

The Study of Technical and Vocational Education and Training Needs of Dairy and Cooking Oil Producing Companies in Tehran Province

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Abstract

Education is not merely provision of information from trainer to learner, but the point is that this person requires practical educations for some of its tasks. By considering industrialization of manufacturing processes, economic development cannot happen without considering the Technical and vocational education and training (TVET). Since the work force in the current period without technical capacities and skills can hardly play its role efficiently. Thus, by taking into account the importance of such educations, the current research is conducted in order to detect the technical and vocational educational courses required by dairy production and edible oil production industries. In fact, the main objective of this research was to specify technical educations required in industries. In order to fulfill the objectives of study, 4 manufacturing companies (two companies in each industrial field) were selected. Totally 198 persons were selected as sample of research. Gathering the data required was performed via questionnaire. In order to analyze the data and determination of technical and vocational educational needs and prioritizing them the one-sample T test and weight score were applied. The findings of research have indicated the technical and vocational educational needs and the priority for each course fore each industry.

Keywords: education, educational needs, technical and vocational trainings, producing companies

Introduction

Nutritious products transferring industries is among the main sectors of industry all over the world (yazdanbakhsh,2013). Such industries play the role of providing foods safety, developing agriculture as well as industrial exports (Farahbakhsh and Norouzi, 2002). Food industries in Iran is a newly established one comparing with other countries, because the first foods industrial production law was approved in 1967.the active companies in this field are mainly producing chocolates, meat , dairy, cooking oil, beverages, and etc (Afshari& Ebrhimi, 2011). Now a day, a huge part of economic population of the country is active in this area. One of the common mechanisms to improve the function of employed population in producing companies is technical and vocational training (TVET). Such educations are now verified by international organizations such as UNESCO and ILO (UNESCO-UNEVOC,2006). TVET has its own features in terms of aim, structure, nature, and method of implementation method. So, they are separable from general and academic educations. "The goal of such educations is enhancement of knowledge, skill and perception as well as more qualified execution of the tasks within job realm"(sepahvand, 2013, p.2) .However, TVET should be planned, executed and assessed by scientific methods in order to guarantee effectiveness. So, one of the main measures is to study and understand the required TVET for producing companies. In fact, identifying the required knowledge, skills and capacities for industrial companies demands scientific research. It is needless to say that efficient development and quality enhancement of TVET programs can be fulfilled more effectively by scientific research, because research findings increase the confidence coefficient of plans objectives achievement.

Research on TVET should be based on one of the main processes of technical and vocational training system that is planning, performing and assessment. Planning of TVET is one of the main stages of the process and its basis is related to educational needs which should be collected and applied by scientific methods. In other words, scientific educational needs assessment can be helpful in increasing effectiveness of TVET courses. The research showed that one of the basic factors of inefficiency in Iran industrial development is low level of quality, knowledge and manned skills. TVET can be effective then in promoting man capital of producing companies and by educational needs assessment it is possible to identify efficient training courses. The main problem of this research is to study and identify TVET needs of industrial companies for further compile the type of needs of the studied industries and companies. Therefore, in terms of economy, the utility training of TVET in the companies under the study will increase, because educational needs assessment revealed what courses are required.

Technical and vocational education and training (TVET)

Scientific training is just for humans. The goal of training is not merely giving information to learners by educators. Instead, practical skills should also be noticed during the training (Khaksar, 2012). Education refers to a set of activities done during its interactions. It is essentially a flexible and dynamic category which depends on

given conditions, needs, and expectations. Education has a variety of models and one of them is TVET. TVET delivers related technology and science to various economic, social and cultural sectors. Such educations are the mechanisms that are presented in order to establish necessary skills for obtaining special jobs and professions. The following items are the features that UNESCO considers for TVET:

“(a) an integral part of general education; (b) a means of preparing for occupational fields and for effective participation in the world of work; (c) an aspect of lifelong learning and a preparation for responsible citizenship; (d) an instrument for promoting environmentally-sound sustainable development; (e) a method of facilitating poverty alleviation.”(UNESCO-UNEVOC, 2006, p.1).

