

# **Industry Perspectives on Quality: Perceptions towards its influence on cost and time in the Engineering Education.**

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## **Abstract**

The paper investigated the respondents' perceptions on industry perspectives on quality and analyzed its influence on cost and time in the Engineering Education. A survey was conducted targeting key participants from the School of Civil Engineering and Built Environment at the Central University of Technology in South Africa which included ;Lecturers, Students and Human Resource Management.

The study adopted both descriptive and analytical survey methods which allowed the use of questionnaires, structured interviews and review of related literature for gathering relevant data. The research targeted forty five people and a response rate of 93% was obtained. Based on the results from the respondents it was clear that quality depends entirely on performance, time and cost.

Keywords: cost, industry, time, management, perspective, perception, quality.

## **1. Introduction**

Quality is defined as “fitness to purpose”, i.e. providing a product (a building) which gives an appropriate service for which it is intended (Miscronet, 2007: Online). The price to be paid for a building is a reflection of the expectation of the quality. The quality of a product or service refers to the perception of the degree to which the product or service meets the customer’s expectations. Quality therefore has no specific meaning unless related to specific function and/or object. It is a perceptual, conditional and somewhat subjective attribute (Tanguchi, 2007: Online). In manufacturing industry it is commonly stated that “Quality drives productivity”. Improved productivity is a source of greater revenues, employment opportunities and technological advances. Most discussions of quality refer to a finished part, wherever it is in the process. Inspection which what quality insurance usually means is historical since the work is done (Tanguchi 2007: Online).

## **2.0 Quality standards and management**

A survey conducted on quality of construction by Federation International for Consulting Engineers (FIDIC, 2001: Online) confirmed that failure to achieve quality in construction is a worldwide problem. The pressure to reduce initial costs of construction and supervision were found to have had an adverse effect on quality, as could be predicted. The problem is serious and is evident in both developed and developing countries.

It further reveals that; within the conventional processes for the procurement of construction contracts, contractors who are keen to win tenders, can do so by submitting low prices ,but at the risk of not being able to produce construction work which fulfils the specification or meets such sustainable standards. Likewise consultants may be under pressure to reduce the initial cost of construction supervision so that contractors are not able to produce the required quality.

Lack of quality in construction is manifested in poor or non-sustainable workmanship, and unsafe structures, and in delays, cost overruns and disputes in construction contracts.

Quality involves doing things the right way the first time, according to Maloney (1990:400).The work done must conform to specifications agreed upon for the project. Quality performance is thus measured by the extent to which the completed work possesses the attributes desired by the client and the designer. Poor quality performance results in increased rework, which may lead to time and cost overruns.

## **2.1 Cost and time**

The interrelationship between time and money is always of major importance to both the owner and the prime contractor. In order to complete a project on time the contractor must have a sufficient cash flow (Hazen and Sawyer, 2007).This means that each contractor must be paid promptly, within the terms of the

contract, for the work performed within the specified payment period. It is therefore essential that all progress payments, as well as payments for additional works ordered by client, be quickly processed to maintain the contractors cash flow.

Bassett, Morledge and Sharif (1996), recognizes that construction projects frequently finish late in terms of contract dates, programmed durations and consequently client expectations. Disappointment, dispute and litigation often follow. The paper argues that time for construction is the consequence of the logic of any (one) design solution for any problem. Complex designs solutions involving on-site rather than prefabricated processes consequently result in buildings of the same overall cost taking longer to build.

Harris,Holt Kaming and Olomolaiye, (1997: 830) maintain that inflationary increases in material cost, inaccurate material estimating and project complexity are the main causes of cost overruns. The predominant causes of delay are design changes, poor labour productivity and inadequate planning.

A major aim of a client in promoting a project is to procure the required facilities at minimum cost within his budget (Chappell1991:14-20). For this reason time is one of the most critical factors that must be controlled in a project. Odeyinka and Yusuf (1997:31) have shown that causes of construction delays can be nested in four layers, namely, client-caused delay, contractor-caused delay, extra contractual delay and consultant caused delay.

