

Full Length Research Paper

Training needs for faculty members: Towards achieving quality of University Education in the light of technological innovations

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The aim of this study was to identify training needs of university faculty members, in order to achieve the desired quality in the light of technological innovations. A list of training needs of faculty members was developed in terms of technological innovations in general, developing skills of faculty members in the use of technological innovations and promoting university faculty members in quality assurance skills. The study followed the descriptive-analytic design in presenting the literature. The data collection was based on a questionnaire developed to assess university faculty members' needs in four areas, these are: teaching, scientific research, community service and promoting quality assurance procedures. The participants were 135 university faculty members chosen from different Saudi universities. Results were statistically analyzed using SPSS. The results revealed the need for university faculty to be trained in the light of technological innovations. The study recommends a program for training faculty members, to use technological innovations, meet their scientific research needs, university teaching, and community service and meet course requirements in terms of quality standards and performance indicators.

Key words: Technological innovations, university education, university faculty members, training needs, quality management, community service, scientific research.

INTRODUCTION

University education is considered as a major consumer of modern technology as well as the regional and international changes in the areas of teaching, learning styles, scientific research and quality of education. This need to implement technological innovations is directed towards investment of knowledge and research to develop human resources, satisfy social needs and

create new specialties to face challenges in the modern era. The need for faculty training based on the use of innovative technology has emerged to enhance their abilities to face the demands of the labor market and employ quality standards of education in general and in their areas of specializations in particular (Altschuld and Kumar, 2002).

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Preparation and professional development of faculty members has gained the attention of educational institutions all over the world. Programs for upgrading their performance and providing the appropriate environment are provided to help them play their roles effectively. However, with globalization, knowledge, revolution and modern technology, a number of studies revealed that there are problems facing university education. These are the poor academic achievement level, failure and withdrawal. There are some other serious challenges faced by faculty members such as preparation, conducting scientific research and being able to solve community problems. The aim of the present study is to show how quality higher education can be achieved using innovative technology through the study of the following:

1. The strong impact of technological advancement on the field of education, its systems and methods.
2. The shift in the teacher's roles from the traditional to the role of facilitator and guide.
3. Lack of skills and experiences required for effective university teaching.
4. The advancement in developing training programs in various areas of teaching and learning.
5. The need for faculty members to be updated on scientific developments to help improve teaching quality.
6. The increasing number of students, which require increased use of technological innovations.

Thus, professional development of faculty as a basic requirement of improving quality of university education can be achieved through:

Self-development: This is based on a faculty member's effort to improve themselves by attending seminars, lectures, conferences, workshops, conducting researches and translation, etc.

Institutional-development: This is achieved through training workshops, seminars, researches and exchange visits with other universities organized by the institution.

Achievement of quality in university education comes with many challenges including the need for more reliance on technological innovations, increasing social demand on education, and the need to invest resources to cope with sustained development. Technological innovations are not objective; their efficacy lies in the way they are used by qualified and skilled faculty members in the teaching and learning process.

Results of a number of studies revealed some challenges and obstacles that are faced in the training of faculty members, particularly, those which are related to the use of innovative technology in higher education, are assumed to provide on one hand, a match between outcomes of education and the demands of the labor market, and employing it in conducting research and quality assurance procedures on the other.

In-service training programs which are designed for use inside the classroom include computer use, internet and designing web pages. Results of studies such as (Sopina and McNeill, 2015) indicated the mastery of the targeted skills. In order to assess the quality of the educational process including, students' method of learning, use of educational technology (distance learning, electronic learning and video-conferencing), teaching environment, learning and assessment, curricula and media. On these, survey of the viewpoints of the research participants on the quality of higher education was conducted (Alshaghдали et al., 2014).

In order to investigate in-service training and the use of programmed learning as one form of innovative technology, the study of Xian (2014) was conducted to examine training course in five USA states. Results revealed that only 5% of teachers use programmed learning. Results also indicated that effective employment of educational technology is closely related to the success of training. In addition, teachers need to blend computerized programs with other conventional courses. Measuring the effect of total quality assurance on creating the match between needs of labor market and educational outcomes was done in Hou et al. (2015) study. They indicated the importance of laying emphasis on the teaching jobs as a core point affecting quality of education in terms of decisions and policies. The study targeted a number of higher education institutions in Taiwan such as International Business Corporation and Engineering Institute.

Assessing training needs of faculty members regarding the use of innovative technology and the way this is related to achieving total quality seems to be an interest of many researchers. The study of Stukalina (2012) investigated the views of 352 faculty members through a 100 items questionnaire consisted of six aspects. These are; technology processes and curricula, design and plan for learning environment, education and curriculum, assessment, productivity and professional performance, and social and ethical issues. Results showed that 30.8% of colleges administrative systems provide faculty members the opportunities for using innovative technology. Results also indicated that the research participants are in need of training on twelve (12) innovative technologies such as use of internet, data display and presentation equipments and video conferencing.

Currently, the higher institutions are assigned important roles such as the continuous assessment of professional development needs of faculty members, demands of work place and bridging the gap between the educational outcomes, appealing for the demands of the community, commitment to quality standards in every activity conducted in campus and ways of overcoming drawbacks resulting from lack of using innovative educational technology (Elabeidy, 2009) Also, the use of innovative technology is considered one of the major factors which support quality and research activities in South Africa

(Manduna, 2014).

