

## **ASSESSMENT DESIGN AND DEVELOPMENT: THE OMAN EXPERIENCE**

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### **ABSTRACT**

Providing quality education is one of the thrusts of all higher education institutions in Oman and around the globe. Inherent to quality education is the development of students' learning through an effective approach towards teaching and assessment practices.

The effectiveness of learning could be best measured using different assessment tools to be able to evaluate students' understanding of what has been taught to them. Higher education institutions have been utilizing different assessment tools; however, some of them do not have a systematic method to be able to assess the efficiency of the tools and to be able to properly evaluate the attainment of the learning outcomes of the course.

The teacher's considerable participation in the use of the assessment tools is highly encouraged in order to check whether or not learning has taken place. The conformance to assessment standards through the use of effective assessment tools brings forth a number of benefits when preparing exam questions and when assessing learning. In this sense, teachers in their own right are not only learning facilitators in class but also exam writers and learning assessors.

The intent of this study is to discover and explore the various assessment tools being used by HEIs in Oman and describe its perceived value. Come up with quality exam standards in constructing valid, reliable, standard, comprehensive and objective exam questions. Develop an assessment framework which emanated from a sound assessment process structure.

**KEYWORDS:** Assessment, Quality Exams, Test Blueprint, Test Construction

### **INTRODUCTION**

Higher Education Institutions (HEIs) in the Sultanate of Oman are geared towards excellence in education evident by the quality standards set by the Ministry of Higher Education and the Oman Academic Accreditation Authority (OAAA). Student Learning by Coursework Program of the OAAA has set standards on the attainment of student learning outcomes, programs outcomes and graduate attributes through a comprehensive approach to teaching, learning and assessment. Assessment is a process to measure students' experience which is evaluated in order to determine whether or not learning has taken place.

Teachers play a vital role in making effective assessment. Teachers have to answer questions related to assessment such as: What assessment tools have to be used to effectively evaluate students' learning? What quality framework has to be utilized as basis in designing an effective assessment? What standards, described in the assessment framework, have to be considered in order to develop effective assessment? What makes an assessment effective?

The various institutions in the Sultanate employ different assessment tools in order to evaluate students' performance. Teacher's preference on the use of assessment tools greatly depends on the institutional pedagogical framework. In addition, some teachers would tend to think creatively on the use of most conceivable effective assessment tools that are helpful in the process of assessment. The perceived value of each assessment tool is best described through exam characteristics i.e. on how exams become valid, reliable, and fair. A framework and quality exam standards, based on the institutional pedagogical framework, should be conceptualized in order to guarantee the afore-cited assessment characteristics. When such assessment tool bears all the characteristics it should suppose to have, then teachers could consider it effective in making decisions to gauge the extent of students' learning and performance.

Assessment items should not linger away from the learning outcomes covered during teaching or instruction as both are closely linked. A gap of indirection should not exist between them instead both should concur on the rule of thumb "What you teach is what you test." An outcome-based learning approach of assessment ensures that teaching and assessment are always linked to the learning outcomes.

The Bloom's Taxonomy of Knowledge immensely helps teachers in the construction of test items. Learning outcomes, teaching objectives and assessment items and types of exams are all written according to the progressive cognitive levels of Bloom's Taxonomy.

This research study seeks to answer the following questions: 1) What are the different tools used by HEIs in Oman in assessing their intended competencies? 2) What framework is recommended for use by higher education institutions in Oman in developing and evaluating the validity of assessments like the construction of exam questions, etc.? 3) How quality exams are developed?

## LITERATURE REVIEW

The Higher Education Institutions (HEIs) in Oman and other institutions abroad are using various assessment tools to assess the learning experience of students. Along this line, different terms were also used to define the assessment process. **Black and Wiliam (1998)** define assessment broadly to include all activities that teachers and students undertake to get information that can be used diagnostically to alter teaching and learning. According to **Elton and Laurillard (1979)**, assessment drives learning which has been advocated by many researchers in the field of learning and assessment over a long period of time.

**Moser, et. al. (1993)** believe that assessment helps to hone students to become critical thinkers and self-critical individuals, for which institutions aimed at. Evidently, institutions aim to mold students' holistic development with the use of different assessment tools. In Higher Education Institutions (HEIs) in Oman, the continuous assessment process has been the primary focus in order for institutions to evaluate students' performance, staff performance and the student's learning experience. As cited by **Brown (2001)**, continuous assessment helps to estimate students' skills with reliability and in the long run, helps students to handle stress management and time management.