Bingunath and Mustafa (2003) maintain that government; industry and clients are all seeking to bring about change in the construction industry to meet challenges of improving quality, competitiveness and profitability to increase value to clients.

Most construction contracts are signed with a definite contract period stipulated, and the extent to which this target is met is a measure of project success. A project that is completed late can be damaging both to client and contractor.

### **3.0 Methodology**

Both descriptive and analytical survey methods (observations and questionnaires) were used to obtain data in order to meet the research objectives. Leedy (2001) argues that facts are needed to solve any research problem. Therefore, certain methodologies are used to extract the meaning of data since these facts contain desirable aspects of the truth.

#### **3.1 Data collection procedures**

The data for this investigation was collected from primary and secondary sources. The primary data was obtained from Students, Human Resource and Academic Staff, all from the Department of Civil Engineering and Built Environment at the Central University of Technology, Free State in South Africa through the use of questionnaires, structured interviews and informal observations.

The secondary data in this study was obtained through literature review from relevant publications and information sourced from the institution's library. Library and international sources included conference papers, articles, reports, books, and journals, codes of practice, other thesis, and the Internet. The secondary data was utilized in order to establish criteria and theories against which the empirical research of the primary data was measured.

#### **3.2 Sampling**

Saunders, Lewis and Thornhill (1997) (cited in Mbachu, 2003) argue that, unlike the quota- and probability sample, there are no rules for sample sizes in non-probability sampling. Rather, the actual size depends, amongst other things, on available resources and the logic behind the sample selection.

### 3.3 Bias

“Descriptive surveys are particularly susceptible to bias.” (Nkado 1999:57) (cited in Mbachu, 2003). Leedy (1997:219) (cited in Mbachu, 2003) defines “bias” as any influence, condition, or set of conditions that single or together distort the data from what may have been obtained under the conditions of pure chance.

The researcher made all the effort to eliminate the likelihood of biased data although the possibility of biased data could be acknowledged. .

### 4.0 Results, data analysis and interpretation

Data gathered to achieve these were analysed by using simple descriptive statistics, namely frequency and percentages.

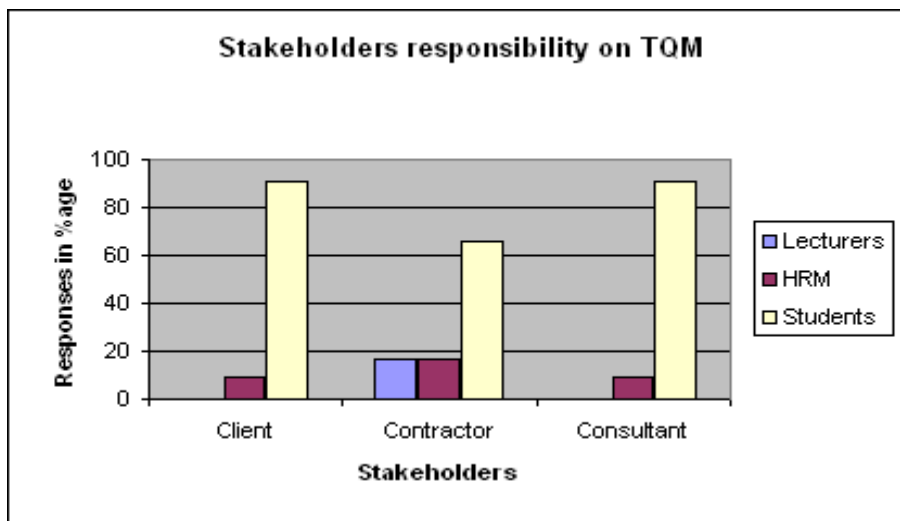
**Table 1: Respondents opinions on who amongst construction stakeholders should be responsible for the implementation Quality Standards (QS) in the construction industry**

	Lecturers	Human Resource- Managers	Students
Client	9%	9%	0%
Contractors	58%	33%	17%
Consultants	33%	58%	83%

From the above table 1 only 9% from both Lecturers and Human Resource Managers (HRM) responded that it is the responsibility of the client to implement Quality Standards (QS).58% of Lecturers responded that it was the responsibility of contractors while 58% of HRM were for the consultants.83% of students responded that it is the responsibility of the consultants.