In the Kingdom of Saudi Arabia, like most countries all over the world, there is a growing interest in designing a model for quality control in higher education since the last decade. This seems important due to the increase in number of government and private universities and colleges. Also, due to the focus on developing faculty members' skills in using innovative technology, creative teaching methods and achieving quality standards (Al-shafei et al., 2015).

The views of (171) faculty members, towards the quality of teaching in higher education were investigated using a questionnaire by (Veiga-Simão, Flores, Barros, Fernandes, and Mesquita, 2015) Results indicated that, participants stressed that effective teaching rely on employing innovative technology and opportunities for professional development. Participants also feel satisfied about their teaching which creates interactive environment with students.

LITERATURE REVIEW

Training needs of faculty members

Training needs means the changes required in the skills, knowledge and behaviors of university faculty to achieve purposes and overcome difficulties. (Andronescu and Solomon, 2010) defines training needs as all of the changes required in the knowledge, skills, attitudes and experiences of an individual to get him fit to effectively fulfill the duties of his present job. needs are identified by (Boon, Lutz, and Marburger., 2015) as the knowledge, skills, attitudes and behaviors that need to be changed or modified at the trainee to cope with contemporary or development aspects. The following are some concepts related to training needs:

1. There are knowledge, attitudes and skills that need to be acquired, modified or changed.
2. They represent shortcomings in the target group
3. They require identification of human and technological innovations and of problems that need training.
4. They entail constant revision of reality to reach maturity and self-evaluation.

So, training needs represent the difference between the present reality of a faculty member's performance and what should this performance be in future in order to face changes and developments in knowledge, skills, attitudes and abilities.

The importance of identifying training needs

Training needs are identified on a scientific basis to help the training program planners design effective programs that will help achieve realistic and well-defined objectives

(Florian and Hegarty, 2004). Haesner et al. (2015) points out that identifying professional needs is essential for any successful training process. Training needs represent the primary element in a successful training program if well-defined.

Pop and David (2009) also confirms training needs as the initial step of building and designing any successful training program. (Mohamed and Osman, 2014) has justified the importance of identifying training needs for the following purposes:

1. Designing training programs.
2. Help focus on improvement of performance.
3. Directing trainees and identifying the types of training and expected outcomes.
4. Overcome the problems of wasting money effort and time.

Since identifying training needs is an organized survey based on co-operative effort by members of the organization to eliminate the gap between target objectives and reality, many related institutions also take part in the process (Kaufman, Hughes, and Riccio, 2010).

Benefits of identifying staff training needs

1. Building training plans.
2. Identifying training objectives.
3. Designing training programs directed towards achievement of objectives.
4. Improving training effectiveness.
5. Identifying staff performance problems and difficulties.
6. Involving staff in community service.
7. Helping trainers design programs that satisfy needs of trainees (Chan, 2010).
8. Effective planning of training programs activities.
9. Defining assessment criteria of training programs.
10. Raising efficiency of university education.

In the light of these benefits, the present research aims at identifying university faculty training needs in order to improve their skills and knowledge using innovative technology.

QUALITY IN UNIVERSITY EDUCATION

Keçetep and Özkan (2014) identify quality as a set of standards and criteria that need to be present at all aspects of university education including incomes and outcomes in order to satisfy individual and social needs through the effective investment of all human and material resources. (Ozcan, 2013) also confirms that quality is one of the essentials of teaching improvement and performance development.

Liu (2015) in a study conducted in three Chinese universities identified three aspects of quality in higher

education, the academic, the social, and the individual. The core of quality is to satisfy users' needs, identify aims and specify the product quality requirements known as the qualitative quality of the product.

Requirements of quality achievement in higher education

In order to achieve the aim of qualitative education in higher institutions, the following essential steps must be taken: (Inskipp, 2004).

1. Support of quality management system
2. Establishing a culture of quality among members of the institution.
3. Developing university human resources and updating curricula.
4. Involving all faculty members in performance improvement.
5. Identifying needs of stakeholders inside and outside the educational institution.
6. Practicing self-evaluation effectively (Yunna et al., 2014)
7. Developing a system for data gathering to help make sound decisions.
8. Involving all concerned staff in plans of quality achievement.

Challenges facing quality in higher education

1. The absence of market competitiveness of university graduates.
2. The poor learning outcomes in some specializations.
3. Unemployment of higher education graduates due to poor skills and abilities.
4. Over-emphasis on rules and regulations.
5. Dominance of traditional methods of teaching encouraging memorization over analysis and creativity. Such obstacles have directly affected the effectiveness of university education for the following reasons:
6. Neglecting the use of educational technology.
7. The gap between results of scientific research and applications in society.
8. Lack of interaction between university and society.
9. Mismatch between university learning outcomes and community needs.
10. Emphasis on quantity over quality in academic preparation of graduates (Lytras et al., 2010).

Benefits of adopting quality measures in University Education

1. Establishing quality control systems that can improve review and develop courses.
2. Focusing efforts on satisfying actual needs of society and labor market.

