

Arun Vijay  
Subbarayalu<sup>1</sup>  
Ahmed Al Kuwaiti

## DEVELOPMENT OF A SIX SIGMA RATING SCALE FOR MEASURING THE QUALITY OF WORK LIFE OF TEACHING STAFF WORKING IN SAUDI UNIVERSITIES

### Article info:

Received 05.09.2016

Accepted 06.02.2017

UDC – 005.31:304

DOI – 10.18421/IJQR11.02-10

**Abstract:** Higher Education institutions in Saudi Arabia is currently performing several evaluations by both students and teaching staff as a measure to improve the quality by understanding the perception of its stakeholders. In order to retain the best and efficient work force to carry out the teaching roles in these universities, the Quality of Work Life (QoWL) prevailing in these Educational institutions needs to be studied. Accordingly, this study was conducted among the teaching staff of the University of Dammam [UOD] to capture their experiences related to various aspects of the QoWL. The teaching staff opinion was captured through a pre-tested QoWL questionnaire and the data were analyzed through six sigma analytical tool using the Poisson distribution model. From the non-conformance level captured through the responses from the faculty/teaching staff about the various aspects of quality of work life prevailing in their respective colleges, the corresponding sigma rating for each component of QoWL was calculated. Subsequently, an innovative six point quality rating system was established for each sigma values. The overall opinion of teaching staff about the QoWL prevailing at UOD is rated as “Adaptable” signifying that there is room for further improvement and appropriate strategies need to be employed to improve it.

**Keywords:** Quality of Work life, Teaching staff, Six Sigma, Universities, Saudi Arabia

## 1. Introduction

Higher education is the key for success of any nation which boosts the economic potential of entire nation leading to the development of the whole country (Singh and Singh, 2015). These educational industries work as a supplier for other

industries and as such, the higher education sector in Saudi Arabia is rapidly growing due to increasing numbers of students entering the educational institutions. Presently, there are 24 public universities accommodating 669, 271 students (Ministry of Higher Education [MOHE], 2014). In addition to this, the Ministry of Education also manages 18 teachers colleges for men and 80 teachers colleges for women. Moreover, there are few specialized institutes and colleges for military and

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<sup>1</sup> Corresponding author: Arun Vijay Subbarayalu  
email: [sjarunvijay@gmail.com](mailto:sjarunvijay@gmail.com)

security education (Mosa, 2000). Furthermore, there are few technical colleges [N=12] and institutes for health [N=37] (MOHE, 2014; Alamri, 2011). From these figures, it is obvious that not only the number of institutions is increasing; but the supplies for the highly skilled work force to manage the demand are also increasing exponentially in Saudi Arabia. As result of increase in enrollment of students in these Universities, particularly at bachelor's level, there has been significant increase in teaching loads of the academics (Al Kuwaiti and Subbarayalu, 2015a). As result of this, there is a significant drift of the nation's best academics to high paying industry positions for the reason that an inadequate and/or inappropriate incentive and reward systems prevailing within the Saudi university sector (Al Ankari, 2013). To combat that, many Saudi universities consider sustainability aspects such as criteria in hiring, promoting, and extension of tenure of faculty and staff members (Alshuwaikhat et al., 2016). It is realized that the faculty are one of the main pillars of university education, as well as one of the major constituents of the education process due to the pivotal role they play in realizing the major objective of the educational and research process (National report of Ministry of Higher Education, 2009). Thus, in order to retain the best academics to carry out the teaching role in Saudi universities, the Quality of Work Life (QoWL) of the teaching staff needs to be understood by the higher education policy planners so that appropriate measures can be taken to optimize their QoWL.

The QoWL is a multi-dimensional concept which has been defined by scholars in diverse ways showing discrepancy on its constructs as well as components (Levine et al., 1984; Mirvis and Lawler, 1984; Taylor, 1978; Walton, 1975). The basic idea of the Quality of work life (QoWL) model is grounded from the Maslow's Hierarchy of needs Theory in which it mainly turn around five needs within each individual (Maslow, 1954). Walton (1975) identified eight

dimensions that make up the quality of working life framework viz. (i) Adequate income and fair compensation; (ii) Safe and healthy working conditions, (iii) Immediate opportunity to use and develop human Capacities. (iv) Opportunity for continued growth and security, (v) Social integration in the work organization; (vi) Constitutionalism in the work organization, (vii) Work and the total life space. Nanjudeswaraswamy & Swamy (2013a) reviewed nine components of the QoWL influencing an employee in the organization viz. work environment, organization culture and climate, relation and co-operation, training and development, compensation and rewards, facilities, job satisfaction and job security, autonomy of work and adequacy of resources. It was concluded that the contribution of these nine components were positively associated with the employee's satisfaction and their opinion on QoWL in different sectors. Lau defined QoWL as the favorable conditions and environments of a workplace that support and promote employees' satisfaction by providing them with job security and reward (Lau, 2000). Later, Serey (2006) defined the QoWL as to meet the contemporary work environment and it includes (i) an opportunity to exercise one's talents and capacities, to face challenges and situations that require independent initiative and self-direction; (ii) an activity thought to be worthwhile by the individuals involved; (iii) an activity in which one understands the role the individual plays in the achievement of some overall goals; and (iv) a sense of taking pride in what one is doing and in doing it well. Based on these definitions, it is concluded that the QoWL is associated with job satisfaction, job involvement, motivation, productivity, health, safety and well-being, job security, competence development and balance between work and non-work life (Vijay and Sekar, 2013; Rethinam and Ismail, 2008; European Foundation for the Improvement of Living Conditions, 2002). Precisely, the Quality of Work life (QoWL) has a dynamic multiple

structure which involves concepts such as job security, reward systems, workflows, opportunities for educational and job development, as well as participation in decision-making (Mirkamali and Thani, 2011).

