

FOSTERING CREATIVITY IN CONSTRUCTION EDUCATION: FINDING THE MEANING OF CREATIVITY WITHIN CONSTRUCTION INDUSTRY

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ABSTRACT

Many industries today attempt to meet their global challenges through two simple words: creativity and innovation. Construction industry more related to being a creative industry find no exemption. It constitute of realising buildings in Architecture and infrastructure in Engineering through technological interventions. It is an industry that relates to artistic, scientific and technical knowledge. Education in construction industry should also consider this complex nature and fostering creativity will differ from one subject area to another. One such basis for determining a definition and identifying a nuance of the creativity would be to interpret the creative definition into the education objectives: Knowledge, Skills and Attitudes. The composition of these three may differ from one discipline to another but a similar mechanism could be used to educate to foster creativity in any knowledge base either artistic, scientific or technical.

First step in this process is to find a working definition to creativity or innovation in the particular knowledge base, discipline or field. It could be done by simply asking “what does it meant to be creative in construction industry?” for the purpose of this paper or asking a similar question pertaining to any industry in a similar manner to kick-off a series of inner thoughts.

Keywords: Creativity, Innovation, Construction Education, Education Objectives, Skills, Knowledge, Attitudes.

1. INTRODUCTION

The significance of creativity and innovation has been felt for survival in any industry more than any time in the history. According to a recent study by IBM (IBM Corporation, 2010) with 1500 CEO’s it has been highlighted that “creativity is the most important leadership quality”. There have many other developments in various fields emphasising the needs for creativity for the advancement to meet the global challenges and construction industry will find no exemption specially being related to a creative industry as well. The paper attempts to discuss what creativity means in construction industry and its implications on fostering creativity in education programs.

Construction industry can be termed as a creative industry based on various aspects: it produces original products every time it goes into construction: there is a creative craft of architecture and design engineering involved in it: It produces creative products. It involves in realising buildings in architecture and Infrastructure in engineering through various technological interventions. It is an industry that relates to artistic, scientific and technological knowledge.

Any education program that relates to construction industry should understand this complex nature and allow for fostering creativity in their own definition. Defining would be the most difficult task and one suggestion is to define it in terms of education objectives (Bloom, 1956): Knowledge, Skills and Attitude (KSA). What is to be creative in construction industry? (or any related discipline) should we focus more on knowledge? Should we focus more on skills? Should we focus more on attitudes? What could be the magical formula of the composition of KSA? The composition of KSA may differ from one field of study to another based on the theoretical basis, focused subjects areas, philosophy of the school, socio-economic factors that will prevail from time to time. Designing the curriculum to get the desired KSA composition will provide a basis to foster creativity in an education program.

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2. FINDING SANCTUARY IN TWO WORDS: CREATIVITY AND INNOVATION

Darwin put his theory as the survival of the fittest: in today's context it is being creative and innovative that could be classified as the fittest. It is important to understand that creativity is commonly referred to as generating valuable original ideas while innovation is making those ideas in to a process or a product.

Recent development in the interest in study of creativity has demonstrated its significance in various fields. Europe has put creativity and innovation to fore in their cooperation where the Communication of March 2008 simply puts it as: 'Europe needs to boost its capacity for creativity and innovation for both social and economic reasons'. The decisions of the European council to establish the year 2009 as the European Year of Creativity and Innovation further strengthen their emphasis.

Creativity is a vague term to be defined and could only be defined relatively. Therefore, different individuals, disciplines, organisations, countries or regions may find their own way of being creative but the utmost necessity is consistently emphasised in various fields.

Out of the world self-made billionaires majority are engaged in knowledge based industries. The knowledge economies are rapidly taking over the industrial economies making a significant place for creative and innovative businesses to thrive in global markets. The intellectual property laws are becoming important aspect as the innovation become the key in success within global economical turmoil.

In economic development Asian region find it more important to develop entrepreneurship as opposed to large corporations in Europe and US (Bacon-Shone and Hui, 2009) and the degree of the regional creativity was enormous that Muhammad Yunus and Grameen bank was even awarded the Nobel Peace Award for their innovativeness.