3. Building a set of organizational frameworks that work on achievement of quality.
4. Constant improvement of academic performance.
5. Overcoming effects of lack of competitiveness of graduates in labor market.
6. Satisfying needs and facing social problems.
7. Improving quality of services.
8. Raising the levels of performance.

Criteria of quality control in education as identified by Mohamed and Osman (2014)

1. Formulation of objectives: general/specific, knowledge, skills and attitudes.
2. Course design: study plans- course description- evaluation.
3. Teaching and learning: methods, techniques, strategies, and technology.
4. Faculty members: quality- quantity- ratio of students to staff.
5. Learning resources: library- databases- labs- equipment- websites.
6. Internet.
7. Students' evaluations: tests.
8. Students' portfolios: course descriptions, course reports, student activities sample, and course plans.
9. Quality assurance: educational development, quality guides, internal assessment.
10. Supportive services: psychological guidance, academic guidance, and medical care.

TECHNOLOGICAL INNOVATIONS

Higher education has recently witnessed a great development as a result of technology use on both the levels of concepts and application. The traditional role of the teacher has changed into both facilitator and organizer in the learning environment in order to achieve quality. The teacher performs these roles relying mainly on innovative technology (electronic library, multi-media, computer-assisted learning, individualization of learning, learning resources center, open university, distant learning, video-conferencing and web-conferencing). (Stukalina, 2012) confirms that faculty member's acquaintance with concepts related to modern technology helps him develop the ability and skills to use it in teaching.

Innovative technology is a comprehensive system involving all items of modern technology: equipment, programs, learning environments and methods in order to improve quality of the learning process (Al-Naggar, 2009). Thus, the innovative item of technology has two aspects: the material one involving equipment and programs and the second involving the strategies and methods used (Stukalina, 2012).

The present study identifies innovative technology as a

comprehensive system of effective use of modern technology including equipment, materials, programs and teaching strategies used to match the nature of course content in order to develop the educational system through interaction between learners, teachers and content.

Importance of using technology to develop teaching practice

1. Attracting learners' attention and overcoming distractors in the learning situation.
2. Employing students' senses to activate their learning potentials.
3. Developing learners' self-directed learning skills making learning more interactive and efficient.
4. Providing indirect communication environment relating learning to the world outside the classroom.
5. Achieving the principle of purposeful learning.
6. Providing a safe and organized learning environment (Guo and Lanb, 2010).
7. Developing cooperation and partnership skills.
8. Encouraging virtual interaction.
9. Applying learning mastery principles.
10. Raising learners' positivism and motivation.
11. Developing learners' creativity, curiosity and group-work skills.
12. Achievement of active learning and positive participation.

Characteristics of innovative technology

Innovative technology is characterized by some features essentially related to learning theories, and is designed and produced to match the nature of the educational process. (Casanova et al., 2011) identifies these characteristics as follows:

Interactivity: it is the ability to add the elements of action and reaction in the learning situation. The learners choose the media, the types of interaction, training, communication and feedback. Some of the technological innovations allowing this are: computer-assisted instruction, interactive multi-media, hypertext systems, live radio, direct TV, video-conferencing and network.

Individualization: it allows individualized learning according to abilities, skills and previous experiences. Some of the technological innovations allowing individualization are:

1. Computer-assisted learning.
2. Learning modules.
3. Audio tutorial systems.
4. Video tutorial systems.

5. Computer tutorial systems.
6. Personalized instruction.
7. Individually prescribed instruction.
8. Interactive video programs.

Diversity it means introducing educational content in different forms: visual, audio, using motion pictures or using computer and internet. Diversity provides varied alternatives and stimuli for learning such as written and audio texts, drawings, and graphics. (Khallaf-allah, 2010).

Cosmic: using technological innovations in conferences, forums and distant lecturing to serve the purposes of teaching, training and exchanging experiences.

Integration: The media is integrated in order to achieve the specified learning purpose. The suitable medium is chosen (whether visual, audio, drawings, cartoons, music or sound effects).

Accessibility: It means that the technological innovation is available at the time it is needed by the teacher and student (Griffith and Rubera, 2014).

Total quality management: This feature is related to the achieved quality of the design and production of the technological innovation on both the material and cognitive levels.

Factors of success in implementing innovative technology in universities

A group of elements need to be considered for successful use of technological innovations: (Sorensen, 2009).

1. Staff awareness of the technological innovations; it is important to study and understand the innovation, realize its components and potentials and how it can help achieve objectives and overcome obstacles.
2. Study of rewards and benefits before starting the planning process to guarantee the achievement of objectives of the educational institution.
3. Planning the use of technological innovations according to circumstances and available human and material resources at the institution.
4. Providing the suitable environment for the implementation of innovative technology.
5. Funding; identifying sources of funding and making sure of its availability in order to achieve required outcomes.
6. Providing academic professionals equipped with the experiences needed to use technological innovations.
7. Needs and financial support; the importance of establishing an infrastructure and the preparations needed to achieve objectives.

