TABLE OF SPECIFICATION DEVELOPMENT AND USAGE: AN OVERVIEW

Dr Aijaz Ahmed
Federal Urdu University

Aziz-un-Nisa
University of Karachi

Dr Tayyaba Zarif
Newports Institute of Communications and Economics

Abstract
A table of specification (TOS) is the scientific expression specified to the plan for writing Test items. A table of specification reveals what has been taught in the teaching and learning process. In fact, table of specification is a mirror of mode of two dimensions instructional process like Content and Intellectual procedure. At the same time, table of specification Development and Usage are continuing theme to discussion. The Purpose of this Study to shortly discuss the overview of some selected aspects of developing process of table of specification and its Usage in classroom teaching and learning process and to some extend its relation with Bloom’s taxonomy as well.

The key focal point of the paper is to present the comprehensive understanding of the Table of specification Development and Usage

Keywords: Table of specification, development, Usage , Taxonomy

1. Introduction

The rationale of this article is to elaborate development and usage of a table of specification for use in both classroom and testing. As per understanding the common elements of tables of specifications are presented and explicated. Specific emphasis is placed on content-process validity. There are 2 tables of specifications in the literature serve as examples.

2. Table of Specification

Table of specification is an instrument that teachers use to formulate a test or exam. The table is aimed to establish a comparison and organize the number of questions dedicated to each tier of Bloom’s taxonomy. For example: A biology paper may include 15 MCQs, 3 questions on defining terms and concepts, 5 questions for difference, and 5 questions on
labeling and explaining role of vital organs. Consolidation of the data reveals that more percentage/ weight age is placed on the more difficult aspects of the paper as student progress through the exam. While developing the “Table of Specification” plan; generally “Number of Questions” is kept on one axis and “Subject” on the other. These heads of the chart are subjected to the complexity of the test and may require addition of further heads as per requirement. A table of specification may comprise of various columns and rows depending upon the topic and its difficulty level. A test may encompass various natures of questions such as multiple choice questions, true false, short questions, essays; and subjects. Other types of table of specification may include different elements on the axis. Table of specification is a beneficial instrument which allows teachers to test student’s ability and aptitude through fair distribution of difficult and easier questions. Moreover the table is created in a manner so that it can be revisited and reconsidered effortlessly at time of need or when required.

3. Blooms Taxonomy and Table of Specification

For Curriculum alignment the well-build association among objectives, assessment, and instruction is very necessary (Anderson, 2002).

Objectives present specifications for a lot of the information to be composed. Any educational project looking for to bring about changes in learners is duty-bound to collect information about the level to which such changes have occurred. (Anderson& Krathwohl, year NA)

A learning object is any reusable media that address a specific objective or objectives, or, work plans, and that can be reused within a variety of learning contexts to provide the learner with an educational experience. (Villani, 2005)

The Taxonomy of Educational Objectives, build up by Benjamin Bloom in the 1950s, is a construction for classifying educational goals, objectives, and standards. The taxonomy was used as a means of articulated qualitatively diverse types of thinking. The six taxonomy categories are used to organize thinking skills from the most basic (lower) to the more complex (higher) levels of thinking. The hierarchical nature of the taxonomy meant that mastery of the simpler category was precondition to mastery of the next more multifaceted one.
From Major Domains of Bloom's Taxonomy the Six Major Levels of Bloom's Cognitive Domain are as under

![Diagram of Bloom's Taxonomy]

**Knowledge.**
Remembering information

**Comprehension.**
Explaining the information

**Application.**
Using abstractions in concrete conditions

**Analysis.**
Breaking down a whole into component parts

**Synthesis.**
Putting parts together to form an integrated whole

**Evaluation.**
Creation judgments concerning the merits of thoughts, materials, or phenomena

Illustrated by Author

In the 1990s, a former student of Bloom’s named Lorin Anderson revisited and revised the taxonomy.

**Table: 1 Revised Taxonomy**

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating</td>
<td>Placing collectively ideas or elements to develop an original idea or engage in creative thinking</td>
</tr>
<tr>
<td>Evaluating</td>
<td>Judging the value of ideas, materials and methods by developing and applying principles and criteria</td>
</tr>
<tr>
<td>Analyzing</td>
<td>Breaking information down into its component elements</td>
</tr>
<tr>
<td>Applying</td>
<td>Implementing abstractions in concrete circumstances</td>
</tr>
<tr>
<td>Understanding</td>
<td>Understanding of given information</td>
</tr>
<tr>
<td>Remembering</td>
<td>Recall or recognition of definite information</td>
</tr>
</tbody>
</table>

Approximately all educators have been, at some point, exposed to Bloom’s Taxonomy. When developing objectives. And, while not all developers may use the taxonomy as guide in developing educational succession and range, the majority feel it is helpful in focusing on learner outcomes which not only address low order cognitive level but higher level as well. (Muzio, et. al., 2001) suggests the following basis at the back the use of Bloom’s taxonomy:

- Bloom’s terms are comparatively easy to understand by beginner developers with little, if no, experience of instructional plan.
- A number of synonyms are able to be given for each of Bloom’s terms. This is helpful when developing verbs specifying learner outcomes.

