

Occupational Competence Tests as a tool for assessing the vocational training system in the Sultanate of Oman

Abstract

Occupational Competence Tests are used by the Occupational Skills and Testing Centre (OSSTC) of Sultanate of Oman to evaluate the first employability of workers. The development of Occupational Competence Tests is a scientific procedure based on criterion referenced tests with a high interlink to the newly shaped Advanced Occupational Standards. In order to further elaborate on this achievement the article is roughly organised in three parts.

1. The first part presents the subject matter and the planned institutional setup of the OSSTC that will be operational by the end of the project in 2010.
2. The second part will focus on the two main products and instruments of OSSTC as means to improve TVET:
 - a) Advanced Occupational Standards and
 - b) Competence Tests for Certification and Evaluation.
3. The third and final part will give a short description of the empirical test results in the occupational field of automotive

Fact sheet of Oman

The Sultanate of Oman is a state in the south of the Arabian Peninsula with a size of app. 309.500m² and app. 2.567.000 inhabitants. The population consists of 73% Omanis and 27% Expatriats.

The rate of illiteracy has been decreased in all regions of the Sultanate in the duration from 1993 to 2003 from 41.2 to 22%. The GDP was at 15.604 US\$ in the year 2006 (Ministry of Social Development, 2009). According to an actual study from Rand corporation, Oman's biggest challenge are concerns about unemployment in face of a growing youth population on the one hand and oil reserves – its major source of revenue since 1964 – quickly being depleted on the other hand (Gonzales et al., 2008). The rate of unemployment among Oman nationals was between 12 and 15 % in the year of 2006.

Lack of Skilled Worker

In order to reduce unemployment of nationals and to reduce dependence of the country on foreign workers which build the backbone of the Oman work force, the government has

launched a labour market reform to increase the share of Omani nationals in the workforce. This process is called “Omanization”. The private sector has employ Omanis and gets hard restrictions for hiring non-nationals. In addition, education and training has been the main target for reform efforts since many years – this includes the establishment of a more effective TVET system.

In order to empower vocational education and training in the Sultanate to produce better trained Oman nationals on the level of skilled and semi skilled work, the Ministry of Manpower has initiated in 2005 the project “Occupational Standards and Skill Testing Centre (OSSTC)”. The project is implemented in cooperation with the German Agency for Technical Collaboration (gtz).

A barrier for success of “Omanization” efforts and policies on the labour market till today is the mismatch between labour market demands and recent graduates’ skills. More than 230 observation-interviews in companies executed by OSSTC analysts revealed that graduates from vocational education and training institutes very often are not accepted by companies because of insufficient motivation and work related competence. Companies therefore complain that a sufficient number of nationals are lacking which possess the skills and dispositions required for employability in order to fulfil the Omanization quota in the private sector.

Overview of the Occupational Standard and Skill Testing Centre (OSSTC)

The major achievement of OSSTC is the development of Advanced Occupational Standards (AOS). AOSs can be seen as a preparatory step for the development of sustainable training and teacher training solutions based on modern occupational profiles. Up to the present, the OSSTC has developed nearly 60 AOSs with the help of a pool of international subject matter experts. The standards have been established in close cooperation with companies in Oman. Collaboration with the private and public sector is a key component of the center’s activities. The Occupational Standard and Skill Testing Centre (OSSTC) is supposed to become a new department of the Ministry of Manpower. Its basic purpose is empowerment of TVET in the Sultanate of Oman. In close cooperation with the private sector, the OSSTC establishes Advanced Occupational Standards (AOS, definition see below) which fit the needs and demands of the labour market in Oman.

In addition to the development of AOSs for a specified number of occupations, OSSTC will take charge in the organisation and implementation of new curricula, teacher training concepts, and occupational competence tests – all oriented or related to the AOSs.

The OSSTC will have 5 units addressing different functions as followed:

1. The development of Advanced Occupational Standards in an ongoing dynamic process with companies/ the private sector.
2. The development and administration of occupational competence tests based on the AOS and the development and operation of a national system for testing and certification.
3. The establishment of concepts and programs for Human Resource Development in TVET.
4. The planning and execution of scientific research in TVET with international relations for further enhancement of the TVET-System
5. The facilitation of cordial partnership between private sector companies and the Ministry of Manpower in all relevant areas of the OSSTC and vocational training.