As an Industry construction industry is significant for its visual component and making its mark for centuries. It is the landmarks of construction industry that tell the stories of the history civilisations are recognised through their interventions. Take the wonders of the world if it was not for the contribution of the construction industry they would not exist. All the wonders were outcomes of constructions industry and they were named wonders for their creativity and innovativeness. This fact itself provides strong evidence of its strong relation to creativity within the industry.

3. CONSTRUCTION INDUSTRY VS CREATIVITY

The relationship of construction industry to creativity is twofold: in one way it relates more to being a creative industry and in another way as in any other industry the need for creativity and innovativeness has become vital for its survival.

Defining it as a creative industry is more dependent on it being producing creative items, producing original products, engagement of a creative process, visual nature of the industry and engagement of creative professionals within the industry (refer interview outcomes, section 7, p. 5). Creating of visual landmarks makes it an important industry that demands for it to become a creative industry.

Understanding the degree of creativity or innovativeness within industry can be done in two ways: in one way theoretically it could be defined to give a framework for creativity and in another way it could be evaluated using various indicators.

Theoretically understanding the industry referring to the common attributes of creativity the Person, Product, Process and Place the creativity in construction industry can also be understood.

Using various indicators a composite index can be developed to measure creativity where these indicators could include research publications, patents, construction sector developments, new business registrations, revenue generations, income generation factors, GDP percentage growth. This is another vast interesting area for further investigations beyond the span of this paper but worth mentioning.

For any Industry its education would play a major role for its advancement. Considering the importance of creativity in construction industry it will be equally important to foster creativity within the making of their work force through the education system.

4. FOSTERING CREATIVITY IN EDUCATION

Education plays a crucial role in relation to creativity (Villalba, 2009). Education is the key to enhance creativity encouraging them to be innovative as a lifelong habit. Understanding creativity again plays a major role in fostering for creativity in education. David Bohm (1998, p. 1) states that creativity is something that is impossible to define and if the whole idea of creativity is so nebulous then an attempt to foster creativity in learning may be equally difficult. Ried and Petocz (2004, pp. 46-53) summarise many theoretical developments in educating for creativity that has been done mainly focusing on theories of creativity developed by educational psychologists.

Which attribute to focus: creative person, product, process seems to be in the debate and there are no hard rules and depending on the learning domain and within its relativity to its environment this could change (Reid and Petocz, 2004). Some theories have been developed on person (Amabile, 1998) and some have focused on process (Swede, 1993) whereas others have worked on the product (Sternberg and Lubert, 1995).

It is also argued that education systems educate children out of creativity (Sternberg, 2006; Villalba, 2009). Studies have shown that children's ability to come up with many original ideas decrease with the education systems educating to conformity. Sternberg (2006) argues that the creativity is destroyed when students are asked to colour within the lines of the colouring books. Judgement of creativity depends on the context and the stakeholders in that context (Beghetto, 2005) where it could also impact the creative output. Collins and Amabile's (1999) research on motivation and creativity also revealed that creativity is associated with high levels of interest, enjoyment and curiosity.

Recently there have been developments in education sector for fostering of creativity understanding its necessity. Education may play a major role in fostering for creativity in any industry for its progression. Therefore the education system should be consciously designed to cater to its contemporary needs in fostering creativity and bringing innovative professionals. Understanding the industry, its socio-economic setting, cultural context, human capacity available are some factors to be considered in planning these education programs.

5. CONSTRUCTION EDUCATION

When the term construction education is used it refers to a broader spectrum with various definitions. In a broader sense it can be understood as the education system that educates labour at all levels needed for the function of the industry. This may include formal and informal sectors. Formal education will start from vocational training to undergraduate, postgraduate and professional education programs. Informal sector are unskilled and skilled labour that get there onsite training and knowledge transfer.

The history of the construction education runs back to a time the knowledge transfer was done by the teacher to student as a family held craft or a craft that was learnt by a student living with the teacher. All knowledge, skills and attitudes are transferred throughout a long time. The master builder or the Architect in the historical time was needed to have knowledge of many disciplines or rather almost ten disciplines (Vitruvius, 216 BC). A similar need is found in modern world but delivering mechanism has been changed to acquiring consultants for every lapse in knowledge. Different specialisations are available within one discipline allowing for very specific situational specialist to be consulted according to situation.

