

# How Challenging? Using Bloom's Taxonomy To Assess Learning Objectives In A Degree Completion Program

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## ABSTRACT

*This paper describes the analysis of learning objectives in Philosophy classes in an adult learner degree completion program. The goal of the research was to determine if the level of cognitive challenge in the learning objectives was consistent with the course level. Using Blooms Taxonomy as the criteria, learning objectives were subjected to content analysis (Bloom et al., 1956). Unexpectedly Understanding, a lower level cognitive skill, was the most emphasized of the cognitive skills. Given the nature of the students as adult learners one might have reasonably expected Application, also a lower level skill, to be most emphasized. Analysis, an upper level cognitive skill was next most emphasized. However, Synthesis, which is an upper level skill, was least emphasized. As a result of the study, the school conducted faculty training sessions emphasizing the importance of developing higher level cognitive skills in students by offering appropriate cognitive challenges in the learning objectives and in the course content and assessment associated with those objectives. A follow-up study is scheduled for Fall 2005.*

## BACKGROUND

It is a truism that each generation has concerns for the progress of succeeding generations. Erasmus Darwin talked of mankind "possessing the faculty of continuing to improve by its own inherent activity and of delivering down those improvements by generation to posterity." (Darwin, 1794). Educators, more than the general population, have concerns for the cognitive development of the succeeding generation. We do not want to produce students who can only parrot the assumed wisdom of our generation. Rather, we expect that students should be able to think critically about the knowledge they inherit. We hope they will learn from our mistakes as well as our triumphs. This will only be possible if graduates have the ability to analyze fact, data and information and to synthesize and evaluate the "facts" with which they are presented. That is, we expect that students will develop their higher levels of cognitive abilities.

## CONTEXT

The Assessment Committee in our School is charged with the responsibility to evaluate degree programs and to make recommendations to the Academic Coordinators responsible for administrative oversight of the programs. The Committee is also responsible to Administration of the School for reporting results, particularly in the context of regional accreditation. This paper describes the process developed in committee to assess the level of cognitive challenge in courses. Initially Philosophy courses were selected for assessment.

The degree completion program is intended to assist adult learners with Associates Degrees or at least 60 credit hours of college level course work to earn a Bachelors Degree. The program is delivered at more than 40

points of delivery from Tallahassee to Homestead, Florida. The average age of the students is approximately 38. The gender ratio varies by site but is about 60% female and 40% male. The racial make up also varies by site but is fairly evenly divided among Anglo, Hispanic and Black students. In general, our students are working adults who seek a degree because it is needed to qualify for promotion, to maintain their current employment, or for personal development.

The student population reflects several national trends. First, there are now more females than males graduating from college. This reverses the historical trend of more males going to and graduating from college. Second, there is an ever increasing number of older students attending college. Third, more minority students are attending and graduating from college (Bash, 2003).

## **PROCESS**

Given the geographic distribution of the course delivery in the program it was not feasible to visit every classroom to observe the cognitive level of course delivery on a site-by-site, instructor-by-instructor basis. A reasonable surrogate was determined to be a careful analysis of the course syllabi throughout the program. In particular, all learning objectives in the syllabi were to be systematically examined using Blooms Taxonomy as the criteria. The goal was to determine if the cognitive challenge represented by the learning objectives was consistent with the course level, that is, Junior (300) and Senior (400) level courses would have sufficiently challenging learning objectives reflective of upper level undergraduate courses. Specifically, would 300 and 400 level courses appropriately emphasize evaluation, synthesis, and analysis rather than simply knowledge, understanding and application.

All syllabi for Fall Term 2003 were requested from the central repository for course syllabi. That is, a census was conducted. In practice, a complete census was not achieved, as about 10 percent of the course syllabi were not available for a variety of reasons. However, the committee decided it would be impractical to delay the study for the missing syllabi. Analysis was conducted on a discipline basis. Emphasis was placed upon disciplines clearly calling for higher cognitive skills, e.g. Philosophy.