An earlier study demonstrated that the quality of education would increase when the faculty members are having a better quality of work life and this could be possible by providing better welfare facilities to them (Patro, 2015). Also, it is claimed that if the quality of work life is better in an organization; then the occupational stress shall be relatively lesser among the employees in such organizations (Wang et al., 2014). In other way, it is inferred that if perceived QoWL is better in the organization, overall organizational health is better or improving (Hans et al., 2015). Thus, the QoWL involves concepts such as job security, reward systems, workflows, opportunities for educational and job development, as well as participation in decision-making (Mirkamali and Thani, 2011).

Few studies have been conducted to address the quality of work life of teaching staff working in higher education institutions across globe (Boas and Morin, 2013; Shahbazi et al., 2011). But no such studies have been reported in Saudi higher education sector. It is also observed that there is no separate rating scale exists to evaluate the quality of work life of teaching staff working in the higher education sector and there is a need for a new innovative quality rating system to facilitate this process. Accordingly, a gap was identified by the researchers regarding the investigation of this most important dimension of quality of work life among academics in Saudi Arabia. In order to accomplish that, the researchers attempted to develop a quality rating system using six sigma methods. Six-sigma is a business improvement strategy used to improve profitability, to drive out waste, to reduce costs of poor quality and to improve the effectiveness and efficiency of all

operations so as to meet or even exceed customers' needs and expectations (Anthony and Banuelas, 2001). Since teaching staff assumes a pivotal role in these education sectors, their opinion and satisfaction is paramount for measuring the QoWL prevailing in the higher education institutions. However, such rating system which is purely based on teaching staff' opinion on the QoWL is lacking. Previous studies adopted six sigma concepts to arrive at a quality-rating scale based on the student's perception (Al Kuwaiti and Subbarayalu, 2015b; Vijay, 2013). Likewise, the present study utilizes a Six Sigma Poisson distribution Model to arrive at a six-point quality-rating scale based on the number of "defects" (i.e. non-conformance) captured from the responses of the teaching staff. Authors calculated both "defects per opportunity" (DPO) and "parts per million defectives" (PPM) to drive this rating scale in which each one of the point corresponds to one sigma value in a continuum ranging from  $1\sigma$  to  $6\sigma$ . Accordingly, this study attempted to drive a new rating scale grounded from six sigma model to categorize the teaching staff's opinion about the QoWL at a higher education institution in Saudi Arabia.

## 2. Materials and Methods

### 2.1. Study Design

A Cross sectional Survey design was adopted

### 2.2. Study Population

Teaching staff (N=2839) belonging to all the four academic clusters (i.e. Health, Arts & Education, Science & Management, and Engineering & Technical) of University of Dammam [UOD] were the focus of this study. Samples were selected using a two-stage Cluster sampling method where at the first stage; the academic units belonging to four academic clusters were selected based

on its Homogeneity (i.e. Health, Engineering, Arts and Education, Science and Management) and at the second stage, samples (i.e. Teaching staff) from each academic cluster of the University were invited to participate in an online survey. A total of 360 teaching staff were randomly selected and were distributed with the QoWL tool using 'Questionpro', an online survey application. 338 completed Questionnaires were received, demonstrating a 93% response rate. The survey is anonymous where no personal information about the participants were recorded (i.e. name, employment ID etc). To access this online questionnaire, all the participants were first exposed to an informed consent form and it was made mandatory for the participants to complete it in such a way to make an informed decision whether they agree to be a subject in this research.

### 2.3. The Questionnaire tool

For the purpose of this study, a self-designed questionnaire tool entitled, "Quality of Work Life [QoWL]" tool was developed (Appendix) and tested for validity and reliability. To validate this tool, a pilot study was conducted prior to the conduct of this study. While testing the questionnaire using factor analysis with the rotation varimax method, the total variance explained the sum of squared loadings as 60.31 percent. Reliability testing also showed that overall alpha coefficient value of 0.93 for internal consistency and invariably positive and significant inter-factor correlations. The instrument consists of twenty three (N = 23) Likert scale items capturing different attributes of the QoWL. Each item consists of a statement with five response options requiring the teaching staff to indicate their degree of agreement with it in an ascending order: 1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree. The 24<sup>th</sup> item is a global item that seeks teaching staff overall opinion on the QoWL prevailing at UOD. The five sub-scales

studied in the questionnaire include (i) Working conditions (ii) Psychosocial factors at workplace; (iii) Opportunities for training and development (iv) Compensation & Rewards and, (v) Job satisfaction and Job security.

### 2.4. Statistical Analysis

The researcher had chosen the six sigma Poisson distribution model to analyze the non-conformance level which was captured from the responses of the teaching staff on various aspects of quality of work life elements prevailing at UOD. The Poisson distribution model was applied assuming that, when several choices are given in the questionnaire, the chance for the teaching staff to report dissatisfaction on every choice is minimum (Benbow and Kubaik, 2005; Levine, 2008; Pyzdek, 2003). The response options provided for each question in the questionnaire range from 1 to 5 where the selection of the options 1, 2 and 3 was considered as "Non-conformance". Similarly, the selection of the options 4 and 5 by the teaching staff was considered as "Conformance". The logic behind this selection is based on the threshold fixed by the researchers to get complete satisfaction (i.e. option either 4 or 5) of the teaching staff about the quality of work life. Moreover, the option 3 (i.e. Neutral) describes that the respondents expressed their opinion in an uncertain manner for a particular issue, therefore it was considered as "Non-conformance". As such, those who opt neutral option have been counted as non-conformance in this study. The quality-rating scale developed in this study consists of six points in a continuum where each point in the scale corresponds to one sigma value. Higher the sigma value, the better is the quality of work life of the teaching staff working at UOD. The description of the quality-rating scale is shown in Table 1.