8. Periodical application at specified steps to reach intended objectives.
9. Trial of technological innovations to ensure its applicability and conformity with the course. Trial should start with small samples then to larger samples making use of trial results.
10. Training; use of a technological innovation are in three stages:
 - a. Identification; theoretical training of a large group to explain and show characteristics and potentials of a technological innovation.
 - b. Transformation; practical training on the skills involved in the use of the technological innovation.
 - c. Confirmation; training to confirm learning and solve problems.

The following are some of the problems facing current research

1. Lack of coordination between higher education institutions and society concerning planning and design of programs.
2. Weak correlation between higher education outputs and labor market requirements; as well as the lack of important basic experiences.
3. Innovative technology is a major pillar of quality in higher education.
4. The need for investigating strategies to be followed by higher institutions to assure the quality of academic outcomes to co-operate with community needs.
5. The importance of adopting quality standards in terms of communication and information technology.
6. Poor interest of the university in the use of innovative technology.
7. The need for faculty members to be trained on the use of innovative technology.
8. The need for designing training programs on use of innovative technology to meet changing needs of faculty members.
9. The needs of staff members to be trained on use of innovative technology to teach, developed research skills and offer consultations.
10. Lack of focus on effective teaching and use of modern methods of teaching.

RESEARCH PROBLEM (FACULTY MEMBERS IN SAUDI UNIVERSITIES ARE UNABLE TO ACHIEVE HIGH QUALITY EDUCATION DUE TO LACK OF USE OF INNOVATIVE TECHNOLOGY)

The present study investigates training needs of university faculty to achieve the desired quality in terms of innovative technology. The study attempts to answer the following research questions:

1. What are the training needs of university faculty

- members?
2. What standards need to be met in order to achieve quality in university education and how this relates training needs of faculty?
3. What are the technological innovations needed by university faculty members?

Research objectives

1. Improving university faculty skills in order to achieve quality in higher education.
2. Developing a list of training needs in the light of innovative technology (McConnell, 2003).
3. Achieving quality in higher education and how this is related to training needs of faculty members.
4. Meeting the needs of faculty members related to technological innovations.

METHODOLOGY

Research design

The quasi experimental design was employed to investigate the problem of research.

Research participants

One hundred and thirty five (135) faculty members were chosen from Saudi universities.

Data collection instruments

List of training needs

A primary list of university staff training needs was prepared based on:

1. A review of literature related to these aspects: training needs for teaching, training needs for research, training needs for community services and training needs for quality management.
2. A review of results of studies rere related to training needs.
3. Personal interviews with staff to identify their opinions concerning their training needs. They responded to the following questions:

- a. What are your training needs for teaching?
- b. What are your training needs for scientific research?
- c. What are your training needs for community service?
- d. What are your training needs for quality management?
- e. Consulting training specialists at the deanship on quality and development concerning staff training needs.
- f. Clear and specific statement of the items, and each item focus on one single need only.
- g. The list consists of four parts: teaching, scientific research, community service and quality management.
- h. Standardization of the questionnaire:

Face validity

To specify relatedness of item to the part it belongs to, the list was presented to 15 jurors in the areas included in the questionnaire:

Core One: Training needs for teaching:

1. Planning, preparation and execution (29) items.
2. Teaching methods and strategies (26) items.
3. Educational technology and learning resources (27) items.
4. Evaluation (42) items.
5. Indicators of teaching performance (21) items.
6. Learning outcomes (13) items.

Core Two: Training needs for scientific research (60) items.

Core Three: Training needs for community service (58) items.

Core Four: training needs for quality management (67) items.

Reliability of the list of training needs

For reliability, the list was to a group of 58 faculty members, quality and development consultants and quality administrators in Saudi universities. Alpha- Cronbach reliability was calculated and reached (0.89).

In the light of reliability and validity of the initial list, a final list was developed consisting of the following four cores:

1. Core One: Training needs for teaching (82 items).
 2. Core Two: Training needs for research (52 items).
 3. Core Three: Training needs for community service (55 items).
 4. Core Four: Training needs for quality management (67 items).
- Questionnaire was administered to (138) faculty member's to identify training needs.

Statistical analysis

SPSS program was used to calculate means, standard deviations, frequencies, standard error, variance and Chi-square.

The list of educational quality control standards: Based on the following:

1. A review of literature in the areas of total quality, curriculum and instruction.
2. A review of related studies
3. A list of 10 main criteria is prepared; statement of objectives- course design- teaching and learning- staff- learning resources and innovations- student evaluation- student portfolios- quality assurance- supportive services- management).
4. Regarding the achievement of teaching and learning objectives.
5. Standardizing the list of criteria according to the following procedures:

a) Face validity: the list of quality management was presented to a group of experts to decide its relatedness to the objectives.

b) Reliability of the list: after administering the list to a group of (24) staff, reliability factor was calculated using Alpha-Cronbach equation. It reached 0.90..

c) In the light of opinions of experts and reliability factor, a final version of the list was prepared and administered to a group of (37) university faculty.

d) Statistical analysis: SPSS program was used to calculate the means standard deviations, frequencies, standard error and variance.

List of technological innovations: Based on the following:

1. A review of related literature in order to prepare the list of technological innovations to be used in university education.
2. A review of studies related to technological innovations.