Advanced Occupational Standards (AOS)

This unit is the heart of the center and the backbone for activities in all the other units. The development of AOSs provides a platform for the development of effective vocational training curricula, testing packages, and teacher training concepts. Shortly, the AOS give a structured description of the competencies required for skilled and semi-skilled work. These competencies are specified according to core work processes (CWPs) which include objects (materials, products, general tasks of work, phenomena) as well as tools, methods and organisational features mediating the object related activities of the worker. Therefore, a CWP can be introduced as a repetitive pattern of interactive activity related to objects that are constitutive for an occupation. For example, “Standard Service” is the name given to a CWP that constitutes (among others) the occupational profile “Automotive Mechatronic”. “Table Service”, another CWP, obviously belongs to the occupational profile “General Waiter”. It is important to notice at this point that the definition of CWPs and related competencies requires a profound analysis of the working processes on the shop-floor level. OSSTC adopted the scientific procedure of work process analysis which was introduced for example by Spöttl and other vocational scientists (see e.g. 2000). The procedure is meanwhile well established in the context of vocational research in Europe and in particular Germany.

Testing & Certification

The core activity of this unit is the development of reliable and valid tests that can be used to measure entry-level competence with reference to the AOS. Test scores shall be used, for example, to classify advanced vocational beginners who have first work experience (acquired for example during apprenticeship or initial training) and are ready to apply for an employment as a skilled worker.

Practitioners from the shop floor and subject matter experts have to be involved as much as possible in the test development process (e.g. item writing) so that the test content is correct as well as practically relevant.

Tests, the OSSTC will release, are designed to support decision-making in two areas: First, pre-selection of applicants for an entry-level employment and, second, evaluation of VET outcomes.

The OSSTC has adopted a web based testing solution. Thus, tests are available in a paper-pencil and web- or computer based form.

For the web based testing solution an Open Source Product called “ILIAS”¹ is used for the distribution and data collection.

Development of Human Resources

The purpose of this unit is to plan, organize and implement training programs which will improve both the quality of OSSTC activities itself (in-house training) and the way teaching is realized in TVET. The primary target group for providing external training are teachers, instructors, and trainers of the Vocational Training Institutes and Centres (VTI/VTC) in the country. In addition, the unit will also offer special training for trainers working for private sector companies. For example, a future training need of company training staff is addressed with regard to the introduction of learning forms and methods requiring the collaboration between schools and companies (e.g. learn and work assignments, internships).

Research in VET

The OSSTC research unit is intended to provide empirical evidence for strategic decision making related to all issues of VET. Research topics of interest for example are how core work processes are an object of change in the future or what will be the specific effects of

1 ILIAS is an acronym for **I**ntegrated **L**earn-, **I**nformation- and **W**ork cooperation-**S**ystem. For further details look at <http://www.ilias.de> (english website)

establishing more work process oriented learning strategies in VET for the employability of young Omani workers.

Therefore, recommendations based on research results of this unit will help to systematically improve the work of OSSTC but also of the Ministry of Manpower with its training institutions as well as private sector training efforts.

Public Private Partnership

The purpose of this unit is to strengthen the effective cooperation and relationship between the public and private sectors. It serves as facilitating agent for all activities that involve private sector companies, e.g. in the development of AOS and entry-level tests but also for further training of technical teachers and instructors and for VET research. Therefore a network of representative companies of every occupational field has to be build up and enhanced.

The Concept of Advanced Occupational Standards (AOS)

The development of Advanced Occupational Standards (AOS) is an essential part of the OSSTC's work. As mentioned before, AOS describe the qualifications and competencies which a skilled worker must posses in order to perform successfully at the workplace.

Almost 60 AOS have been developed in 15 occupational fields during the project up to the present. These 60 AOSs will cover approximately 80 % of the labour market in Oman.

In principle, AOS deliver general descriptions of basic activity dimensions (including tools, methods and objects) as well as personal requirements (e.g. knowledge, competencies, skills and abilities) that have a defining character for the work in the occupation.

AOSs in particular reflect company needs and describe competencies for skilled and semi skilled workers and evidently focus on occupations rather than jobs. Any AOS description comprises the following sections:

1. A brief description of the occupational profile
2. A list of all relevant core work-processes that constitute the occupational profile
3. A list of the competencies relevant for performing each of the core work processes
4. A detailed description for each core work process in terms of objects, mediating aspects, and conditions in the organisational environment.

Furthermore AOSs are providing the common ground and a rationale for the achievement of occupational competence tests, curriculum development and teacher training programs. The AOS (in its content) is the outcome of a Work Process Analysis (WPA) as explained below.