What is authentic in the process of planning and performing TVET is increasing operational and functional skills of trainers and finally economic development and working improvement either directly or indirectly. TVET is very costly comparing with theoretical educations. In addition, the delivered TVETs should be proportionate with market requirements(Abdollahi and Saadatmand, 2011). They are also considered as a complementary part of public educational system; so, their cultural content should be noticed in this respect. TVET is generally delivered in two forms of formal and informal(Mohammadali, 2011). Technical and vocational skills development should also be presented by private and public technical schools (Hartel, 2009). Other groups of researchers categorized TVET alternatively and introduce comprehensive typology of TVET. A)Institution-based training [(i) Provided by the formal education system and (ii) Provided outside the formal education system] , B) Workplace-based training ((i) Pre-employment training(ii) In-service training) C) Combination of multiple types of training (e.g. sandwich programs, dual systems)(EFT,2012, P.5)

TVET is important from various points of views. 1) Studies show that such educations are very significant throughout the world. The research reports of various countries such as Canada, Saudi Arabia, Kenya, Germany, and Qana are the instances of such significance (Molgat and Akomaning 2011; Baqadir et al , 2010). 2) TVET plays a main role in providing man force with proper skills, knowledge and qualifications for globalized world and for working place. 3) International organizations such as UNESCO and ILO pay attentions to such educations. And after all, in the third millennium, individuals with no technical skills live in background and countries will not achieve technological development and economic growth (Sukri et al, 2012).In view of educational content, TVET has special features. The findings of the research by Baqdir et al(2012) showed the necessary aspects for adjustment of such educations with working place requirements as follows:

- authentic, practical knowledge on technological developments and trends in manufacturing industries gained through attendance at workshops and seminars organized by the manufacturing industry;
- apprenticeship: for example the importance of enhancing learning through ‘entering the field’, ‘participant observation’, and ‘portfolio records of practical aspects of manufacturing-related studies’;
- interpersonal communication skills and critical thinking skills;

Azreen and Mohamad also discussed that in TVET, we should consider team work skills, critical thinking, problem solution and professional ethics.

Educational programs have various elements. One of the very requirements in the process of any educational program is educational needs assessment(Doaei and Aghel, 2012). The goal of needs assessment is to determine the main requirements for education (Maleki et al, 2010). It is supposed that determined educational needs are the step stones of any educational program (Akomaning et al, 2011). Practically speaking, educational needs assessment is a set of procedures and methods that are applied to determine educational priorities (Ross,2008). It is a process that indicates: what courses should be performed? How much each of them required?

Methodology of the research

The present study is of descriptive type and performed by survey method and is of applied type in view of the research type. The research was done in Tehran province in Iran. Four food industrial companies were selected two of which produce dairy products and two others produce cooking oil. The statistical society consisted of technical and operational employees of dairy products and cooking oil producing companies in Tehran who had educational cooperation with TVET general office in Tehran province. The formal statistics show that 6 companies cooperate with the same office among which the following four ones were selected. 70% of production personnel of each company were selected proportionally in random. The distribution of the statistical samples is as shown in table 1.

Table 1- The distribution of statistical samples based on age and working years average

Field of activity	Name of company	F	Age		Seniority	
				SD	X	SD
Dairy	PAK	49	39.7	7.3	14.7	6.6
	PEGAH	77	32.9	8.7	13	4.5
Cooking oil	VARAMIN	25	35.7	7.7	13.1	8
	PARSGHOO	47	40.7	4.37	18.3	6.89
Total	4	198				

Since the present research was done with the support and at the request of TVET general office, the goal of goal of courses identification was in macro level that means on company level. Questionnaires were applied for collecting required data. For the required educational titles and fields, a variety of individuals were inquired including the technical experts and supervisors, education authorities of the held training courses as well as the information system of TVET general office. Then the questionnaires were filled in and acknowledged with the consultation and help of educational science specialists at the university. Further, the subjects were requested to determine how much they think it the stated courses on the questionnaire is necessary for their companies and for their own field of industry. The questionnaires were designed according to Likert spectrum ranging from very low (1) to very high (5). In the present research, data were analyzed by descriptive statistical methods; classification of the data was done by tables, mean calculation and standard deviation. To examine the research statistical hypotheses ($H_1: \mu < 3$) and ($H_0: \leq 3$), the single group T test was applied to determine significance of the mean of each educational need comparing with the theoretical mean. To prioritize the educational needs, the weight score was applied. All data analysis operation and statistical tests were performed by SPSS.

Results

The findings of research are provided in tables 2 to 5. Based on parameters provided in tables 2, 3, 4 and 5, the titles of technical and vocational educational needs and priority of each of them is specified. The t values indicates whether each of the specified educational courses are determined as need in the significant level or not ($\alpha < 3$) and their rank is specified based on the weight coefficient.