The assessment tools used by HEIs in Oman include, but not limited to, Rubrics, Paper/Pencil Test (with the use of a test blueprint), Reflective Review Tools, Feedback/Survey Tools, etc. The researchers of this study describe these tools as follow: a) A rubrics system helps an objective assessment of student activities based on predefined criteria; b) Using a test blueprint, a paper/pencil test ensures its content validity; c) Reflective Review Tools help students to self-assess themselves regarding their own learning experience; d) Feedback tools assist students to review and reflect what

they learned and how they perform as the lessons progress; and e) Reflective Review tools describe students' performance through reflections and feedback.

Students' development and acquisition of the intended knowledge and skills are mainly assessed through quizzes, major exams (e.g. midterm, in-semester, final), oral exam, projects/assignment, class participation, practical test, and laboratory exam.

Based on the continuous assessment, other assessment tools and knowledge/skills acquisition strategies used by HEIs in Oman, it has been noticed that students have been exposed to both types of assessment namely: the formative and the summative assessments, which are widely used as direct and indirect measurement of learning.

It was emphasized by **Brown and Knight (1994)** that the terms formative and summative refer to the purpose of assessment rather than the methods used. When an assessment provides feedback on performance then it is considered formative and when the mark or grade contributes to the final outcome then it is considered as summative. Such an idea is supported by **Sadler (1989)** who claims that formative assessment is specifically intended to provide feedback on performance to improve and accelerate learning.

The researchers of this study defines 'summative assessment' as a form of a measure that is usually used to grade a student in a form of quizzes, major examinations, projects, assignments, reports, presentations, etc. while 'formative assessment' as a form of measure to identify the weaknesses and strengths of students to be able to remediate, if required. Some formative assessments include, but not limited, to Q&A or lesson's guide questions, homework activities, simulations, tutorials, classroom discussions, business games, reviews, conferences and peer/self-assessment.

The researchers of this study believe that an ideal assessment process should fit for purpose in terms of validity, reliability, and fairness. **Wolming and Wilkstrom (2010)** claimed that test validity is the degree of how teachers' judgment about their students can be trusted based on the quality of evidence gathered. **Wells, C. and Wollack, J. (2003)** described test reliability as the consistency of scores students would receive on alternate forms of the same test. The researchers of this study believe that test reliability is an indicator where exam is free from error as described by the results which appear the same even though it has been administered several times to a new set or group of students. **Thorndike, R. M. (2005)** compared reliability from validity claiming that reliability describes the consistency of a measurement, while validity addresses the appropriateness of the instrument for measuring the desired construct.

The **Code of Fair Testing Practices in Education, Washington, DC: Joint Committee on Testing Practices (2004)** explains that "Fairness implies that every test taker has the opportunity to prepare for the test and is informed about the general nature and content of the test, as appropriate to the purpose of the test. Fairness also extends to the accurate reporting of individual and group test results. Fairness is not an isolated concept, but must be considered in all aspects of the testing process." Fairness requires the predetermined criteria aligning the achievement of the learning outcomes.

Most HEIs in Oman are using an outcome-based approach in teaching and assessment. **Gosling and Moon (2002)** had observed that the outcomes-based approach to teaching and assessment have been increasingly popular at an international level. **Astin (1993) and Fyre (1999)** found out that assessment for accountability is increasing from multiple stakeholders (students, parents, systems, institutions) who share a common goal of improving outcomes for all students, that are designed to assure institutional conformity to specified norms and a move toward learning-based models which emphasize what students know and can actually do i.e., student learning outcomes.

In outcome-based approach, teaching is always aligned to testing. The defined learning outcomes are measured through different assessment processes based on what has been taught in class. **Jenkins and Unwin (2001)** defined learning outcomes as statements of what is expected that the student will be able to do as a result of learning the activity. **Gosling and Moon (2001)** mentioned that learning outcome is a statement of what a learner is expected to know, understand and/or be able to demonstrate at the end of a period of learning". **Donnelly and Fitzmaurice (2005)** describe a learning outcome as a statement of what the learner is expected to know, understand and/or be able to do at the end of a period of learning.