**Table 2: Respondents opinions on who amongst construction stakeholders should be responsible for Total Quality Management (TQM) during construction period**

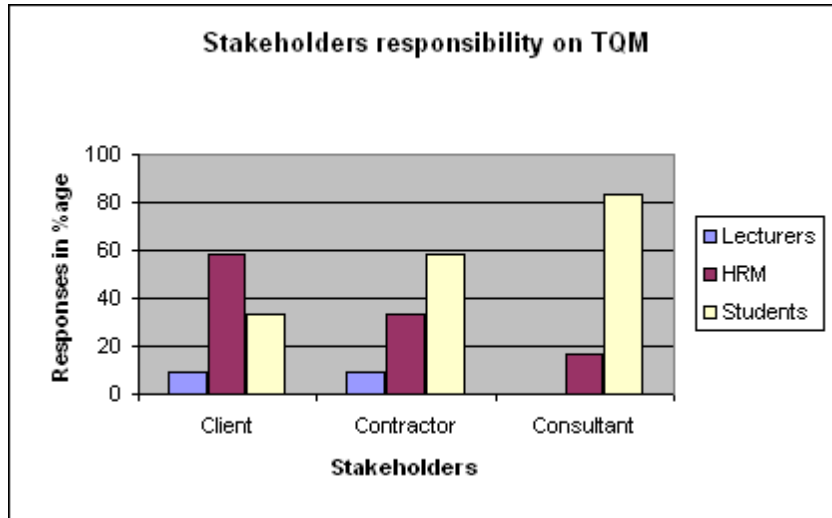
	Lecturers	Human Resource- Managers	Students
Client	0%	17%	0%
Contractors	9%	17%	9%
Consultants	91%	66%	91%



Results from table 2 show that Lecturers and Students do not perceive client as being responsible for TQM. 91% of the two responded that it should be the responsibility of the consultants while 66% of HRM agree with this statement.

**Table 3: Respondents opinions on whether prolonged construction time/duration could affect the quality of construction**

	Lecturers	Human Resource- Managers	Students
Yes	74%	66%	74%
No	17%	17%	17%
Unsure	9%	17%	9%



74% of both Students and Lecturers responded that prolonged construction time/duration could affect the quality of construction products by indicating “Yes”, 66% of HRM also agreed to this argument with “Yes” answer while 17% of HRM and 9% of both Students and Lecturers were “Un sure” about the statement. All the respondents had 17% with “No” answer to the statement.

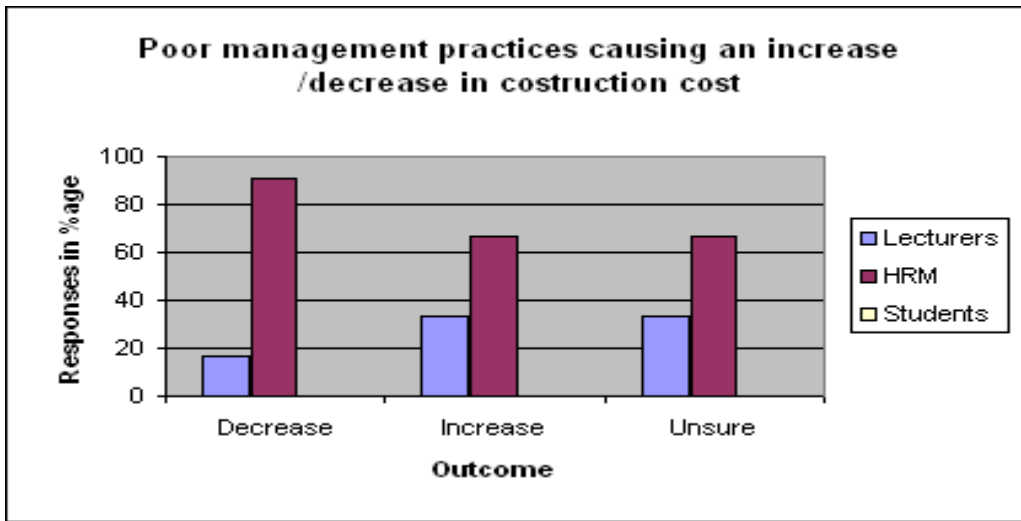
**Table 4: whether respondents agree that quality can affect the cost of construction works**