For the working framework of this paper the education that are concerned with professionals were considered. Within Sri Lankan Context four main disciplines with established professional bodies can be seen: Architecture, Civil Engineering, Quantity Surveying, Town and Country Planning. When the construction education is referred within the study the education programs that prepare the professionals needed for the industry are considered.

6. FINDING A WAY TO FOSTER CREATIVITY IN CONSTRUCTION EDUCATION

Understanding this complex nature the education must also suit the industry in fostering creativity and innovation not merely for its survival but for progression as well. Since the professional education as a whole was taken into consideration fostering creativity should also be discussed on ground that is common to all disciplines in a more objective stance. Therefore first a definition was to be formed for creativity within construction industry. This could be done by raising a simple question “what does it mean to be creative in construction industry?” To further interpret this into education term this can be elaborate in asking what could be more important out of three education objectives: Knowledge, Skills and Attitudes.

For conducting of the research a broader guide can be used in order to understand the education objectives in terms of construction education.

Knowledge: Subjects within cognitive domain are usually subjects with technical nature that deals with numerical notations, calculations, involves cognitive skills (Bloom, 1956). Majority of the subjects taught within the programs are under this category.

Skills: Subjects within psychomotor domain include ones that involved skill development (Harrow, 1972) such as drawing, sketching and all design projects.

Attitudes: Subjects within the Affective domain that involves understanding of value systems, emotions or feelings (Bloom, 1956). Subjects with more philosophical bias fall into this category.

Depending on the definitions the education can focus on a certain line of thinking. For a school of thought that is based on a philosophy that creativity in construction education is being able to respond to financial constraints therefore focusing more on knowledge would come up with a education program to suit that particular need. Even though the mechanisms showcase to be seemingly simple, actual realisation would be a complex task that involve in much more in depth study of the subjects and developing a taxonomy for the subjects to be divided into Knowledge Skills and Attitudes.

7. INTERVIEW OUTCOMES

A scope was defined for the particular study within the construction education and also within the suggested mechanism and then a method was derived to conduct the study.

7.1. SCOPE

The scope is framed for this paper in two ways: in one way it is defined within the construction education and again its scope is limited within the suggested mechanism to foster creativity within an education system for only attempting to find a definition for creativity.

When the term construction education is used within this paper it is referring the professional education including undergraduate, postgraduate and professional education programs. Ideally for the study views of the four professionals Architects, Engineers (Civil), Quantity Surveyors, Town and Country Planners would have been taken but making a realistic scope only Architectural view was taken. With the common view that they are the most creative professionals as a starting point their view was taken and leaving room for further studies with other professionals in the industry.

The suggested mechanism has more steps towards building education programs but within the scope of the paper only step in finding a working definition is considered. Finding the meaning of creativity and further the important education objective was only considered getting a rather qualitative view on the concept.

7.2. METHOD

The study was done using structured interviews of 20 professionals and academic Architects within construction industry. The group have experience ranging from 03 years to 37 years. 09 were females and 11 were males out of the interviewees. Out of the sample 09 were academics, 07 were professionals and 04 are engaged in both.

The interview was focused on raising structured questions including which education objective can be more influencing in fostering creativity as seen from a very basic professional or an academic point of view. The interviews were done covering their views on current Sri Lankan context. Then data was analysed using both qualitative and quantitative methods to draw some conclusive remarks.

7.3. IS CONSTRUCTION INDUSTRY A CREATIVE INDUSTRY

Answering for the question “Is construction industry a creative industry?” 87% answered yes while 13% answered as it depends on situation specially on the process of in which it is realised.

Conceptualising on the reason for categorising construction industry as a creative industry following concept map is drawn.

The construction industry was categorised as a creative industry based on four aspects of people involved, product, thinking process and nature of the industry. Each aspect again has its own different concepts making the total concept of construction industry is a creative industry.