**Table 1.** The six sigma rating scale for grading the teaching staff’s opinion about the quality of work life prevailing at UOD, Saudi Arabia

Quality Rating Scale	Rating Range Descriptions	Description of the Quality Work life rating
6	Above 5 and up to 6	Excellent, delightful, healthy & world class quality of work life experience provided to the teaching staff
5	Above 4 and up to 5	Benchmarked and competing quality of work life experience offered to the teaching staff
4	Above 3 and up to 4	The Quality of Work Life is adequate with medium necessary provisions needs to be carried out to gain complete satisfaction from the teaching staff.
3	Above 2 and up to 3	The Quality of work is adaptable and is just sufficient to accomplish the objectives of teaching & other academic activities without hindering job performance among the teaching staff.
2	Above 1 and up to 2	Highly compromised quality of work life that has the possibility to hinder the performance of the teaching staff.
1	Less than or equal to 1	The Quality of Work is totally inadequate for the teaching staff to perform their academic activities in an effective and efficient manner.

### 3. Results

The perceptions of the teaching staff about all the items included in the QoWL questionnaire tool were analyzed. From the response of the teaching staff, the opportunities and defects were calculated for each item in the questionnaire. An “Opportunity” is defined as the satisfaction of the teaching staff about the QoWL prevailing in their respective college, and a “defect” is defined as anything that could lead to dissatisfaction among the teaching staff about their QoWL. Consequently, the Defect per Opportunity (DPO) was calculated which is expressed as the ratio of the defects actually found to the number of opportunities (Bass, 2007). Further, the PPM defectives and the corresponding sigma value for each attribute of QoWL was calculated using Minitab analytical software. The description of sigma rating for the teaching staff’s perception on various dimensions of quality of work life prevailing at UOD, Saudi Arabia is shown in Table 2.

Table 2 shows the sigma rating for the teaching staff’s perception about the various components of quality of work life

prevailing in their respective college attached with UoD. The training and developmental opportunities offered at UOD were rated by the teaching staff as “Adaptable” as shown by the sigma value ( $\sigma = 2.18$ ), and it is just sufficient to accomplish the objectives of the teaching & other academic activities without hindering job performance among the teaching staff. Likewise, the following QoWL elements were rated by the teaching staff as “Adaptable” viz. (i) Working conditions ( $\sigma = 2.08$ ); and (ii) Psychosocial factors at work place ( $\sigma = 2.04$ ). Besides these, the teaching staff rated certain QoWL elements as “Highly Compromised” indicating that it would affect their academic career in the short run, if the existing atmosphere is not improved. These elements include: (i) Compensation and rewards offered at UOD ( $\sigma = 1.84$ ) and; (ii) Job Satisfaction & Job Security ( $\sigma = 1.91$ ). The overall opinion of the teaching staff on the QoWL elements was rated as “Adaptable” as shown by the sigma value ( $\sigma = 2.03$ ).

From this, it is inferred that the existing quality of work life prevailing at UOD is just

sufficient to accomplish the objectives of the teaching & other academic activities without

hindering the performance of the teaching staff.

**Table 2.** Sigma rating for the teaching staff’s perception on various dimensions of quality of work life prevailing at UOD, Saudi Arabia

Quality of Work Life Components	No. of respondents	No of Questions	Opportunities	Defects (Non-Conformance)	DPO*	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (probability)	PPM** for complete satisfaction	Quality rating (sigma rating)
Working Conditions	338	6	2028	670	0.330375	0.718654	0.281346	281346	2.08
Psychosocial Factors at Work Place	338	5	1690	592	0.350296	0.70448	0.29552	295520	2.04
Opportunity for Training and Development Programs	338	2	676	192	0.284024	0.752749	0.247251	247251	2.18
Compensation and Rewards	338	4	1352	636	0.456897	0.633246	0.366754	366754	1.84
Job Satisfaction & Job Security	338	4	1352	577	0.414511	0.660663	0.339337	339337	1.91
Overall Satisfaction	338	1	338	119	0.352071	0.70323	0.29677	296770	2.03

\* Defect per Opportunity; \*\*Parts per million defectives

Further exploration was carried by analyzing the perception of the teaching staff about the five core components of the QoWL. The description of sigma rating for the teaching staff’s perception on working conditions prevailing at UOD, Saudi Arabia is shown in Table 3.

Table 3 provided the sigma rating for the teaching staff’s feedback about the working conditions existing in their Colleges. Four components such as ‘Support offered by the Department Chair’ ( $\sigma = 2.32$ ), ‘Assignment of Responsibilities’ ( $\sigma = 2.16$ ), ‘Provision of resources for teaching’ ( $\sigma = 2.32$ ), and

‘Provision of excellent working conditions’ ( $\sigma = 2.21$ ) were rated by the teaching staff as “Adaptable” where medium necessary provisions needs to be undertaken to gain complete satisfaction among those employed at UOD. Three critical components i.e. ‘Support offered for conducting research’ ( $\sigma = 1.84$ ), ‘Transparency’ ( $\sigma = 1.73$ ) and ‘Participation in decision making process’ ( $\sigma = 1.77$ ) were rated by the teaching staff as “Highly Compromised” and have the possibility to hinder their performance in short run.