Bloom’s taxonomy helpout in development of Instructional objectives instrumented by Table of specification. This understanding was supported by comments made by Bloom and his colleagues (1956) allthrough the Handbook. On page 18, for example, Flaeys wrote:

"We are of the opinion that although the objectives and test materials and techniques may be specified in an almost unlimited number of ways, the student behaviors involved in these objectives can be represented by a relatively small number of classes. Therefore, this taxonomy is designed to be a classification of the student behaviors which represent the intended outcomes of the educational process." (p. 18).

According to Bloom:

“"The goals of a teaching unit, may find that they all fall within the taxonomy category of recalling or remembering knowledge. Looking at the taxonomy categories may suggest [that the teacher] could include some goals dealing with the application of this knowledge and with the analysis of the situations in which the knowledge is used” (Bloom et al., 1956,p. 2)."
A careful reading of this suggests two important points. First, “recalling or remembering knowledge is the lowest level of Bloom's Taxonomy. The consecutively higher levels are comprehending knowledge, applying knowledge, and so on.

4. Development of Table of Specification

TOS (Table of Specification) is a practical word given to the plan for scripting items for a test. A table of specification should imitate what has been imparted in the instructional order. In other terms, the testing mode is a reflection of the instructional mode. The TOS should inculcate and reflect **content** and **process**, as the instructional mode of TOS has two basic dimensions- **Content matter** and **Intellectual process**. Bloom’s Taxonomy categories can be used to express the process.

While developing TOS we advance with a framework which does not only reflect what has been imparted to the students, but also what intellectual level students possess.

- **Select a topic**
  What to be taught? Must be sorted at first to be specific and definite to proceed

- **Identify the sub-topics to be tested**
  What are the sub heads you will be covering in that topic to unfold the selected topic.

- **Identify the levels of the taxonomy that are most appropriate to assess the content**
  Based on the chosen topic and sub topics, the level or tier of taxonomy must be identified on which teacher or trainer has to work

- **Review the types of skills that can be tested under each level**
  Keeping in view the requirements of the topic teacher must select the level of taxonomy under whose umbrella he/she is going to test the students

- **Consider the number of items that will be used on the entire test and the time available**
  Enlist the total number of test items and their required time to fill them

- **Based on the time spent on/importance of each sub-topic, decide on the number of items that will be used for each sub-topic.**
  Based on the requirement of time for each sub topic, finalize the number of items to be used for judging student

- **Distribute the questions across the cognitive levels**
  Divide the items on the basis of different level of cognitions
5. Usage of Table of Specification

After the development of Table of Specification, the next big step is in knowing its elements and using it properly. The table of specification enables a teacher to test the various concepts and gauge them over Knowledge, Skill and Attitude. The table stipulates the suitable number of test items in the suitable content categories. However it further helps the teacher to elaborate the items in more descriptive way to be able to be specific in conveying the message and also defining the level of intellectual functioning. This table may also assist the instructor in determining the format and design of test items which will help him/her in identification of the weightage of the test items individually based on the respective modules.

6. Table of Specification and Teaching subject of Secondary level

Table of Specification regarding Teaching subject of Secondary level like Science as under for example

<table>
<thead>
<tr>
<th>Example No 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content Area</strong></td>
</tr>
<tr>
<td>Plants</td>
</tr>
<tr>
<td>Cell</td>
</tr>
<tr>
<td>Pollination</td>
</tr>
<tr>
<td>Vertebrates</td>
</tr>
<tr>
<td>Digestive System</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

In the above illustrated example grid; content areas are on the y axis whereas cognitive levels with different weightage are on the x-axis.
Example No 2

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Synthesis</th>
<th>Analysis</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollution</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Matter</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Chemical Change</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Force</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Energy</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8</strong></td>
<td><strong>14</strong></td>
<td><strong>14</strong></td>
<td><strong>13</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>

In the above illustrated example grid; content areas are on the y axis whereas levels according to bloom’s taxonomy are on the x-axis. The table formed by keeping in view themes related to secondary level general science subject. In this grid showing influence of content areas in a manner of different levels.

7. Conclusion

Table of specification is a grid that empowers instructors to develop methodological test instruments. It helps instructor to weigh the different aspects of learning according to blooms taxonomy according to their difficulty level for each module. This grid may consist of numerous heads on different axis as per requirement. The table must mirror what has been taught in instructional sequence keeping in view the content and process. While developing a Table of Specification proceed with a specific objective and develop the test items to examine the intellectual level of student’s functioning.
References
Practice.41,255-260.
Chicago: University of Chicago Press.
Mayer, R.E.
Bloom, B.S. (Ed.). Englehard, M.D., Furst, E.J., Hill, W.H., &Krathwohl, D.R.
(1956). Taxonomy q/educational objectives'."The classification of educational goals'.
Krathwohl, D. R. (2004). Reflections on the taxonomy: Its past, present, and
future. In L.W.
objects: From theory to practice. Internet and Higher Education, 5(21-34).
Pintrich, P.R., Raths, J., &Wittrock, M.C. (2001), A taxonomy/or learning,
teaching, and assessing: A revision q/Bloom's Taxonomy qf Educational Ol?jectives.
Boston: Allyn& Bacon.
Villani, S. (in press). Learning Objects and Instructional Design. In Alex Koohang and