Work-Process Analysis (WPA)

Work-Process Analysis (WPA) is a scientific procedure with instruments used to elicit relevant information about occupational work activities and contexts that are required to specify the content of the AOS. A Core Work Process represents a holistic cycle of activities structured through planning, operation control and evaluation of work (Haegele 2002). The analysis of Core work Processes takes place at the workplace and requires the involvement of workers as interview partners. In addition, curriculum specialists from the Ministry of Manpower can also take part in the analysis.

It is important that the research team establish a positive relationship with the management or owner of the company because they have a huge influence on the accessibility of information and observations.

The analysis is rooted in hermeneutic interpretative phenomenology: Mutual, dynamic and contextual understanding about the observed processes (including materials, tools etc.) will clarify the specific skills and competencies required to do the job but also all relevant business and service activities that the company entails.

The objective of WPA, in this context, is to gather enough concrete information from companies and establishments about core work processes and the core competencies applied on shop floors. This enables the WPA-team to develop AOS on the level of skilled workers. The whole process of developing the AOS has to be prepared and carefully planned, For example, field visit sights have to be explored in advance. In addition, teams of experts with knowledge about the particular occupational field and facilitators must be available before the WPA is initiated. Furthermore, the scope of the targeted occupation and the related occupations in the particular sector of economic activity has to be sufficiently defined. This process can take several weeks or even months.

The overall process can be broken down into four major phases – each consisting of several working activities:

- A. Planning and Preparing
- B. Visiting Companies and Carrying-out WPA
- C. Development of AOS
- D. Recommendations for further handling of AOS regarding curriculum development and career paths for the occupation

Occupational Competence Tests

Test development in the OSSTC project today has an initial, ground-setting character. It is the first time that a systematic approach to testing vocational competencies is realized in the Sultanate. At the beginning, the OSSTC has two central aims:

1. Development and implementation of a strategy for initial test development that enables systematic participation of practitioners in the occupational field (from different countries) to emphasize work process orientation of test content (validity aspect). In addition, the approach to test development is expected to produce results in a relatively short time (test release after approximately 3 months).
2. Realization of a prototype web-based test infrastructure that provides a platform for test administration as well as test development. The platform, among other demands, has to be extendible according to future demands and specifications.

OSSTC tests have a two dimensional structure: First, items (multiple choice) have to cover each CWP of the occupational profile. For example, 9 CWPs comprising the AOS for Automotive Mechatronics are tested with 15 items per CWP resulting in a maximum test length of 135 items. A second dimension is the distinction between items that require either an active (problem-solving) or receptive performance from test takers.

Practitioners from the shop-floor-level (e.g. foremen, supervisors) generate test items during Item Generation Workshops which are monitored and moderated by test development specialists. The generated items will be reviewed by a group of selected practitioners before a field test is conducted with a sample of entry-level workers. Based on the field test results the final test form together with test use specifications (e.g. cut-off scores) is released.

In 2009 a test for the occupational profile Automotive Mechatronic was released by the center. The test was administered to a representative sample of students (N=57), freshly graduated from Vocational Training Centers (VTCs) in Oman. Test performance of this group was significantly lower than for a group of workers (mainly expatriates) representing entry-level or minimum competence per selection by eight companies located in the capital area of Oman.

Results of the occupational competence tests

The results of the first test application in the area of VET outcome evaluation indicates that a sharp gap between the outcome of learning in the VTCs and the demands of work in automotive companies exist in the Sultanate. Though, this inference is based on only one measurement (the inference will be more exact if repeated measures are available), this result

clearly indicates a need for improvement in the direction of work process orientation in the didactics of vocational education and training, which is the main focus of the AOS. Given the average performance of VTC students in the test, it is fair to predict that a majority of students will not be able to work as a skilled worker after leaving the VTC, instead companies will have to offer them additional training on the job or in special training programs in order to develop entry-level skills.

Notably, the scores of VTC students show less variation as compared to the heterogeneous scores of entry-level workers. This indicates that the VTCs have maintained a common standard of education and training. Hence, it does not seem appropriate to single out one VTC and try to make it better in relation to other VTCs. Instead, improvements should be planned and implemented on a system level. Possible interventions on system level that can improve the work process orientation of VTCs are curriculum development, teacher training, and/or the implementation of work process oriented instructional methods (e.g. work and learn assignments, problem based learning, work-process exposure in companies).

Regarding OSSTC's Occupational Competence Tests, this first study demonstrates clearly its practical effect and value. The Ministry of Manpower now possesses a powerful instrument in the form of evidence based measurements. Occupational Competence Tests are available for outcome evaluation and for control of possible intervention effects.

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