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The Impact of Innovation on the Quality of Education Provided by Training Centres

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Abstract
The world is changing and pushing toward the improvement of the educational system which is moving forward with technology. This change in the educational system should be accompanied with the continual assurance of providing a quality of education service by the educational organization. Education could be provided by universities, schools and vocational schools or other academic institutions. One of the education service providers is the professional development training centres. Although a lot of research papers tackled the quality of education, however very little research discussed the quality of training services provided by training centres. This article attempts to specify the ten innovation parameters that could affect the quality of education and the business model in the training centres. It also shed the light on the quality score that could be used by different stakeholders as a tool to pre-assess the quality educational level provided by the professional development training centres.
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1. Introduction

Many procedures and action taken to improve quality of education worldwide did not achieve totally their targets due to the lack of understanding of the holistic approach of education (Cheong Cheng & Ming Tam, 1997).

'Quality' the famous term discussed from 40 years ago through an enormous number of research papers is still in infancy stage in the education sector especially training services. Many definitions for quality exist. In 1979, Crosby defined quality as a tool to avoid defect and achieve conformance to requirements (Crosby, 1979). Juran and Gryna defined quality of a product in 1988 as its fitness for use. (Juran and Gryna, 1988)

Education quality was defined by Cheng in 1995 as 'the set of elements of the education processes that satisfy internal and external stakeholders by meeting their expectations'. (Cheng, 1995)

The last definition was provided by the international organization for standardization specifically through the international standard ISO 9001:2015, that defines quality as a set of inherent characteristics of a product, service or a system that fulfils the needs and wants of stakeholders in order to satisfy customers.

Based on the above definitions we can agree that every educational organization have a high number of interested parties with different level of influence and engagement. Thus, it is very difficult for any educational organization to meet all the needs and wants of its stakeholders. So, every educational organization could expect a huge number of requirements from their stakeholders, and therefore they should prioritize their needs and wants. In addition, they shall draw a clear road map to achieve them. This is one of the reasons why the quality in education is subjective and interfere with many factors and parameters.

The quality of educational services provided by training centres still has a lot of opportunities for research. Authors distinguish between two categories of training services.

The first category is related to the training centres that provide certified training courses which are accredited by international organizations and bodies that give the trainee at the end of the training course a registered certificate that has a validity period after passing an exam. Most of these training courses give the opportunity for trainees to become a member in professional organizations.

The second category is related to training centres that provide non-certified training course. Usually, no exam is required to pass by end of these kind of training courses and attendees receive only a certificate of attendance.

The main difference that exists between both categories of training centres is the degree of quality control. In this article we are tackling both categories. The question that arises:
how does innovation impact the quality of education and the business model of the training centres?

2. Literature review

The quality of training provided by the training centres as educational service may be influenced by the same factors that affect quality in schools or universities, but taking into consideration that a difference in business

model exists since the training centres are not subject to strict control as is the case of other educational organization categories. Many businesses model for quality education were described but each model differs from the others. This article aims to understand what are the variable factors that affect the quality education business model at training centres from innovation perspective.

It is important to highlight the seven different categories of education quality models that were described by Cheng and Tam in 1997. The models are based on the following canons:

- Achieving quality objectives based on compliance to requirements
- Procuring quality resources
- Process approach
- Achieving the satisfaction of the stakeholders
- Positioning of educational organizations in the presence of competition
- Problem solving and improvement strategies
- Adaptation to new change environment

Based on these 7 models, the educational process is not static and depends on many factors that could change over time and one of these factors is innovation as discussed by Fullan in 1993, Schmuck and Runkel in 1985 and Senge 1990.

According to Dustin Swanger in 2016, the challenge is to harness the intelligence and creative energy that exists in smart people in educational organization and develop a culture of innovation. (Swanger, 2016)
He assumes that a culture of innovation means that the leaders will encourage the following:

- Rewarding innovation, even if it fails
- Training faculty and staff in design for Innovation Techniques
- Fostering cross departmental teams to solve problems
- Clearly defining problems that must be addressed
- Understanding your students
- Providing time for unstructured time
- Not imposing too many rules
- Listening with an open mind
- Encouraging prototypes
- Using data and observation

3. Materials and methods

This paper seeks to identify what are the innovation factors that affect the quality of training services and the business model of the training centres. A survey has been forwarded to trainees who attended training in different training centres in Lebanon. The survey included 5 sections, and the aim was to gather the primary data about 47 parameters related to quality of education, and to analyse what are the main parameters that affect the quality of education based on a regression analysis. Basically, this article focuses only on the 10 parameters related to innovation and how much they affect the quality of education.