According to **Suskie (2004)**, the expected learning outcomes for a course are designed so that they can be assessed. These are best-written using the Bloom's Taxonomy of Knowledge, using the six (6) progressive cognitive levels: knowledge, comprehension, application, analysis, synthesis, and evaluation (**Blooms, 1971**). The researcher of this study believes that learning outcomes are closely linked to course delivery and instruction and at the same time to student assessment.

## METHODOLOGY

Descriptive method was employed in the study to be able to gather relevant facts and information to reach sound and objective results.

A total of 101 academic teaching staff responded to the survey floated to the different Higher Education Institutions (HEIs) in Oman. The electronic survey Google form was used to collect data from the respondents. Mean and percentage were used to analyze and interpret the data.

## FINDINGS

The respondents of the study are the following: Higher College of Technology with 47 (46.53%) followed by Al Musanah College of Technology and Salalah College of Technology with 15 (14.85%); University of Nizwa with 9 (8.91%); Shinas College of Technology with 7(6.93%); German University of Technology with 4 (3.95%) and Ibri College of Technology, Ibra College of Technology, Majan College, Rustaq Applied Science College with 1 (.99%).

The respondents have the following specializations: Information Technology with 36 (35.64%); Engineering with 30 (29.71%); English with 17 (16.83%); Business Management and Economics with 7 (6.93%); Nursing with 6 (5.94%) and Mathematics with 5 (4.95%).

Among the respondents, 36 (35.64%) have been teaching for 11-15 years; 27 (26.73%) for 5-10 years; 17 (16.83%) for 16-20 years; 8 (7.98%) for 1-5 years; 5 (4.95%) for 21-25 years; 4 (3.96%) for 25-30 years; 2 (1.98%) for 31-35 years and 36-40 years, respectively.

74 (35%) of the respondents identified Paper/Pencil/Online Test as their most utilized tool to assess intended course learning outcomes; 53 (25%) had identified feedback/survey tools; 48 (23%) for rubrics; 27 (13%) for reflective and review tools. Other tools identified are online base, practical tests and paper/pencil with 11 (5%).

The different assessment types used by respondents to assess students' development and acquisition of intended knowledge and skills are the following: 91 (19%) for Quizzes; 87 (18%) for Major Exams (e.g. Midterm, In-Semester, Final), 79 (16%) for Project/Assignment and Class Participation, 63 (13%) for Practical Test, 45 (9%) for Oral Exam, 33

(7%) for Laboratory Exam and 13 (3%) for Others. Others include Classroom Activities, Class Tests + Class Activities and Spot Quizzes.

Among the respondents, 30 (29.70%) are Extremely Familiar on the use of a test blueprint when preparing examination questions; 49 (48.52%) are Moderately Familiar; 6 (5.94%) are Somewhat Familiar; 9 (8.91%) are Slightly Familiar and 7 (6.93%) are Not at All Familiar.

54 (53.47%) of the respondents perceived a test blueprint as Very Important when preparing exam questions; 34 (33.66%) as Important; 6 (5.94%) as Moderately Important; 5 (4.95%) as Less Important and 2 (1.98%) as Unimportant.

28 (27.72%) of the respondents Frequently Use a test blueprint when preparing exam questions; 42 (41.58%) use it Almost Every time; 16 (15.85%) use it Occasionally/Sometimes; 2 (1.98%) Almost Never use it and 13 (12.87%) Never Use it.

## DISCUSSIONS

The findings show that the Higher Education Institutions use different assessment tools to assess intended competencies. The most utilized tool by the respondents is the paper/pencil/online test which reflects that the institutions use the summative assessment to evaluate students' learning. Some of the respondents also had identified the use of feedback/survey tools and the rubrics as a way of evaluating the attainment of outcomes. The use of the summative and formative forms of assessment shows that HEIs in Oman are likely to use both tools in order to measure students' performance.