**Table 3.** Sigma rating for the teaching staff’s perception on the working conditions prevailing at UOD, Saudi Arabia

Components of Working Environment	No. of respondents	No of Questions	Opportunities	Defects (Non-Conformance)	DPO*	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (probability)	PPM** for complete satisfaction	Quality rating (sigma rating)
Support offered by the Department Chair	338	1	1	78	0.230769	0.793923	0.206077	206077	2.32
Fair Assignment of Responsibility	338	1	1	99	0.292899	0.746097	0.253903	253903	2.16
Adequate provision of resources for teaching	338	1	1	78	0.230769	0.793923	0.206077	206077	2.32
Adequate support offered for conducting research	338	1	1	154	0.455621	0.634054	0.365946	365946	1.84
Transparency in decision making	338	1	1	177	0.523669	0.592343	0.407657	407657	1.73
Participation in decision making process	338	1	1	169	0.500000	0.606531	0.393469	393469	1.77
Provision of excellent working environment	338	1	1	92	0.272189	0.76171	0.23829	238290	2.21

\* Defect per Opportunity; \*\*Parts per million defectives

Further attempt was made to drive sigma rating for teaching staff’s perception on psychosocial factors prevailing at UOD, Saudi Arabia and it is described in Table 4. Table 4 shows the sigma rating for the teaching staff’s experience about the psychosocial factors prevailing at UOD. Three components such as ‘Existence of social support at work place’ ( $\sigma = 2.16$ ); ‘Job requires a great deal of concentration’ ( $\sigma = 2.15$ ); and ‘Ability to maintain healthy work-

life balance’ ( $\sigma = 2.03$ ) were rated by the teaching staff as “Adaptable”. Contrary to this, two other components such as ‘Ability to voice opinions and influence changes in the work area’ ( $\sigma = 1.95$ ) and ‘Work pressure felt by the teaching staff in their current job’ ( $\sigma = 1.97$ ) were rated as “Highly Compromised” and appropriate measures need to be taken to optimize it.

**Table 4.** Sigma rating for the teaching staff’s perception on psychosocial factors prevailing at UOD, Saudi Arabia

Components of Psychosocial work environment	No. of respondents	No of Questions	Opportunities	Defects(Non Conformance)	DPO*	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (probability)	PPM** for complete satisfaction	Quality rating (sigma rating)
Ability to voice opinions and influence changes in the work area	338	1	1	134	0.39645	0.672704	0.327296	327296	1.95
Pressurized to work very fast	338	1	1	130	0.384615	0.680712	0.319288	319288	1.97
Getting adequate social support at the work place	338	1	1	100	0.295858	0.743893	0.256107	256107	2.16
Achieve a healthy balance between my work and home life	338	1	1	119	0.352071	0.70323	0.29677	296770	2.03
Job requires a great deal of concentration to keep eyes on lot of things	338	1	1	101	0.298817	0.741695	0.258305	258305	2.15

\* Defect per Opportunity; \*\*Parts per million defectives

The six sigma rating scale categorizing teaching staff’s perception with regard to training and development programs offered at UOD, Saudi Arabia is explained in Table 5.

Teaching staff’s perception about the training and development programs offered at UOD are shown in Table 5. It is observed that two specific elements such as ‘Regular

conduct of training programs by the university’ ( $\sigma = 2.18$ ) and ‘Motivation provided by the department chair to attend those training programs’ ( $\sigma = 2.12$ ) were rated by the teaching staff as “Adaptable”, indicating that the present scenario is just sufficient to accomplish the objectives of their teaching activities without hindering job performance.

**Table 5.** Sigma rating for the teaching staff’s perception on training and development programs offered at UOD, Saudi Arabia

Components of training & development opportunities	No. of respondents	No of Questions	Opportunities	Defects (Non-Conformance)	DPO*	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (probability)	PPM** for complete satisfaction	Quality rating (sigma rating)
University is conducting regular and periodic training program to the teaching staff	338	1	1	97	0.286982	0.750525	0.249475	249475	2.18
Department Chair provides Full support & Motivation to attend training	338	1	1	105	0.310651	0.73297	0.26703	267030	2.12

\* Defect per Opportunity; \*\*Parts per million defectives

Six sigma rating scale categorizing teaching staff’s perception with regard to compensation and rewards offered at UOD, Saudi Arabia is described in Table 6.

Table 6 shows the sigma rating for teaching staff’s opinion about the compensation and rewards offered at UOD. It is found that the teaching staff rated both ‘Compensation’ ( $\sigma = 2.05$ ) and ‘Fringe benefits’ ( $\sigma = 2.02$ ) offered at UOD ( $\sigma = 2.12$ ) as “Adaptable”, indicating that the present remuneration system existing at UOD is sufficient. Moreover, two specific issues consists of ‘Existence of fair and transparent methodology for academic promotions’ and ‘the compensation offered by the University’ were rated by teaching staff as “Highly Compromised” ( $\sigma = 1.79$ ;  $1.50$  respectively). So, it needs to be enhanced to gain complete satisfaction from the teaching staff.

Six sigma rating scale showing teaching staff’s opinion about Job Satisfaction & Job Security prevailing at UOD, Saudi Arabia is shown in Table 7.

Table 7 provided the sigma rating for the teaching staff’s feedback about the job satisfaction & job security prevailing at their respective Colleges in UOD. Two components such as ‘Job Security’ ( $\sigma = 2.10$ ) and, ‘Utility of Knowledge and Skills’ ( $\sigma = 2.36$ ) were rated by the teaching staff as “Adaptable” where medium necessary provisions prerequisites to gain complete satisfaction among those employed at UOD. Two other components i.e. ‘Work assignment to plan and design work schedules’ ( $\sigma = 1.93$ ) and the ‘Authority & responsibility provided in their respective colleges’ ( $\sigma = 1.92$ ) were rated by the teaching staff as “Highly Compromised”.