4. Results

In order to understand the innovation factor and his impact on the quality of education, trainees' responses were analysed in order to evaluate the training centres and identify the effective and non-effective innovation parameters in the training centres. 299 surveys (Yamane, 1967) were gathered from training centres across the country and showed that trainees were neutral or somehow effective toward 7 innovation parameters over 10, that mean trainees are expecting training centres to have more innovation, only 3 parameters received higher grade as capable and effective which are:

a- Understanding your customers
b- listening with an open mind
c- Clearly defining problems that must be addressed

The 7 parameters that were neutral are

d- Rewarding innovation, even if it fails
e- Training faculty and staff in design for Innovation Techniques
f- Fostering cross departmental teams to solve problems
g- Providing time for unstructured time
h- Not imposing too many rules
i- Encouraging prototypes
j- Using data and observation

On the basis of such result, a hypothesis is developed:
There is a statistically significant difference on the trainee evaluation scores between the different parameters of

the innovation factor.

To test the significance of the difference between parameters, Friedman test which is a non-parametric test alternative to the parametric repeated measures ANOVA test in case of no normal distribution is used.

The null and alternative hypotheses are defined as following:

H0: There is a no significant difference in evaluation scores across parameters.

H1: There is a significant difference in evaluation scores across parameters (i.e., There is at least two parameters that differ in their scores).

Firstly, we want to check the normality of our dependent variable (Scores) for each question. Kolmogorov-Smirnov test and Shapiro-Wilk test provides normality test of a sample. Table 1 shows the results of normality test for each question. All questions have a p-value=0.000 which is less than 0.05, so the hypothesis of normality is rejected and our data is not normally distributed. Thus, non-parametric tests should be applied.

Table 1. Normality test for each parameter.

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Rewarding innovation	.219	291	.000	.903	291	.000
Training faculty and staff in design for innovation techniques	.198	291	.000	.910	291	.000
Fostering cross departmental teams to solve problems	.196	291	.000	.912	291	.000
Clearly defining problems that must be addressed	.204	291	.000	.907	291	.000
Understanding your customers	.211	291	.000	.906	291	.000
Providing time for unstructured time	.219	291	.000	.905	291	.000
Decreasing rules and regulation	.215	291	.000	.907	291	.000
Listen with an open mind	.223	291	.000	.903	291	.000
Encouraging prototypes	.193	291	.000	.911	291	.000
Using data and observation	.200	291	.000	.909	291	.000

Secondly, in order to identify if the trainee responses are statistically different across parameters, Friedman test is performed and the results is given in Table 2. Friedman's analysis revealed that the evaluation scores distributions of the 10 parameters are significantly different. Thus, there is an overall statistically significant difference between the parameters of the innovation factor.

Table 2. Friedman test result.

Null Hypothesis	Test	Sig.	Decision
The distributions of Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9 and Q10 are the same	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.000	Reject the null hypothesis

At this stage, we only know that there are differences somewhere between parameters but we do not know exactly where those differences lie. For this fact, Dunn-Bonferroni post hoc tests were carried out to compare each couple of parameters. For each couple of parameters (noted i and j), the hypotheses are:

H0: There is a no significant difference in scores between parameter i and parameter j.

H1: There is a significant difference in scores between parameter i and parameter j.

After carried out Dunn-Bonferroni post hoc tests, we conclude that parameters 'clearly defining problems they must be addressed', 'understanding your customers' and 'listening with an open mind' are significant different from the remaining parameters.

Only these three parameters were evaluated as capable and effective by the trainees which indicates that the trainees find that their training centres are effective in defining problems clearly, understanding the perspectives of their customers and listening to their customers with an open mind. The others parameters were evaluated as non-effective parameter and they need more development to reach the perspectives of trainees.