## **BLOOM'S TAXONOMY**

Benjamin Bloom headed a team of educational psychologists who, in 1956, developed taxonomy of intellectual behavior. (Bloom et. al, 1956). There were three domains, the Cognitive, the Psychomotor and the Affective. We are here concerned only with the Cognitive domain. Within the Cognitive domain the group identified six categories or levels of intellectual skills, starting with the lower level of simply being able to recall facts and progressing to the most advanced, evaluation, the ability to judge the value of information for a given purpose. Each higher level of course subsumes the lower levels that precede it. That is, the taxonomy is a hierarchical outline of cognitive complexity. Bloom's taxonomy has had significant influence upon educational research (Kottke & Schuster, 1990).

## **METHODOLOGY**

A content analysis of the learning objectives was conducted. The learning objectives for each syllabus were examined. Using the chart of verbs associated with each of the categories in the taxonomy, a word count by objective was taken. The occurrence of each of the categories in Bloom's Taxonomy was recorded. This both speeded the process and assisted in consistency in placing the learning objectives appropriately. Results were recorded in an Excel Spreadsheet and a Chart produced. This facilitated a visual presentation of the relative emphasis placed upon each category in the taxonomy. The Verb chart is illustrated in Chart One. The Learning Outcomes are illustrated in Chart Two.

## **RESULTS**

Chart two displays the results of the content analysis of learning objectives for the Philosophy discipline. The greatest emphasis as reflected in the learning objectives was placed upon Understanding. Next most emphasized was Analysis and then Application. Least emphasized was Synthesis. Evaluation and Knowledge fell between. One might have expected that the content analysis would reflect greater emphasis upon Synthesis and Evaluation relative to Understanding and Knowledge.

It was somewhat surprising that Understanding ranked higher than Application. Although both are lower level skills, given the fact that the learners are adults one might have expected that greater emphasis would have been placed on Application.

## **CONCLUSIONS USE OF RESULTS**

At this point it is important to emphasize a caveat. What the study shows is that based upon content analysis, i.e., a count of the verbs in the learning objectives in the written syllabi Synthesis, an upper level cognitive skill, is least often found. What the study does not explore is the connection between the learning objectives, the course assignments and the assessment of learning during and at the end of the term. There is an implicit assumption that appropriate linkages exist and that the word-count in the learning objectives is reflective of the cognitive challenge presented in the course. So it would be premature to suggest that the 300 and 400 level Philosophy classes do not appropriately emphasize upper level cognitive skills. In fact, Analysis, which is an upper level skill, is emphasized relative to Knowledge and Application, lower level skills. One may suggest that the apparent emphasis upon Understanding is suspect.

The Assessment Committee, based upon the above, felt that it would be appropriate to first reestablish that course syllabi were crafted and written in such a way that the learning objectives appropriately reflect the actual cognitive challenge delivered in the classroom and next to revisit the content analysis of the course syllabi in a follow-up study. This was reported to the Academic Council with a recommendation for further action.

So, as a result of the findings in the study, faculty training sessions on Cognitive Challenge were conducted at each of the delivery sites in summer 2004. The purpose was to make sure that faculty revisited their course syllabi to assure that the appropriate linkages existed between learning objectives, course assignments and assessment procedures so that there could be high confidence that the learning objectives would be reflective of the actual cognitive challenge presented in the classroom. Faculty were encouraged to make certain that the learning objectives in the course syllabi accurately represented the cognitive challenge in their courses.

The Assessment Committee is now studying recommendations to the Academic Council, which is responsible for academic program oversight. One probable recommendation will be to re-visit the sample syllabi to make sure appropriate emphasis is placed upon cognitive challenge. A follow-up study in Fall 2005 will be conducted to understand the effects of the training conducted in Summer 2004 and to explore further recommendations to the Council.