**Table 6.** Sigma rating for the teaching staff's perception about the compensation and rewards offered at UOD, Saudi Arabia

Components of Compensation & rewards offered	No. of respondents	No of Questions	Opportunities	Defects (Non-Conformance)	DPO*	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (probability)	PPM** for complete satisfaction	Quality rating (sigma rating)
Compensation offered at UOD	338	1	1	116	0.343195	0.7095	0.2905	290500	2.05
Existence of fair and transparent methodology for academic promotions	338	1	1	165	0.488166	0.613751	0.386249	386249	1.79
All staff are treated equally & there is no discrepancy in compensation	338	1	1	233	0.689349	0.501903	0.498097	498097	1.50
Fringe benefits offered by the university	338	1	1	122	0.360947	0.697016	0.302984	302984	2.02

\* Defect per Opportunity; \*\*Parts per million defectives

**Table 7.** Sigma rating for the teaching staff's opinion about Job Satisfaction & Job Security prevailing at UOD, Saudi Arabia

Components of Job Satisfaction/Security prevailing at UOD	No. of respondents	No of Questions	Opportunities	Defects (Non-Conformance)	DPO*	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (probability)	PPM** for complete satisfaction	Quality rating (sigma rating)
Teaching staff opinion about Job Security	338	1	1	109	0.322485	0.724347	0.275653	275653	2.10
Teaching staff possess complete autonomy to plan and design my work schedules	338	1	1	137	0.405325	0.66676	0.33324	333240	1.93

**Table 7.** Sigma rating for the teaching staff’s opinion about Job Satisfaction & Job Security prevailing at UOD, Saudi Arabia (continued)

Components of Job Satisfaction/Security prevailing at UOD	No. of respondents	No of Questions	Opportunities	Defects (Non-Conformance)	DPO*	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (probability)	PPM** for complete satisfaction	Quality rating (sigma rating)
Work assignment makes good use of knowledge and skills of the teaching staff	338	1	1	73	0.215976	0.805754	0.194246	194246	2.36
Teaching staff are satisfied with the authority and responsibilities provided to them.	338	1	1	139	0.411243	0.662826	0.337174	337174	1.92

\* Defect per Opportunity; \*\*Parts per million defectives

From these results, it is observed that an appropriate measures needs to be taken in near future to gain complete job satisfaction among the teaching staff at UOD.

**Table 8.** Sigma rating for the teaching staff’s opinion about overall satisfaction of quality of work life prevailing at UOD, Saudi Arabia

Components of training and development opportunities	No. of respondents	No of Questions	Opportunities	Defects (Non-Conformance)	DPO*	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (probability)	PPM** for complete satisfaction	Quality rating (sigma rating)
Overall satisfaction about the Quality of Work Life prevailing at UOD	338	1	1	119	0.352071	0.70323	0.29677	296770	2.03

\* Defect per Opportunity; \*\*Parts per million defectives

Table 8 shows the sigma rating for the teaching staff's opinion about the QoWL existing at UOD. The overall opinion of the teaching staff on the QoWL elements was rated as "Adaptable" as shown by the sigma value ( $\sigma = 2.03$ ). From this, it is inferred that it is just sufficient to accomplish the objectives of the teaching and learning

process without hindering job performance among the teaching staff at UOD.

Authors attempted to find out the overall rating of teaching staff about the quality of work life with respect to variables such as gender, ethnicity, academic qualifications, job position and the academic cluster where they belong (Table 9).

**Table 9.** Sigma rating for the teaching staff's opinion about overall satisfaction of the quality of work life expressed in terms of gender, ethnicity, academic qualifications, job position and academic clusters where they belong

Variables	Classifications	No of questions	Total. No of responders	Opportunities (No of respondents)	Defects (No of Non-Conformance)
<b>GENDER</b>	Male	1	338	200	73
	Female	1	338	138	46
<b>ETHNICITY</b>	Saudi	1	338	134	52
	Non-Saudi	1	338	204	67
<b>TEACHING STAFF QUAIFICATION</b>	Doctorate	1	338	218	55
	Post Graduate	1	338	100	56
	Undergraduate	1	338	20	10
<b>ACADEMIC CLUSTERS</b>	Health science	1	338	74	30
	Engineering	1	338	70	20
	Arts and Education	1	338	95	33
	Science and Management	1	338	99	36
<b>WORK EXPERIENCE</b>	Professor	1	338	44	6
	Associate professor	1	338	48	20
	Assistant professor	1	338	118	34
	Lecturer	1	338	106	54
	Demonstrator	1	338	18	3
	Others	1	338	4	2

**Table 9.** Sigma rating for the teaching staff’s opinion about overall satisfaction of the quality of work life expressed in terms of gender, ethnicity, academic qualifications, job position and academic clusters where they belong (continued)