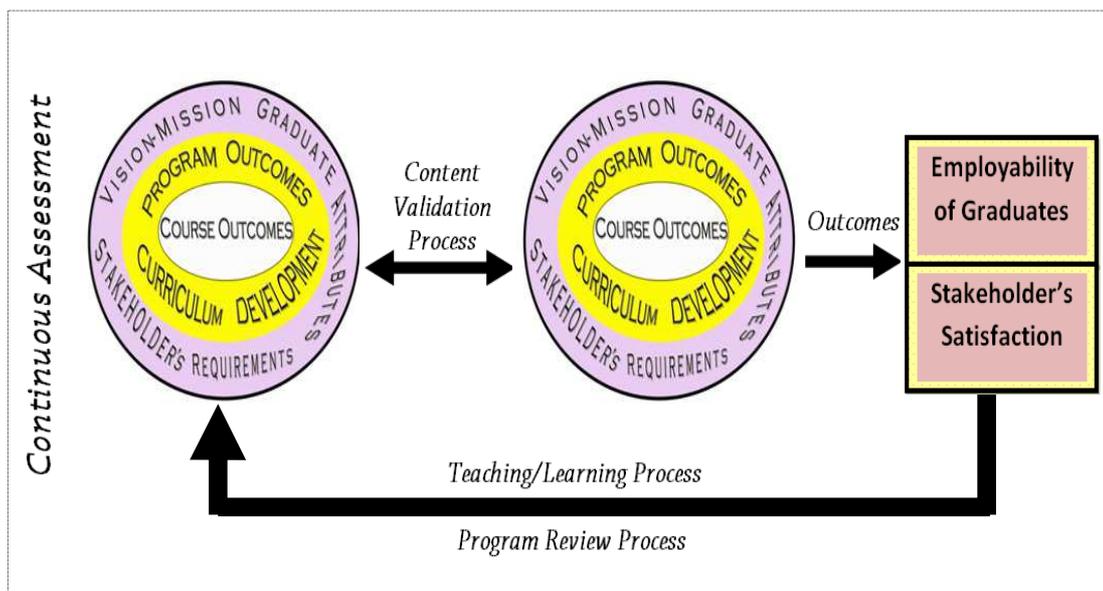
It has to be noted that most of the respondents used Quizzes to assess students' development of intended knowledge and skills followed by Major Exams which are the usual norms among Higher Education Institutions in Oman. Relevant hereto, it has to be emphasized that quizzes and exams are supposed to measure the course learning outcomes with the use of a criteria-based approach. Assessment in these forms should clear out the proper assessment of course learning outcomes in order to evaluate the effectiveness of the teaching and learning process. Different test construction tools are used to assess the attainment of students' learning outcomes. One of these is the use of a test plan or a test blueprint. A test blueprint is a plan prepared by teachers to ensure that fair, complete, valid, reliable, objective questions appear on the exam paper. This shows that the exam papers adequately include the topics to be covered which is made easy by applying the instructional tool, Bloom's Taxonomy of Knowledge devised by Benjamin Bloom, an educational psychologist who made contributions on the classifications of educational objectives. The test blueprint provides a link to what is taught and what is tested which serves as the fundamental block when identifying the kind of questions constructed for any examination/test questions dependent on the cognitive level identified by Bloom.

On the contrary, out of 101 respondents, 30 or 29.70% are Extremely Familiar on the use of a test blue print and 49 or 48.52% are Moderately Familiar. There are also some respondents who are Not at All Familiar. The results show that the rest of the HEIs in Oman are somewhat not observant on the common standard on test construction used by other HEIs abroad. This also could be seen from the result reflecting that there are few respondents who perceived a test blueprint as Less Important and Unimportant. It has also recorded that 54 out of 101 respondents with 53.47% perceived the use of test blueprint as Very Important. These results are in parallel to the respondents' responses on their frequency of use of a test blueprint where 28 out of 101 with 27.72% are using it frequently when preparing exam questions, 42 or 41.58% use it Almost Every time while other respondents Never Use it. Such findings reveal that some teachers in

Oman prepare their examination questions without proper planning on how to achieve the intended course learning outcomes.

The first circle presents that most HEIs in Oman are using the Outcomes-Based Approach as shown on Figure 1 which emanated from a sound assessment structure. In this approach, the focus is on the course learning outcomes as depicted from the figure. The course outcomes were developed from the vision-mission of the HEIS as well as its graduate attributes that are aligned with the program outcomes which are considered during the curriculum development process. This is in answer to the stakeholder’s requirements.