Table 2: technical and producing educational needs of dairy production companies

Course	Mean	SD	T	sig	Wight score	rank
Studying dairy products	4.21	0.9	15.1	0.000	88.28	3
fundamentals and principles of dairy industries	4.13	0.966	13.1	0.000	85.1	5
milk microbiology	3.79	1.01	8.6	0.000	72.35	9
preparation and making healthy milk	3.33	0.91	3.9	0.000	54.13	35
introduction to packaging in milk industries	3.36	1.06	3.7	0.000	57.8	26
sensors	3.37	0.96	4.3	0.000	56.95	28
instrumentation	3.74	0.96	8.5	0.000	68.68	13
operation of milk taking devices	3.34	0.22	3.1	0.002	62.25	16
sensory evaluation	3.38	1.04	4.1	0.000	57.51	27
Usage of antibiotics in dairy industries	4.06	1.03	11.5	0.000	92.4	1
pasteurization CIP	3.48	1.17	4.5	0.000	63.73	15
specialized sterile CIP	3.76	1.07	7.9	0.000	71.03	11
mechanics of fluids in diary	3.30	1.06	3.1	0.002	55.43	33
preliminary CIP	3.36	1.17	3.4	0.001	60.6	19
sampling from milk and dairy products	3.75	1.05	7.9	0.000	71.3	10
pre-pack operation	3.76	1.01	8.4	0.000	69.33	12
milk pasteurization	4	1.13	9.8	0.000	84.55	6
storing and protection of dairy products	4.06	0.91	13.1	0.000	61.78	8
advanced and preliminary hydraulics	3.36	1.15	3.4	0.001	59.4	23
pioric operation	3.49	1.07	5.1	0.000	62.15	17
equipment of dairy industries	3.33	1.12	3.25	0.001	59.6	22
industrial electricity	3.57	1.12	5.7	0.000	65.5	14
PLC	3.34	1.01	3.7	0.000	56.03	30
industrial automation	3.32	1.01	3.5	0.001	55.6	31
advantages of milk	3.44	0.98	4.9	0.000	58.61	25
technology of dairy products	4.16	0.99	13	0.000	87.9	4
milk improvement management	3.45	1.02	4.9	0.000	59.61	25
calibration	3.45	0.99	5.1	0.000	59.28	24
cooling systems	3.68	1.01	7.5	0.000	61.78	18
health of milk	3.31	0.96	3.5	0.000	48.65	37
diseases of dairy cattle	3.38	0.92	4.6	0.000	54.24	34
zoonotic	4.09	0.84	14.3	0.000	81.33	7
compressors	3.37	0.91	4.5	0.000	48.8	36
centrifuge systems	3.46	0.89	5.7	0.000	55.45	32
research and development in dairy industries	4.34	0.78	19.2	0.000	91.9	2
pneumatic	3.61	0.78	7.9	0.000	60.11	20
mass transfer	3.44	0.91	5.3	0.000	56.56	29
fire extinction	3.25	1.1	2.6	0.01	55.35	3
Personal health	3.97	0.82	3.7	0.000	53.93	6
First aids	3.48	1.02	5.2	0.000	95.63	2
Detergent & sterilizing	3.33	0.96	3.7	0.000	54.1	5
Industrial health	3.35	0.89	4.3	0.000	54.53	4
Safety in industry	3.54	1.02	5.9	0.000	62.06	1

3- Safety and health educational needs in dairy production companies

Findings of tables 2 and 3 from the titles of technical and vocational educational needs of dairy production companies indicate that educational needs of dairy industries are specified in two sections: 1) technical and operational educational courses 2) safety and health educational courses. The findings of research indicates that the mean of all required educational courses has been upper than the base mean ($\bar{x} < \mu$). Also, the mean of courses are significant in the 5% alpha level. The maximum amount of mean (4.34) is related to the educational course “research and development in dairy industries” and the least mean (3.25) is related to the educational course “fire extinction”. Totally 7 courses have the mean of 4 and upper that all of these courses are from technical and operational type. In fact, the need for technical and working courses is felt more than the needs for safety and health.