3. Taking into consideration that every item represents the core it belongs to.

4. Standardizing the list of technological innovations as follows:

a) Face Validity: The primary form of the list was presented to (13) faculty members specialized in technology. The list consisted of the following three cores:

Core One: Educational technology (10 items).

Core Two: Multimedia (29 items).

Core Three: Equipment for technological innovations (16 items).

b) Reliability of the List: the needs of 59 faculty member were assessed in terms of the list. Alpha-Cronbach formula was administered to test the reliability of responses of the participants, results (0.88).

c) In the light of the list reliability and validity, a final copy was prepared and administered to 95 faculty members from the Saudi universities.

d) Statistical analysis of data was conducted using SPSS program.

RESULTS AND DISCUSSION

Views of participants on training needs of faculty members

To answer this question, statistical analysis of the data obtained from the questionnaire of staff training needs was conducted using SPSS program. Means, standard deviations, standard error and variance were calculated as shown in Table 1.

Views of participants on training needs for teaching

Table 1 shows mean scores of staff responses to questionnaire items concerning training needs for teaching. Mean was (4.169) with standard deviation of (0.726) and percentage of (82.3%). This confirms the need for training on planning, execution and use of teaching strategies and evaluation methods. The value of Chi square was (41.3) which is significant at (0.01) implying.

Views of participants on training needs for scientific research

Table 1 provides mean scores of staff responses to questionnaire items concerning scientific research (4.339) which is considered high, with standard deviation of (0.703) and percentage of (86.5%). This means there is a high need for training on the skills, principles, ethics and techniques of writing scientific research. The value of Chi square was (44.3) which is significant at (0.01) level.

Views of participants on training needs for community service

Table 1 shows mean scores of staff responses to questionnaire items concerning community service (4.209) with standard deviation of 0.768 and percentage

Table 1. Means, standard deviations, standard error, variance and sum of squares for the four main cores of the questionnaire.

		Teaching needs	Research req.	Community service req.	Quality requirements
N	Valid	11070	7020	7425	9045
	Missing	0	0	0	0
Mean		4.1692	4.3390	4.2090	4.3051
Std. error of mean		0.00691	0.00840	0.00892	0.00758
Std. deviation		0.72686	0.70384	0.76842	0.72118
Variance		0.528	0.495	0.590	0.520
Sum		46153.00	30460.00	31252.00	38940.00

Table 2. Means, standard deviation, standard error, variance and Chi-square value.

Standards of quality		
N	Valid	370
	Missing	0
Mean		4.2973
Std. Error of Mean		0.03724
Std. Deviation		0.71624
Variance		0.513
Sum		1590.00

of 80.5% which represents a high need for training on strengthening ties between university and society. The value of Chi-square was 39.2 which is significant at 0.01 level, implying a high need for training on this aspect.

Views of participants on training needs for achieving high quality

Table 1 shows mean scores of staff responses to questionnaire items concerning quality management (4.305) with standard deviation of 0.721 and percentage of 79.2% representing a high need for training on quality management systems. The value of Chi-square was (38.1) which is significant at (0.01) level.

Views of participants on standards of achieving high quality university education and its relationship with training needs of faculty members

To answer this question, statistical analysis of the data related to achievement of quality in university education was conducted using SPSS program. Means, standard deviation, standard error, variance and Chi-square value were calculated as shown in Table 2.

Table 2 shows mean scores of staff responses to questionnaire items with regards to criteria of university quality management (4.297) with standard deviation of

0.716 and percentage of 83.4% which confirms the importance of these criteria. The value of Chi-square was 42.1 which is significant at 0.01 level.

Table 3 shows means, standard deviations, standard error and variance for standards of quality management. They were all significant at 0.01 level.

Views of participants

The innovative technology needed by faculty members

To answer this question, statistical analysis of the data related to technological innovations required by staff was conducted using SPSS program. Means, standard deviations, standard error, variance and Chi-square were calculated. Results are shown in Table 4.

Innovations related to educational technology: Table 4 shows mean scores of staff responses to the first core of technological innovations concerning educational technology (3.894), standard deviation (0.763) and percentage (76.5%) which confirms the importance of technological innovations related to educational technology (Internet- email- web design- learning groups- file compressing programs- concurrent communication- search engines- file download). The means for this part was high. Chi-square value was (38.7) which is

Table 3. Means, standard deviations, standard error and variance for standards of quality management. They are all significant at 0.01 level.

Criteria for quality management		Statement of objective	Course design	Teaching and learning	Staff	Learning resources and innovations	Students' evaluation	Students portfolios	Quality assurance	Supply services	Management
N	Valid	37	37	37	37	37	37	37	37	37	37
	Missing	0	0	0	0	0	0	0	0	0	0
Mean		4.324	4.29	4.32	4.216	4.162	4.297	4.405	4.270	4.48	4.18
Std. Error of Mean		0.128	0.133	0.122	0.103	0.131	0.115	0.081	0.113	0.099	0.138
Std. Deviation		0.783	0.811	0.747	0.629	0.799	0.701	0.497	0.693	0.606	0.844
Variance		0.614	0.659	0.559	0.396	0.640	0.492	0.248	0.480	0.368	0.713
Sum		160.0	159.0	1600.0	1560.0	1540.0	1590.0	1630.0	1580.0	1660.0	1550.0

Table 4. Means, standard deviations, standard error, variance and Chi-square.