The second circle shows exactly the same elements of the first circle that are reviewed through a content validation process which is an approach to evaluate its consistency and effectiveness during the teaching, learning and assessment processes. This also involves a continuous assessment process which covers both formative and summative assessment process. The end result of this framework is reflected on the employability of graduates as well as the stakeholders’ level of satisfaction. The arrow that connects it back to the first circle means that the feedback that is coming from the graduates and also the stakeholders are the bases for improving the programs.



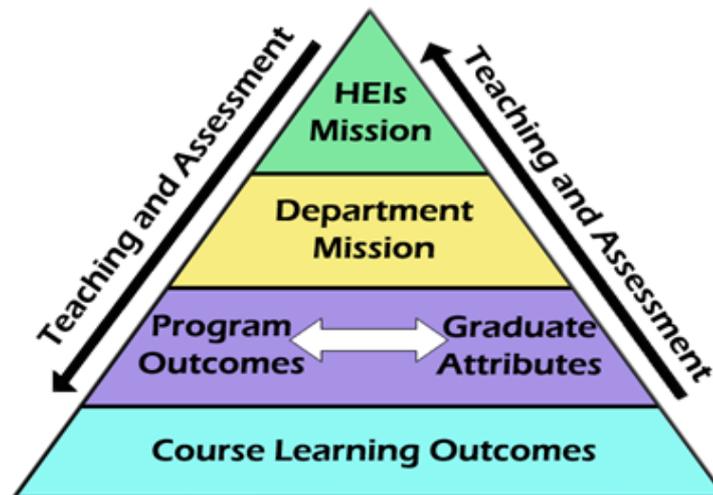
**Figure 1: Assessment Framework**

Moreover, assessment has to be founded on the mission of the HEIs. It has to be grounded using an Outcomes Pyramid that shows how learning outcomes are framed and derived. Effective teaching and learning process is primordially attributed to reliable and effective assessment. This philosophy which the HEIs consistency adheres to give realistic barometer on what it is taught and the way it is tested. This educational process using both the formative and summative assessment enhances both the student learning and the teacher’s teaching capability. To sum up, assessment being an integral part enhances the HEIs educational standard.

Consequently in this regard, the HEI may embark into a framework called Outcomes Pyramid which is used by many higher education institutions abroad. Yokomoto (2004) of Indiana University-Purdue University Indianapolis in his presentation, “Putting Measurable Learning Outcomes into Perspective” has emphasized the use of the Outcomes Pyramid

to establish relationship from the HEI mission statement to Unit Instructional Objective. Such concept has been adopted by the researchers to come up with a tailored structure that will fit HEIs in Oman.

Figure 2 is a graphical presentation of the hierarchical relationship from the HEIs Mission down to the Course Learning Outcomes.



**Figure 2: Outcomes Pyramid**

The teaching staff members have to be imbued with sufficient and effective knowledge with the HEIs Mission. It must delve into not only by the mind but most especially by the heart, and be a part and parcel of the rest of the teaching staff members in fulfilling such mission. The Department Mission emanates from the Mission of the HEIs has one path to follow. It must be made that the Program Design of the HEI should be based on alignment between the Program Outcome and the generic graduate attributes. Program Outcomes are reflective of the mission of the Department which bring about expected results in knowledge, skills, attitudes and abilities that a student should achieve at the end of the program to attain success in the workplace.

The Outcomes Pyramid indicates the relationship as in unification and alignment towards teaching and learning which are interlinked with each other in the assessment process. In this point of view, it is vital that the objective approach of test construction has to be developed systematically with the consideration of evaluating what is to taught against what is tested. Apparently, the findings show that some teachers in HEIs in Oman lack understanding on the basis of assessment i.e. how quality examinations/tests are constructed and why the objective test construction culture has to be developed and improved among educators.

To address the above-mentioned se issues, the following are recommended:

- Higher Education Institutions (HEIs) in Oman have to develop a comprehensive approach and framework of assessment in order to ensure that teachers prepare examinations which are valid reliable, fair, complete and objective. The framework presented in Figure 1 could serve as a reference and model.
- Higher Education Institutions (HEIs) in Oman have to increase the number of assessment tools used to measure students' performance. Teachers are expected to be creative and innovative to think of many other assessment tools which attempt to test the intended knowledge and skills of students.