	Lecturers	Human Resource- Managers	Students
Yes	91%	91%	95%
No	17%	0%	2.5%
Unsure	0%	9%	2.5%

From the results, 91% of both Lecturers and HRM agree that quality can affect construction cost while 95% of Students also agreed to this statement by indicating “Yes”. Only 9% and 2.5% for HRM and Students respectively were “Unsure” with this statement. 17% of Lecturers responded with “No” answer to the statement.

**Table 5: Whether poor management practices can cause a decrease or an increase in construction costs**

	Lecturers	Human Resource- Managers	Students
Decrease	17%	33%	33%
Increase	91%	67%	67%
Unsure	-	-	-



17% of Lecturers indicated that poor management practices can cause a decrease in construction costs while 33% for both HRM and Students agree with this statement. 91% of the Lecturers responded that it would result into an increase in construction cost while 67% of both HRM and Students concur with the statement on the increase. None of the respondents was "Unsure" with the question.

**Table 6: Whether technical skills do influence proper quality outcome and better value for money in the construction industry**

	Lecturers	Human Resource- Managers	Students
Yes	91%	91%	91%
No	0%	0%	4.5%
Unsure	17%	17%	4.5%

91% for all the respondents agreed that technical skills do influence proper quality outcome and better value for money in the construction industry by indicating “Yes”. Both Lecturers and HRM responded by indicating” No” while only 4.5% of the Students indicated” No”.17% of both Lecturers and HRM were “Unsure” while only 4.5% of Students were “Unsure”.

All respondents gave their varying perceptions towards poor management and technical skills in the influence of quality as follows;

- It may lead to decrease in contractors profits
- It may also lead to increase in construction costs
- It may also lead to higher future maintenance costs
- It may also lead to construction disputes.

**Table 7:Which stakeholders would bear the costs due to poor management and technical skills**

	Lecturers	Human Resource- Managers	Students
Client	33%	17%	33%
Contractors	33%	17%	33%
Contractors & Client	33%	66%	33%

33% of Lecturers and Students indicated that client and contractors would bear the costs due to poor management and technical skills. Both of them also gave a

similar indication on contractors and client combined.66% of HRM indicated contractors & client while 17% of them were for client and contractor individually.

## **Conclusion**

Quality depends entirely on performance, cost and time in the construction industry. Based on the results from the respondents about 80% were of the opinion that consultants should be responsible for the implementation of TQM. Over 70% also agreed that prolonged construction period results in cost overruns while 92% responded that quality can affect the cost of construction works.91% of the respondents indicated that lack of technical skills do influence proper quality outcome and better value for money in the industry while 75 % were of the opinion that poor management can cause an increase in the cost of construction works. It can therefore be concluded that from the respondents' results that quality has an adverse influence on performance (through skills) cost and time .Bellow are some key findings:

## **Key findings**

1. Based on the results with varying percentages from all the respondents; all the stakeholders should be responsible for the implementation of quality standards in the industry.
2. Total quality management should be the responsibility of the consultants with little perception on the client and contractors.
3. Majority of respondents agree that prolonged construction time/duration can affect the quality of construction products.
4. Quality can affect the cost of construction works.
5. Poor management practices can cause a decrease or an increase in construction costs.
6. Good technical skills do influence proper quality outcome and better value for money in the construction industry.
7. All stakeholders would bear the cost in case of poor management and technical skills.

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