4- Technical and producing educational needs of edible oil production companies

Course	Mean	SD	T	sig	Wight score	rank
The techniques of control and improvement of the quality of oil	4.28	0.8	12.8	0.000	51.1	5
preliminary and advanced oil refinement	3.50	1.0	4.04	0.000	35.1	15
oil test methods	3.39	0.8	3.8	0.000	31.32	24
plate cutting technology	3.56	1	4.5	0.000	34.43	19
general and food materials chemistry	4.25	0.9	11.7	0.000	51.58	3
furnace technology	3.26	0.97	2.3	0.025	30.71	25
filter press technology	3.76	1.1	5.3	0.000	43.21	8
oil industry equipment	3.38	0.9	2.94	0.004	33.7	21
precipitation of boilers	3.64	1.02	4.96	0.000	37.3	9
preliminary and advanced hydraulics	3.50	1.07	4.15	0.000	34.68	18
Maintenance Technology	3.57	1.04	4.5	0.000	36.75	10
Methods and equipment for oil packaging	3.76	1.06	6.22	0.000	35.6	14
assembly fault detection technology	3.54	1.03	4.33	0.000	35.88	12
pneumatic	3.92	1.1	7.54	0.000	44.86	6
Technical protection	4.17	1.02	8.3	0.000	52.7	2
Tin plate technology	3.63	1.03	5.1	0.000	36.46	11
electronic	3.53	1.12	4.33	0.000	35.85	13
instrument	3.42	1	3.11	0.003	34.83	16
repair and maintenance of compressors	3.43	1.03	3.63	0.001	33.01	22
Maintenance of technical & industrial systems	3.31	0.94	2.5	0.014	32.21	23
different types of edible oil products	4.33	1.06	11.9	0.000	54.45	1
PLC	3.86	0.96	6.8	0.000	43.48	7
repair and maintenance of boilers	3.25	0.8	2.2	0.030	29.97	26
hydrogenation technology	4.33	0.88	14.05	0.000	51.45	4
Statistical Quality Control	3.56	1.11	5.3	0.000	34.4	20
Repair & maintenance of pumps	3.56	0.84	4.6	0.000	34.75	17
Repair & maintenance of gearboxes	3.29	0.93	2.92	0.005	29.85	27

5- Safety and health educational needs in edible oil production companies

Course	Mean	SD	T	sig	Wight score	rank
Safety Methods and Tools in Industry	4.18	0.93	10.6	0.01	50.26	1
fire extinction& fire fighting	3.54	1.1	4.17	0.000	35.25	3
rescue training	3.42	0.83	4.23	0.000	30.92	6
Professional health	3.35	1.03	2.84	0.006	32.76	5
Ergonomic principles	3.78	0.9	7.27	0.000	39.2	2
First aids	3.46	1.03	3.76	0.000	33.96	4

Findings of tables 4 and 5 from the titles of technical and vocational educational needs of dairy production companies indicate that educational needs of dairy industries are specified in two sections: 1) technical and operational educational courses 2) safety and health educational courses. The findings of research indicates that the mean of all required educational courses has been upper than the base mean ($\bar{x} < \mu$). Also, the mean of courses are significant in the 5% alpha level. The maximum amount of mean (4.34) is related to the educational course “research and development in dairy industries” and the least mean (3.25) is related to the educational course “fire extinction”. Totally 7 courses have the mean of 4 and upper that all of these courses are

from technical and operational type. In fact, the need for technical and working courses is felt more than the needs for safety and health.

The contents of table 2 and 3 show the titles of technical and vocational educational needs for dairy production companies. The findings of research indicate that educational needs of dairy industries are specified in two sections: 1) technical and operational educational courses 2) safety and health educational courses. Also in table 4 and 5 the titles of educational courses required for the edible oil production companies are indicated in two sections of 1) technical and operational 2) safety and health. The findings of research indicate that the mean of all required educational courses has been upper than the base mean ($\bar{x} < \mu$).

Discussion and Conclusion

One of the critical questions for managers of industrial companies is that what mechanisms can be used for promotion of human capitals. Based on the findings of the current research, we can respond to this question that a part of this issue is possible via technical and vocational educational courses. The technical and vocational educations can be performed in two fields; 1- for education and preparation of the work force who has not yet entered the work world, 2- in order to increase the knowledge and skills of the work force employed in the dairy and edible oil industries that are assumed as the active economical population. Planning and performing technical and vocational educational courses can be highly effective for preparing the bed for more efficient performance of technical responsibilities and consideration to work's safety aspects.

Based on the findings of research, the technical and vocational educational needs for dairy and edible oil industries were specified. The members performing the technical and vocational educational courses have distinguished two categories of A) technical and operation courses and B) safety and health courses required for dairy and edible oil industries. Thus, performing the specified technical and vocational educational courses can be effective in improvement of human capitals of companies active in the field of dairy and edible oil industries.

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