	Educational information technology innovations	Innovations of multimedia shows	Innovations of educational equipment
N	Valid	950	2755
	Missing	0	0
Mean	3.894	4.304	4.112
Std. Error of Mean	0.024	0.013	0.020
Std. Deviation	0.763	0.726	0.799
Variance	0.583	0.528	0.638
Sum	3700.00	11860.00	6251.00

significant at (0.01) level.

Innovations related to multimedia: Table 4 shows high mean scores of staff responses to the second core of technological innovations questionnaire concerning multimedia (4.304), standard deviation (0.726) and percentage 84.1% which confirms the importance of technological innovations related to multimedia (production of multimedia- design of multimedia presentations- interactive multimedia- photo shop- distant learning- mastery learning- learning management- open education- programmed instruction- electronic content management systems- virtual reality- hypertext systems- hypermedia systems- routing audio systems- individually prescribed systems). The value of Chi-square was (42.2) which is significant at 0.01 levels.

Innovations related to educational equipment: Table 4 shows mean scores of staff responses to the questionnaire items concerned with technological innovations related to educational equipment (4.112), with standard deviation (0.799) and percentage (75.4%). This emphasizes the importance of technological innovations related to educational equipment (data show projectors- Internet digital camera- video digital camera- digital camera- scanner- audio digital equipment- computers- interactive video- faximili- fax- video text- cell

phones- electronic blackboard). Chi-square value was (38) which is significant at 0.01 levels.

DISCUSSION

Results of question one: what are the technological innovations required by university faculty members?

Results from core one

Results show that staff need training in the area of teaching (planning- preparation- execution- teaching strategies- technology- learning resources- evaluation- teaching performance indicators- learning outputs). Mean of scores on the teaching core was (4.169), standard deviation (0.726) and percentage of (82.3%) (Figure 1). Chi-square value was (41.3) which is significant at 0.01 levels. Results agree with results of Xian study (2014) and Stukalina (2012) in the following points:

1. Emphasizing effective teaching strategies and developing staff skills and abilities
2. Encouraging creativity
3. Constant evaluation and variation of evaluation methods
4. Using innovative technology
5. Statement of objectives and methods of student

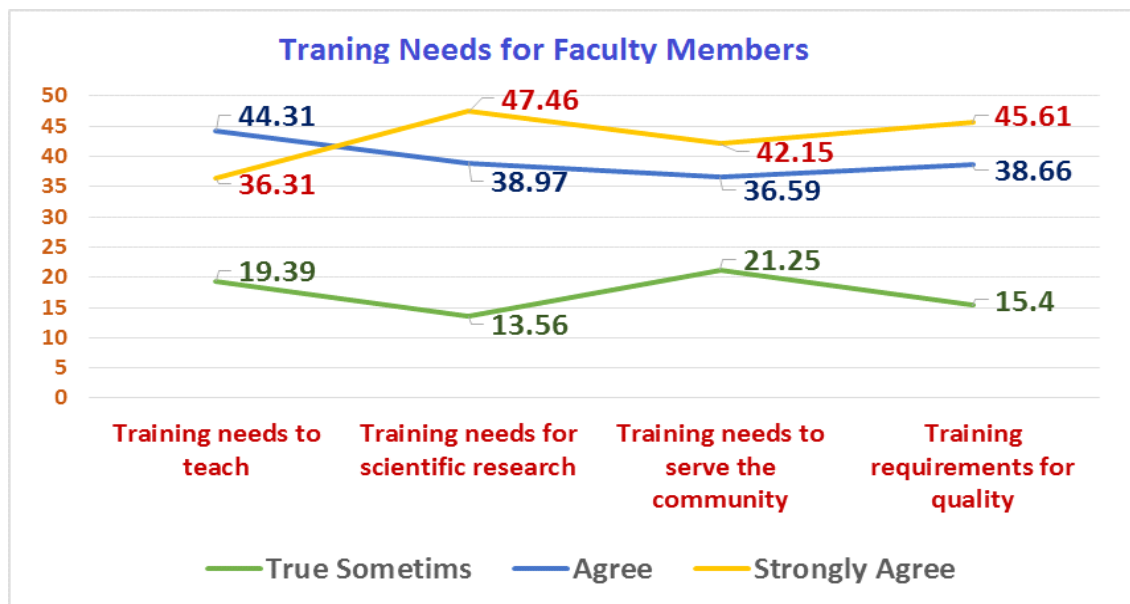


Figure 1. Percentages and frequencies of university faculty training needs.

motivation.

6. Involving computerized educational programs in curricula

7. Building teaching strategies based on innovative technology.

Results for core two

Results refer to staff training needs in the area of scientific research (principles and ethics- skills of writing research reports- statistical analysis of research data- using the digital library- scientific publication- building databases- applying scientific research regulations) Mean of scores of this core was (4.339) with standard deviation (0.703) and percentage of (86.5%) (Figure 1). The value of Chi-square was (44.3) which is significant at (0.01) level. Results indicate the importance of using innovative technology in scientific research to collect and deal with data. Results agree with findings from Xian study (2014) and Casanova et al., (2011) as follows:

1. Training on the skills and procedures of scientific research.
2. Focus on research that develop skills
3. Relating research to requirements of labor market.
4. Using technology in conducting research.