- Higher Education Institutions (HEIs) in Oman have to encourage staff to go for staff development mainly on Teaching Methods, Strategies and Assessment.
- Future researchers have to further evaluate the use and effectiveness of different assessment tools, like a test blueprint, to be able to have varied approaches that may suit the needs of various learners.

## CONCLUSIONS

Assessment is an integral part that enhances educational standards. However, there is a need to increase the number of assessment types and tools in order to ensure student learning. When properly administered, continuous assessment that will include formative and summative assessments can effectively judge the extent of student learning.

Assessment design and development should be based on an assessment framework to ensure that teachers prepare different types of assessment which are valid, reliable, fair, comprehensive and objective. This is supported by the use of the Outcomes Pyramid to ensure that course learning outcomes are aligned with the institution's Vision-Mission statements which are the cornerstones of instruction and assessment.

## REFERENCES

1. ASTIN, A. W. (1996). *Involvement in learning revisited: Lessons we have learned*. *Journal of College Student Development*, 37(2), 123-133.
2. BLOOM, B. S. (1971). *Mastery learning*. In J. H. Block (Ed.), *Mastery learning: Theory and practice*. New York: Holt, Rinehart & Winston.
3. BROWN, S. & KNIGHT, S. (1994). *Assessing students in Higher Education*. London: Kogan Page
4. BROWN, G. (2001), "Assessment: A Guide for Lecturers", LTSN Generic Centre, Assessment Series No.3.
5. BLACK, B. & WILIAM, D. (1998) *Inside the Black Box*. London: Kings College. Retrieved November 18, 2004 from: <http://www.gtce.org.uk/research/standstudy.asp>
6. CODE OF FAIR TESTING PRACTICES IN EDUCATION. (2004). Washington, DC: Joint Committee on Testing Practices.
7. DONNELLY, R. & FITZMAURICE, M. (2005). *Designing Modules for Learning*. In: *Emerging Issues in the Practice of University Learning and Teaching*, O'Neill, G et al. Dublin : AISHE.
8. ELTON, L. & LAURILLARD, D. (1979). *Trends in Student Learning*." *Studies in Higher Education*, 4, 87-102.
9. GOSLING, D. AND MOON, J. (2001) *How to use Learning Outcomes and Assessment Criteria*. London: SEEC Office.
10. JENKINS, A. & UNWIN, D. (2001) *How to Write Learning Outcomes*. Available online: <http://www.ncgia.ucsb.edu/education/curricula/giscc/units/format/outcomes.html>
11. MOON, J. (2002) *The Module and Programme Development Handbook*. London: Kogan Page Limited.

12. MOSER, C., MADEN, M., MACFARLANE, A., WALTON, J., CASSELS, J., & KENNEDY, H. (1993) *National Commission on Education Learning to Succeed A Radical Look at Education Today and A Strategy for the Future*. London: Heinemann.
13. SCRIVEN, M. (1967) *The Methodology of Evaluation* in Tyler,R.W., Gagné, R.M.,& Scriven, M. (eds.) *Perspectives of curriculum evaluation*. Chicago: Rand McNally, 39-93.
14. OMAN ACADEMIC ACCREDITATION AUTHORITY. (2014) *Student Learning by Coursework Program*. [Online] Available from: [http://www.oaaa.gov.om/Program.aspx#Pgm\\_Standards\\_New](http://www.oaaa.gov.om/Program.aspx#Pgm_Standards_New)
15. SADLER, R. (1989) *Formative Assessment and the Design of Instructional Systems*, *Instructional Science*, 18 119-144
16. SUSKIE, L. (2004). *Assessing Student Learning: A Common Sense Guide*. Anker Publishing Company: Bolton, MA.
17. THORNDIKE, R. M. (2005), *Measurement and Evaluation in Psychology and Education*, 7th edition. Person New Jersey.
18. WELLS, C & WOLLACK, J. (2003), *An Instructor's Guide to Understanding Test Reliability, Testing & Evaluation Services*, University of Wisconsin.
19. WOLMING, S. & WIKSTROM, C. (2010). *The Concept of Validity in Theory and Practice. Assessment in Education: Principles, Policy & Practice*, 17, 117-132.
20. YOKOMOTO, C.F. (2004). *Developing a Plan for Understanding, Writing and Assessing Measurable Learning Outcomes*, Indiana University-Purdue University Indianapolis