Variables	Classifications	DPO	Chance for a teaching staff to be totally Satisfied	Non-Conformance per teaching staff (Probability)	PPM for complete Satisfaction	Quality Rating (Sigma rating)
<b>GENDER</b>	Male	0.365	0.694197	0.305803	305803	2.01
	Female	0.333333	0.716531	0.283469	283468	2.07
<b>ETHNICITY</b>	Saudi	0.38806	0.678372	0.321628	321628	1.96
	Non-Saudi	0.328431	0.720052	0.279948	279948	2.08
<b>TEACHING STAFF QUAIFICATION</b>	Doctorate	0.252294	0.777017	0.222983	222983	2.26
	Post Graduate	0.56	0.571209	0.428791	428791	1.68
	Undergraduate	0.50	0.606531	0.393469	393469	1.77
<b>ACADEMIC CLUSTERS</b>	Health science	0.405405	0.666706	0.333294	333293	1.93
	Engineering	0.285714	0.751477	0.248523	248523	2.18
	Arts and Education	0.347368	0.706545	0.293455	293455	2.04
	Science and Management	0.363636	0.695144	0.304856	304856	2.01
<b>JOB TITLE</b>	Professor	0.136364	0.872525	0.127475	127475	2.64
	Associate professor	0.416667	0.659241	0.340759	340759	1.91
	Assistant professor	0.288136	0.74966	0.25034	250340	2.17
	Lecturer	0.509434	0.600836	0.399164	399164	1.75
	Demonstrator	0.166667	0.846482	0.153518	153518	2.52
	Others	0.50	0.606531	0.393469	393469	1.77
<b>WORK EXPERIENCE</b>	<1 year	0.20	0.818731	0.181269	181269	2.41
	1 to 2 years	0.50	0.606531	0.393469	393469	1.77
	2 to 5 years	0.422018	0.655722	0.344278	344278	1.9
	5 to 10 years	0.230769	0.793923	0.206077	206077	2.3
	> 10 years	0.388889	0.67781	0.32219	322190	1.96

With respect to gender, both male and female respondents rated their overall QoWL as “Adaptable” as shown by the sigma value (male = 2.01; female =2.07). While taking consideration of ethnicity, Saudis rated their QoWL as “Highly Compromised” ( $\sigma = 1.96$ ), where Non-Saudis rated it as “Adaptable” ( $\sigma = 2.08$ ). Teaching staff with doctorate degree rated their QoWL as “Adaptable” ( $\sigma = 2.26$ ); post graduate and under graduate degree holders rated it as “Highly Compromised” (Postgraduate degree holders=1.68; undergraduate degree holders=1.77). While observing the response of the participants with respect to their job title, professors, assistant professors and demonstrators rated their QoWL as “Adaptable” ( $\sigma = 2.64$ ; 2.17 and 2.52 respectively); whereas associate professors, lecturers and others rated it as “Highly Compromised” ( $\sigma = 1.91$ ; 1.75 and 1.77 respectively). Furthermore, the respondents from academic clusters such as engineering, arts and education, science and

management rated their QoWL as “Adaptable” ( $\sigma = 2.18$ ; 2.04 and 2.01 respectively). However, the teaching from health science cluster perceived it differently where they rated their QoWL as “Highly Compromised” ( $\sigma = 1.93$ ).

Further, the work experience of the teaching staff is found to be influencing the QoWL. Specifically, both junior teaching (i.e. work experience <1year) [ $\sigma = 2.41$ ] and those who have 5 to 10 years of experience rated their QoWL as “Adaptable” [ $\sigma = 2.30$ ]. Contrary to this, the teaching staff whose work experience falls in the category of ‘one to two years’ [ $\sigma = 1.77$ ]; ‘2 to 5 years’ [ $\sigma = 1.90$ ]; and ‘more than 10 years’ [ $\sigma = 1.96$ ] rated the QoWL as “Highly Compromised”. Further, a chi-square test ( $\chi^2$ ) was applied to find out the association between these variables with regard to the overall quality of work life (Table 10).

**Table 10.** Chi-square test ( $\chi^2$ ) showing the association between the variables influencing the overall quality of work life of teaching staff working at UOD, Saudi Arabia

Variables	Classifications	No of Respondents (N=338)	Agreement score (Cumulative percentage of those who opted either ‘4’ or ‘5’) %, (N)	Agreement score of Mean $\pm$ S.D	$\chi^2$
<b>Gender</b>	Male	200	63.5 (127)	3.52 $\pm$ 1.13	<b>344.48*</b>
	Female	138	66.6 (92)	3.59 $\pm$ 0.95	
<b>Ethnicity</b>	Saudi	134	61.19 (82)	3.36 $\pm$ 1.07	<b>353.36*</b>
	Non-Saudi	204	67.16 (137)	3.67 $\pm$ 1.04	
<b>Teaching staff Qualifications</b>	Doctorate	218	74.8 (163)	3.74 $\pm$ 0.91	<b>379.43*</b>
	PG	100	44 (44)	3.14 $\pm$ 1.22	
	UG	20	50 (10)	3.33 $\pm$ 1.24	
<b>Academic Clusters</b>	Health Science	74	59.5 (44)	4.00 $\pm$ 0.00	<b>21.84</b>
	Engineering	70	71.4 (50)	3.49 $\pm$ 1.15	
	Arts and Education	95	65.3 (62)	3.77 $\pm$ 0.95	
	Science and Management	99	63.63 (63)	3.54 $\pm$ 0.98	

**Table 10.** Chi-square test ( $\chi^2$ ) showing the association between the variables influencing the overall quality of work life of teaching staff working at UOD, Saudi Arabia (continued)

Variables	Classifications	No of Respondents (N=338)	Agreement score (Cumulative percentage of those who opted either '4' or '5') %, (N)	Agreement score of Mean $\pm$ S.D	$\chi^2$
<b>Job Title</b>	Professor	44	86.4 (38)	3.43 $\pm$ 1.13	<b>382.38*</b>
	Associate Professor	48	58.3 (28)	3.95 $\pm$ 0.65	
	Assistant Professor	118	71.2 (84)	3.54 $\pm$ 0.92	
	Lecturer	106	49 (52)	3.64 $\pm$ 1.06	
	Demonstrator	18	83.3 (15)	3.19 $\pm$ 1.18	
	Others	4	50 (2)	4.00 $\pm$ 0.91	
<b>Work experience</b>	<1 year	30	80 (24)	3.50 $\pm$ 0.58	<b>367.65*</b>
	1 to 2 years	36	50 (18)	3.73 $\pm$ 1.02	
	2 to 5 years	109	57.8 (63)	3.33 $\pm$ 1.31	
	5 to 10 years	91	77 (70)	3.45 $\pm$ 1.08	
	>10 years	72	61 (44)	3.77 $\pm$ 0.94	