Results of core three

Results show training needs of staff in the area of community service (identifying social needs, planning

university activities to serve community, cooperation between organization and professional groups, providing training programs that match qualitative and quantitative requirements of labor market, raising awareness of the importance of work, encouraging investment in technical and professional training, treating labor market problems, continuous education programs to satisfy social needs and project management). Mean of scores for this core was (4.209) with standard deviation of (0.768) and percentage of (80.5%) (Figure 1). Chi-square value was (39.2) which is significant at (0.01) level. These results match the findings of Xian (2014) as follows:

1. Training on providing social consultations
2. Employing research findings to serve community
3. Staff participation with views, knowledge and experiences to serve community
4. Improving university outputs to serve labor market needs
5. There is a gap between outcomes and labor market due to negligence of innovative technology.
6. Poor contribution of education in building social knowledge.
7. Empowering the relationship between the academic product and social needs.

Results of core four

Results refer to staff training needs in the area of quality management (disseminating a culture of quality input, output and processes assessment; basics of educational programs evaluation; basics and mechanisms of

QUALITY STANDARDS TO ACHIEVE QUALITY IN HIGHER

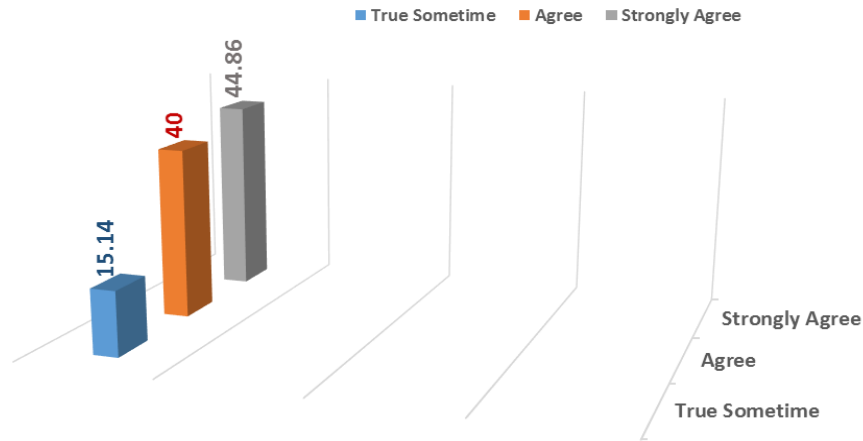


Figure 2. Percentages and frequencies of criteria of university quality management.

international accreditation; quality control; sustained development systems; improving learning outcomes; achievement of key performance indicators; referenced comparisons; applying total quality standards; preparing course specifications; preparing field practice specifications; preparing course reports; preparing program reports; preparing program for self-study; preparing institution's self-study; using technological innovations to achieve learning outcomes). Mean of scores was 4.305 with standard deviation of 0.721 and a percentage of 79.2% (Figure 1). Chi-square value was 38.1 which is significant at 0.01 level. Results agree with the findings of Xian study (2014) which are as follows:

1. Relating objectives of training programs to development of staff abilities to achieve quality standards.
2. Training on formulation of learning outcomes.
3. Building and designing tests according to teaching and learning requirements.
4. Improving staff abilities to integrate computerized programs in their courses.
5. Ability to relate learning outcomes to requirements of labor market.
6. Increasing interest in university quality in the light of communication and information technology.
7. Emphasizing evaluation methods as a guarantee of quality achievement.

Interpretation of results of question two: What are the criteria for the achievement of quality in university in relation to staff training needs?

Results of the statistical analysis of data acquired from questionnaire concerning achievement of university

qualitative quality in relation to training requirements revealed staff need to master: statement of objectives, course design, learning resources and innovations, methods of evaluation, student portfolios, quality assurance, supportive services and management. Mean of scores of responses was as high as 4.297 with standard deviation of 0.716 and a percentage of 83.4%. Chi-square value was 42.1 which is significant at 0.01 level (Figure 2). Results correlate with the findings of Al-Shafei et al. (2015), Stukalina (2012) and Elabeidy (2009):

1. Planning for learning environment
2. Variation in evaluation methods.
3. Analyzing staff skills, capabilities and attitudes.
4. Analyzing administrative and teaching tasks of staff.
5. There is a lack of reliance on technology in teaching.
6. The importance of quality management in achieving educational quality.
7. Identifying the strategies and mechanisms that can help academic institutions achieve quality outcomes to meet community needs.

Results of question three: What are the technological innovations required by university faculty?