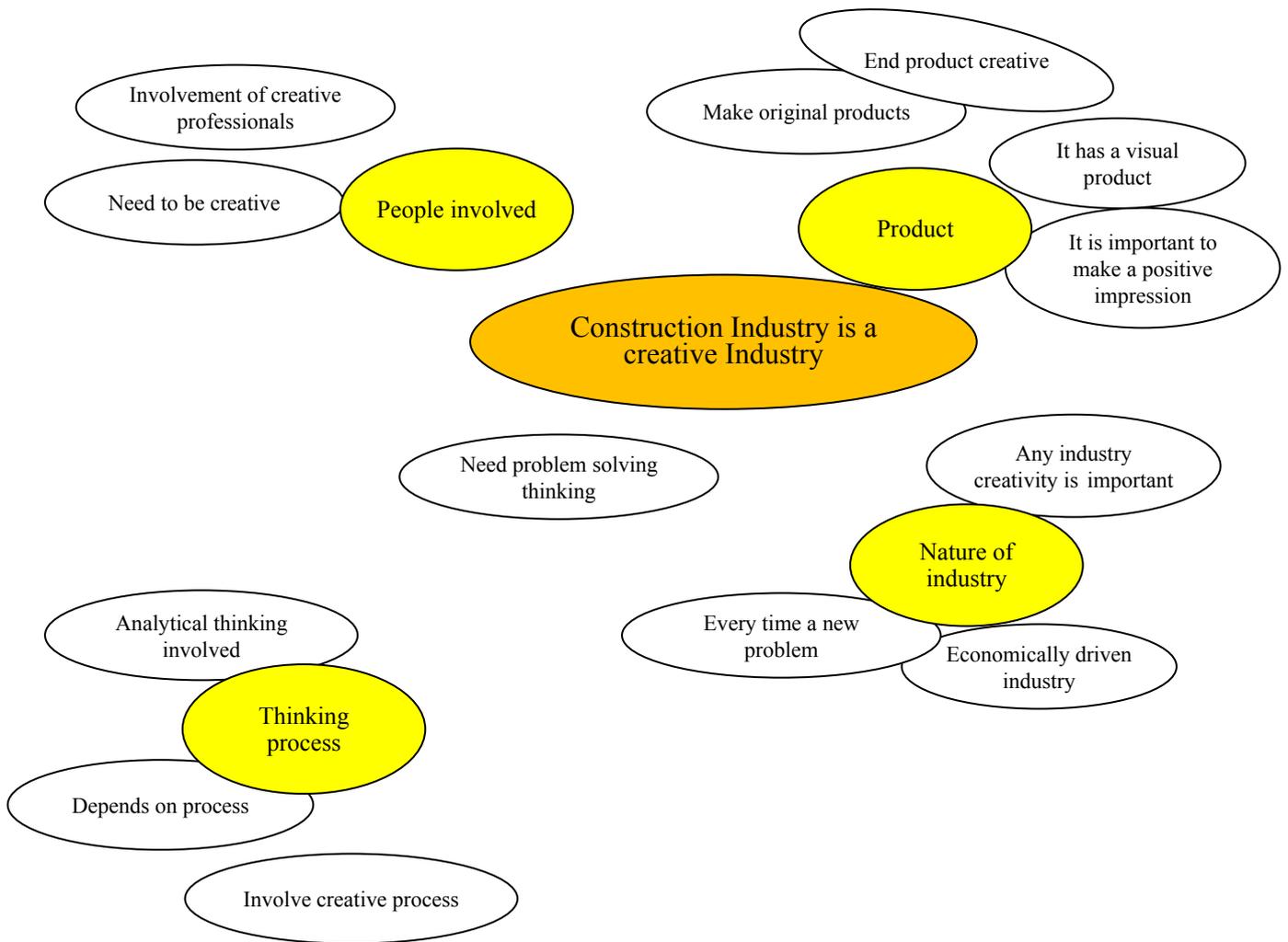


Figure 1: Concept Map of Why Construction Industry is Termed as a Creative Industry

7.4. WHAT DOES IT MEAN TO BE CREATIVE IN CONSTRUCTION INDUSTRY?

Analysing the various concepts from the interviews following concept map was drawn.