\*Significant at 0.05 level

From the results, it is observed that a significant association was found between the opinion of both male and female teaching staff with regard to their overall quality of work life prevailing at UOD. Specifically, 67% of female teaching staff found satisfied with their quality of work life whereas 64% of males were registered their satisfaction regarding this issue. Likewise, a significant association was also found between ethnicity where 67% of Non-Saudi academics were satisfied with the overall QoWL. Similarly, 61% of Saudi academics were recorded their satisfaction. With regard to the academic qualification of teaching staff, a significant association was found where 75% of teaching staff with doctoral qualification were found satisfied with the overall quality of life prevailing at UOD. Conformance to this finding, a significant association was found in the quality of life among various

academic positions of the teaching staff. 86% of professors were found satisfied with the overall QoWL whereas 71% of assistant professors registered their satisfaction. It is interesting to note that the work experience of the teaching staff show a significant association. One specific variable consisting of the academic cluster where the teaching staff belongs does not show an association. This may be due to the differences, which exist between the academic clusters with respect to the QoWL elements like working conditions; psychosocial factors at workplace; opportunities for training and development and job satisfaction and job security. However, over 60% of teaching staff belongs to the four academic clusters were happy and satisfied with the quality of work life prevailing in their respective colleges.

#### 4. Discussion of findings

This study was conducted to survey the teaching staff's perceptions and attitude toward the quality of work life existing in the Saudi higher education sector. In order to facilitate this, the teaching staff belonging to four academic clusters (i.e. Health, Arts & Education, Science & Management, and Engineering & Technical) of University of Dammam [UOD] was targeted. To the best of our knowledge, this is the first Saudi Arabia-based study to document the teaching staff's opinion on the QoWL prevailing at its higher education institutions. The QoWL questionnaire tool was utilized to capture the five major attributes of the quality of work life prevailing in the Saudi higher education sector (Appendix). Teaching staff members responses were recorded using a five-point scale, viz., (1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree and (5) Strongly agree. The reliability and validity of this questionnaire tool had been tested through pre-testing, which indicated that there is a high level of internal consistency (Cronbach's  $\alpha=0.93$ ) for this scale with the specific sample items ( $N=23$ ). For the purpose of rating the teaching staff opinion on various aspects of the quality of work life prevailing at UOD, a six-point rating scale was developed (Table 1) based on the guidelines of the earlier study done by Vijay (2013). Unlike previous study, the current study seeks to develop a new quality-rating scale to capture the teaching staff experiences regarding five critical elements of QoWL consist of: (i) Working conditions (ii) Psychosocial factors at workplace; (iii) Opportunities for training and development (iv) Compensation & Rewards and, (v) Job satisfaction and Job security.

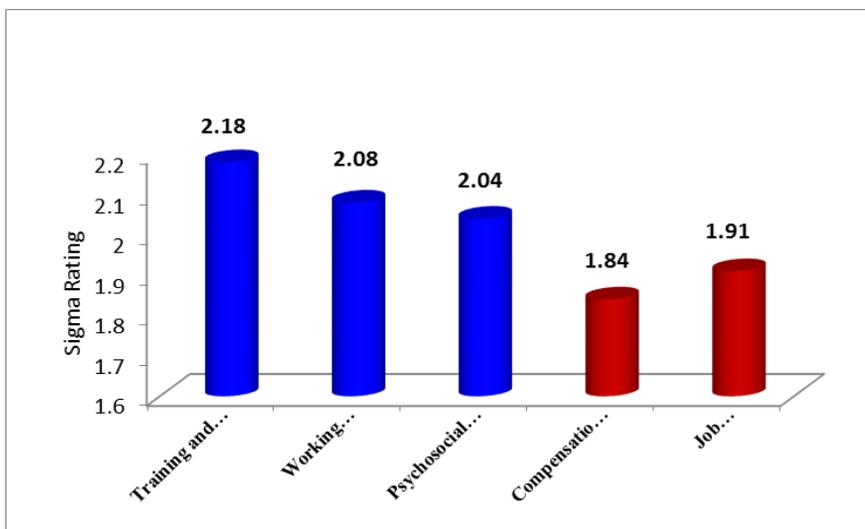
The summary of the findings illustrating the perception of teaching staff about the quality of work life is depicted in Figure 1. While analyzing the response from teaching staff about five core elements of their QoWL existing at UOD, the teaching staff rated three specific elements facilitating QoWL at

UOD as "Adaptable" viz. (i) Opportunity for training and development offered at UOD ( $\sigma = 2.18$ ); (ii) Working conditions ( $\sigma = 2.08$ ) and;(iii) Psychosocial factors at work place ( $\sigma = 2.04$ ). Further, the respondents criticized a few of the QoWL elements as "Highly Compromised". These include (i) Compensation and Rewards offered at UOD ( $\sigma = 1.84$ ) and; (ii) Job Satisfaction & Job Security ( $\sigma = 1.91$ ). The overall opinion of the teaching staff on the QoWL elements was rated as "Adaptable" as shown by the sigma value ( $\sigma = 2.03$ ). The global item (24<sup>th</sup> item) provides scope to record the overall opinion felt by the teaching staff, and their observation about the QoWL prevailing in their respective colleges. Teaching staff rated the overall opinion about the QoWL as "Adaptable" ( $>2$  and  $<3$  in sigma level). Previous studies indicated that once the global item scores demonstrated a high level of satisfaction, then one can explore the individual items for important clues to plan further improvements (Rubaish et al., 2012). Accordingly, a further exploration was carried out by analyzing the opinion of the teaching staff about each of the individual items in the questionnaire. From the analysis, it is observed that majority of the individual items ( $N=14$ ) were rated by the teaching staff as "Adaptable." It is interesting to note that 13 out of 23 Likert scale items in the questionnaire are correlated (between 2 sigma and 3 sigma level) and it is in conformance to the findings of the previous studies (Al Kuwaiti & Subbarayalu, 2015b; Vijay, 2013; Nair and Bennet, 2011; Rubaish, 2010). Thus, the observation of the global item results could give a clue about the overall quality of work experienced by the teaching staff working in Saudi higher education sector.