Results confirm that staff need training on surveying the Internet, designing educational websites, file compressing, concurrent communication search engines, file upload and download in order to achieve qualitative quality of their teaching and research work and community service. Mean of scores was as high as 3.894 with standard deviation of 0.763 and a percentage of 76.5% which is significant at 0.01 level (Figure 3). Results

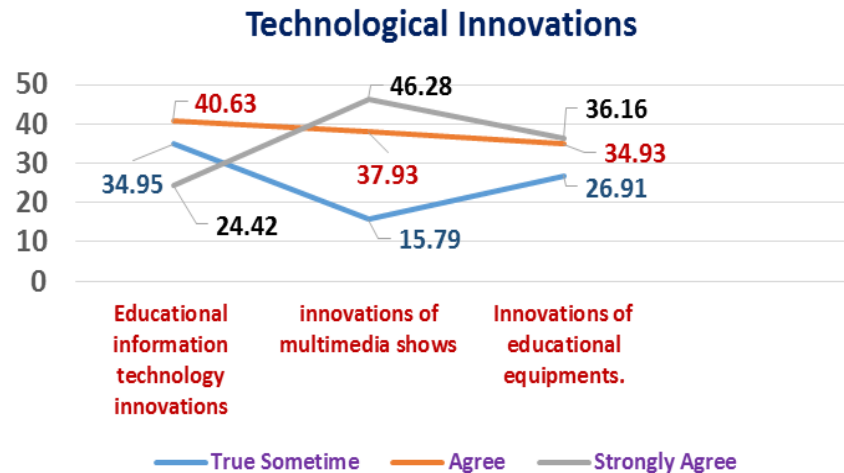


Figure 3. Percentages and frequencies related to technological innovations.

match findings from the studies of Manduna (2014), Stukalina (2012), Elabeidy (2009), in the following points:

1. Educational system lacks interest in information technology and industrial technology.
2. Training on information and communication technology
3. The need for training on web designing.
4. Lack of reliance on educational technology.

Discussion of results related to multimedia

Results of this core shows staff training needs on: producing multimedia, interactive multimedia, designing presentation, Photoshop, mastery learning, distance learning, communication technology, hypertext, virtual classes, etc. Mean of scores was (4.304) with standard deviation (0.726) and percentage of (84.1%). Chi-square value was (42.2) which is significant at (0.01) level. Results match results of Stukalina (2012) and Veiga-Simão et al. (2015) in:

1. Designing educational environment rich in technology and its products.
2. Training on preparing electronic books, computer programs, using the internet and designing web pages.
3. Multimedia packages.
4. Designing staff training programs to face the digital age and equip them with skills related to innovative technology.
5. Staff need of continuous training to manage virtual classes.
6. Training on teaching through video conferencing.
7. Training on planning learning environment.

Results related to educational equipment

Results revealed staff need for training on the use of:

projectors, Internet digital camera, video text, televised communication bank, tele-text, telex, electronic blackboard, and interactive video to achieve qualitative quality teaching, research, community service and quality management. Mean of scores was 4.112 with standard deviation of 0.799 and a percentage of 75.4%. Chi-square value was 38 which is significant at 0.01 level.

Results match the results of Stukalina (2012) and Veiga-Simão et al. (2015), in the following:

1. The most needed training is computer training.
2. Training on the use of data display equipment.
3. Developing the abilities to use technology in education and planning in learning environment and developing material, programs and equipment.
4. Graduates lack skills on how to use innovative technology due to the absence of a model

RECOMMENDATIONS

The present study recommends conducting training sessions that aim at promoting the quality of university faculty performance by using technological innovations including the following:

Training sessions to meet training needs for basic teaching skills as follows

1. Intended learning outcomes (cognitive, affective and psychomotor).
2. Psychomotor performance indicators to compare students' performance.
3. Ethics of teaching profession.
4. Content analysis and design skills.
5. Effective and innovative teaching methods.
6. Cooperative learning and problems solving skills.

7. Evaluation using portfolios: pre-, post, formative and peer evaluation.
8. Design and production of learning packages.
9. Course design according to international standards.
10. Using multimedia innovations.
11. Innovative teaching equipment.
12. Using innovative communication and information technology.

Training sessions for scientific research needs as follows:

1. Ethics of scientific research.
2. Using the internet for scientific research purposes.
3. Research report writing skills.
4. Statistical analysis of research data.
5. Using the digital library.
6. Scientific journal editing and publication procedures.
7. Scientific research and project management.
8. Use of multimedia innovations.
9. Innovative educational equipment.
10. Using innovative communication and information technology.

Training sessions for community service needs as follows:

1. Vocational planning and human resources management.
2. Planning, execution, follow-up and evaluation of training sessions and programs to promote communication and integration between universities and social institutions.
3. Developing social work systems and solving social problems through scientific research and social participation.
4. Raising awareness of social issues.
5. Obtaining knowledge in the areas of science and technology in and outside the university.
6. Using multimedia innovations.
7. Using communication and information technology innovations.

Training sessions for quality management needs as follows:

1. Time management and conferencing skills.
2. Course and program design (including content, methods of teaching and technology).
3. Basics and mechanisms of quality assurance and international accreditation.
4. Systems of sustained development of staff scientific research skills and abilities.
5. Methods of teaching as specified by major universities.
6. Key performance indicators and referenced comparisons.

7. Using technological innovations to achieve learning outcomes.
8. Strategic planning.
9. Preparing course and program descriptions.
10. Preparing course and program reports.
11. Preparing program and institution self-study.
12. Video-conferencing.
13. Using multimedia innovations.
14. Innovative teaching equipment.
15. Using communication and information technology innovations.

Conflict of Interests

The authors have not declared any conflict of interests.

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