Chart One: Chart Of Verbs

Knowledge	Understanding	Application	Analysis	Synthesis	Evaluation
Choose	Arrange	Apply	Analyze	Arrange	Appraise
Define	Cite	Chart	Calculate	Assemble	Assess
Enumerate	Classify	Collect	Categorize	Collect	Choose
Identify	Comprehend	Compute	Compare	Compose	Compare
Indicate	Describe	Construct	Contrast	Construct	Contrast
Know	Discuss	Demonstrate	Criticize	Create	Criticize
Label	Explain	Dramatize	Debate	Design	Critique
List	Explore	Employ	Detect	Formulate	Decide
Match	Express	Give examples	Determine	Generate	Defend
Memorize	Extrapolate	Interpret	Diagram	Integrate	Estimate
Omit	Generalize	Investigate	Differentiate	Organize	Evaluate
Name	Identify	Operate	Disassemble	Perform	Grade
Recall	Indicate	Practice	Distinguish	Plan	Judge
Record	Infer	Predict	Examine	Prepare	Justify
Relate	Interpret	Schedule	Experiment	Produce	Measure
Repeat	Judge	Shop	Inspect	Propose	Rate
Reproduce	Locate	Show	Inventory	Set up	Reframe
Select	Manage	Sketch	Justify	Synthesize	Revise
State	Match	Translate	Question		Score
Underline	Paraphrase	Transfer	Relate		Select
Who	Recognize	Use	Separate		Value
What	Report	Document	Solve		Weigh
When	Represent		Subdivide		
Where	Restate		Test		
Which	Review				
	Show				
	Suggest				
	Summarize				
	Tell				
	Trace				
	Translate				

Chart Two

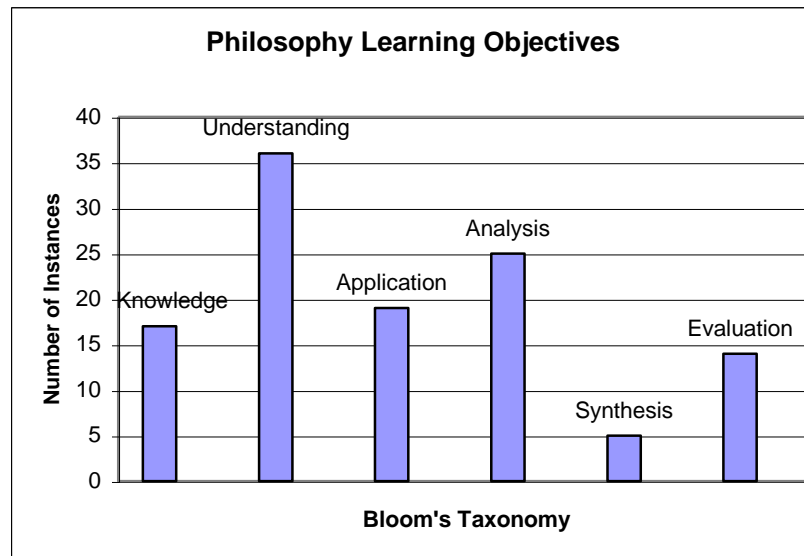


Chart Three Use Of Bloom's Taxonomy In Assessment: Sample Questions

Level	Cognitive Behaviors -- Examples
<b>Evaluation</b>	<i>Assessment of one's own or someone else's synthesis or analysis.</i> Sample question: Evaluate another administrator's program for quality assurance in dispensing medications.
<b>Synthesis</b>	<i>Integration of application, understanding and knowledge.</i> Sample question: Design a program to assure quality (accuracy) in dispensing medications.
<b>Analysis</b>	<i>Determine root causes of errors in dispensing medications.</i> Sample question: Determine the nurse/patient ratio influence upon accuracy in dispensing medications.
<b>Application</b>	<i>Use of understanding and knowledge.</i> Sample question. How does one insure the proper medication is dispensed?
<b>Understanding</b>	<i>Comprehension of knowledge.</i> Sample question: Describe the method for properly dispensing a medication.
<b>Knowledge</b>	<i>Memorizing facts, principles, theories, language.</i> Sample question: Name the three most dispensed medications in Miami-Dade County hospitals.

After Eder, 2004

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