In this study, sigma rating of QoWL elements differs from each other i.e. Training and development ( $\sigma = 2.18$ ); working conditions ( $\sigma = 2.08$ ); Psychosocial factors at workplace ( $\sigma = 2.04$ ); Compensation and rewards ( $\sigma = 1.84$ ) and Job satisfaction and Job security ( $\sigma = 1.91$ )

respectively. Similarly, minimal to maximum variation is observed in the perception of respondents among gender, ethnicity, qualifications, academic clusters, job title and work experience for overall satisfaction on QoWL (Table 9). Several reasons might to be attributed to the variation in the perception of the QoWL among the respondents' viz. (i) Observed differences in working environment with respect to their college or department since the QoWL for academicians is an attitudinal response to the prevailing work environment that include role stress, job characteristics, supervisory structure and attitudes and behavior (Winter et al., 2000); (ii) Organizational features such as policies and procedures, leadership style, operations and general contextual factors of setting, all have a profound effect on how staff views the QoWL (Cavry, 1995); (iii) Variation in training and developmental opportunity (Kulkarni, 2013); (iv) Amount of stress faced by the staff in their current job that

various among different disciplines across the university (Manzoor et al., 2011); (v) Type of Leadership behavior exists in the College/ Department tends to affect trust and satisfaction of employees to organization and it is considered a one of the factors contributing to the QoWL (Omolayo, 2007; Yuan-Duen and Shih-Hao, 2007); (vi) The demographic variables such as gender, age, education level, years of experience in the current university and income level also found to be associated with this difference in perception (Tabassum et al., 2012). A recent study by Nanjudeswaraswamy and Swamy (2013b) found that male employees are more satisfied than the female employees with respect to the QoWL prevailing in technical educational institutions. It is also revealed that all the dimensions of QoWL are positively correlated which indicates that enhancement of the QoWL dimensions can lead to increase in overall QoWL of faculty (Nanjudeswaraswamy and Swamy, 2013b).



**Figure 1.** Teaching staff rating of various dimensions of the Quality of work life of a higher education institution in Saudi Arabia

The present study adds value to the literature in several ways viz (i) the newly developed rating scale places teaching staff's perceptions on the QoWL in six categories in

which appropriate rating descriptions are developed for each category. Each rating description is developed, keeping in view of the existence of the quality of work life as

perceived by the teaching staff at UOD; (ii) each of the “six” points in the rating scale is established statistically using a suitable statistical distribution model through calculation of “DPO”, “non-conformance per teaching staff” and “PPM defectives” (Bass, 2007; Park, 2003). Consequently, a sigma rating is calculated for each QoWL component related to the higher education institutions in Saudi Arabia.

There are several limitations to this study that need to be addressed. First, the results are derived from a self-report survey among the teaching staff working at UOD and independent verification of data was not possible. Secondly, this newly developed rating scale is purely driven by the opinion of the teaching staff and it must be used with caution. It is recommended to use this rating scale supplemented with other parameters such as physical infrastructure, factual data and the policies & procedures influencing the QoWL of the teaching staff at the higher education institutions in Saudi Arabia. It is also recommended to use this newly developed quality-rating scale at a wider level to grade the quality of work life of teaching staff working at universities across the globe using diverse QoWL tools.

## 5. Conclusions

This study contributing to the literature by providing an innovative six-point quality-rating scale based on six sigma Poisson

distribution model to grade the quality of work life of teaching staff working at UOD, KSA. The overall opinion of the teaching staff about the QoWL prevailing at UOD is rated as “Adaptable” signifying that there is room for further improvement by formulating appropriate strategies. Precisely, three specific QoWL elements are rated by the teaching staff as “Adaptable” viz. (i) Training and developmental opportunities offered at UOD; (ii) Working conditions and; (iii) Psychosocial factors at work place. On the contrary, the two QoWL elements such as ‘Compensation and Rewards’ and ‘Job satisfaction & Job security’ are rated by the teaching staff as “Highly Compromised” indicating that it would affect their academic career if unattended. This study also concluded that a significant association is found among teaching staff’s overall satisfaction about the QoWL with regard to variables such as gender, ethnicity, educational qualifications and job title. This study provides an alarming signal to policy-planners at the higher education institutions that the QoWL of teaching staff need to be strengthened in Saudi Arabia.

**Acknowledgements:** The authors expressed their gratitude to the Deanship of Scientific Research, University of Dammam for funding this research project. The author expressed their special thanks to all the teaching staff of UOD who participated in this Study.

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**Arun Vijay Subbarayalu**

University of Dammam,  
Deanship of Quality and  
Academic Accreditation,  
Dammam, Saudi Arabia  
[sjarunvijay@gmail.com](mailto:sjarunvijay@gmail.com)

**Ahmed Al Kuwaiti**

University of Dammam,  
Deanship of Quality and  
Academic Accreditation,  
Dammam, Saudi Arabia  
[akuwaiti@uod.edu.sa](mailto:akuwaiti@uod.edu.sa)

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