It would be interesting now to find out how innovation factor is related to the quality factor and to indicate the weight of this factor on improving the educational organization quality. To find this linear relationship between these factors, linear regression analysis is used in this study. The variables are divided into:

- Dependent variable which is the total quality factor score.
- Independent variable which is the total innovation factor score.

Simple regression analysis in SPSS were used to explore the relation between the independent variable and the dependent variable. The variables are calculated as follow:

Quality factor: The quality factor is the dependent variable. The responses is Likert-scale data and by calculating the total score we assume that distance between categories is equal.

Innovation factor: The innovation factor is the independent variable. It is explained in the regression model given in table 3 as total innovation score computed using the responses of trainees and it is calculated by summing all scores for all innovation factor parameters.

The linear relationship between quality and innovation can be written as:

Total Quality Score=22.430+1.565 Total Innovation score

Table 3. Regression analysis.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	22.430	3.048		7.359	.000
	Total innovation score	1.565	.100	.678	15.698	.000

a. Dependent Variable: Total Quality score

As the coefficient of innovation factor is positive and the variable is significant (p-value<0.05), we can conclude that the innovation factor has direct and positive impact to the quality factor.

Moreover, for every increase of one point on the total innovation score, total quality score is predicted to be higher by 1.565 points holding all other variables constant (So, for every unit increases in total innovation score, 1.565 units increase in total quality score is predicted). This is significantly different from 0 so, we interpret this difference as a real effect and not a chance artifact.

5. Findings

The above-mentioned results and findings show clearly the positive relation between innovation and quality of education. It shows also that the training centres are focusing on trainee satisfaction through listening to them with an open mind, which is a good step but nowadays this is not enough because radical innovation is the only solution to make business achieve sustainability.

Results also reflect the main 7 parameters that an owner or a top management at training centres should focus on, in order to increase the quality of education.

a- Rewarding innovation, even if it fails
b- Training faculty and staff in design for innovation techniques
c- Fostering cross departmental teams to solve problems
d- Providing time for unstructured time
e- Not imposing too many rules
f- Encouraging prototypes
g- Using data and observation

Basically, potential solutions to tackle the 7 parameters include but are not limited to:

- Restructuring the course materials to focus on innovative ideas
- Providing the trainings through innovative techniques
- Recruiting trainers with deep experience in problem solving through radical innovation
- Build the capacity of the trainee on benefiting from their times and create innovative idea that will help them in their jobs

However, in order to assure sustainability of the implementation of this taken action, we have to assure that it permanently incorporated into the organizational governance of the training centres and this led us to raise the point about which business model shall be implemented into this category of educational organization.

Training centres are more flexible with their organizational governance and their financial resource. Therefore, they have the possibility to innovate more quickly than universities and schools where the organizational governance is more complicated and this explains why 7 parameters over 10 were evaluated as neutral. This means that learners are waiting more innovation from training centres than from other categories of educational organization as universities, schools and vocational schools.

According to the results, trainees see that training centres are focusing on understanding customers, listening with an open mind and clearly defining problems that must be addressed. That means they are focusing on trainee satisfaction. If we compare this result with the above-mentioned business model described by Yin Cheong Cheng and Wai Ming Tam in 1997, we find that it matches with the fourth model based on ‘achieving the satisfaction of the stakeholders’.(Cheng and Tam, 1997)

However, in order to be pragmatic and since we are talking about 10 parameters of innovation, the fourth model is not enough to assure a good quality of education. A new business model should be based on radical innovation that assure that the remaining 7 parameters will be implemented on continual basis.

This new model should be based on a process approach that achieves the unique value that includes high degree of resilience in order to adapt with upcoming challenges and should lead the training centres to build an organizational governance that assures developing the capacity of trainees on competencies and skills that are needed in todays and tomorrow’s economy.

6. Conclusion

Innovation affects the quality of education provided by training centres. There is a need to think about a new innovative and unique business model related to training services that takes into consideration providing a quality of education while sustaining financial profit.

Changes in the organizational governance between training centres and other educational organization affect the canvas (Osterwalder, Pigneur and Clark, 2010) related to the training sectors and may increase the degree of industrialization; this point needs more investigation in the future.

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