that the test that has been develop ensure adequate content of cognitive sampling that was been taught in the class. In last teacher and students must be at the same path way, while preparing Table of Specification

Table 05, TABLE OF SPECIFICATION (Final Examination)**Subject Course:** Generic BScN 3rd Semester**Date of Examination:** September 2016

LEVELS OF	NO. OF	COGNITIVE			TOTAL	ITEM	PERCENTAGE
ABILITY/ RECITATIONS	KNOWLEDGE	COMPREHENSION	APPLICATION	HIGHER THAN APPLICATION	TEST	PLACEMENT	
TOPICS						ITEMS	
STEP 1.	STEP 2.	STEP 7.			STEP 5.	STEP 9.	STEP 3.
Antipsychotic	18 hours	6	4	3	13	30	30%
Antianxiotic	15 hours	6	4	2	12	25	25%
Antidepressant	12 hours	5	3	2	10	20	20%
Antimanic	9 hours	5	3	2	10	13	12.5%
Anti perkisons	6 hours	3	1	1	5	12	12.5%
TOTAL	STEP 6.				STEP 4.	100%	
	25	15	10	50	ITEMS		
	60 Hours	50%	30%	20%			
ACTION VERBS	STEP 8						
	tell	interpret					
	list	outline					
	describe	discuss	solve				
	relate	distinguish	show				
	locate	predict	use				
	write	restate	illustrate				
	find	translate	construct				
	state	compare	complete				
	name	describe	examine				
		explain	classify				

References

1. Bloom, B. S., Hasting, J.J. & Midaus, G.F. (1971). Handbook on Formative and Summative Evaluation of student learning. New York: McGraw-Hill, Inc.
2. Gronlund, N.E. (2006). Assessment of student achievement. (8th ed). Boston: Pearson
3. Kastberg, S. E. (2003). Using Bloom's taxonomy as a framework for classroom assessment. *The Mathematics Teacher*, 96, 402.
4. Kubiszyn, T.K. Borich, G. (2003). Educational Testing and Measurement : Classroom Application & practice. (7th ed) New York: John Wiley and Son. Inc.
5. Linn, R.L & Gronlund, N.E. (2000), measurement and assessment in teaching. Columbus, OH: Merrill
6. Wolming, S. & Wikstrom, C. (2010). The concept of validity in theory and practice. *Assessment in Education: Principles, Policy & Practice*, 17, 117-132.