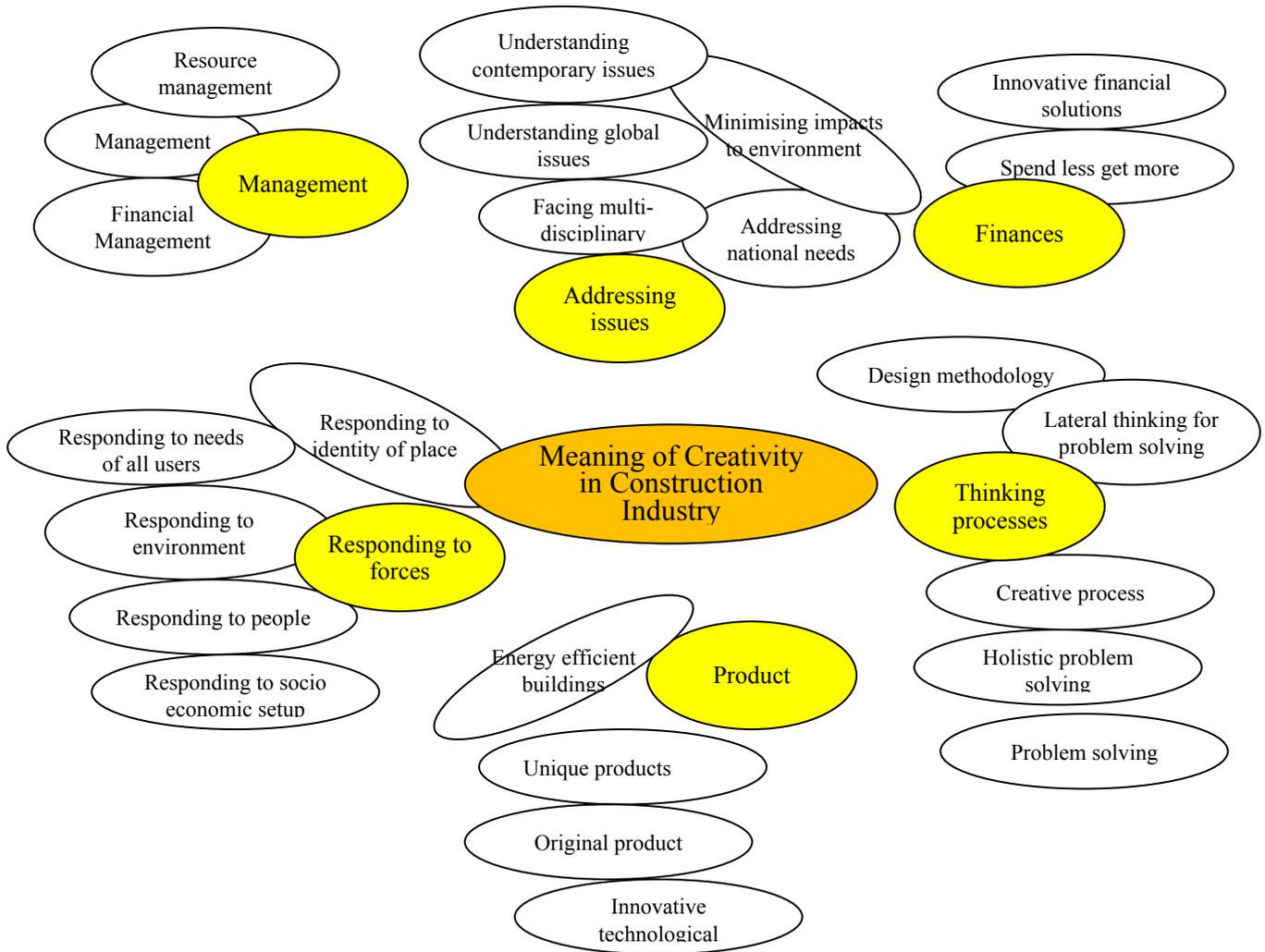


Figure 2: Concept Map of What Does it Mean to be Creative in Construction Industry

The responses to the question “what does it mean to be creative?” was analysed using a coding it is seen that six themes management, addressing issues, finances, responding to forces, product and thinking processes can be found constituting the meaning of creativity in construction industry. Every theme is again made up of various concepts that were stated during interviewed in defining the creativity within the construction industry.

7.5. WHAT IS MORE IMPORTANT, KNOWLEDGE? SKILLS? OR ATTITUDES?

Out of the interviews 18.75% responded as knowledge is important where only 6.25% responded as skill is important. 62.5% was with the view that attitude is the important factor in fostering creativity in an education programme. 12.5 % responded that all carry equal weight and it is a difficult task to prioritise.

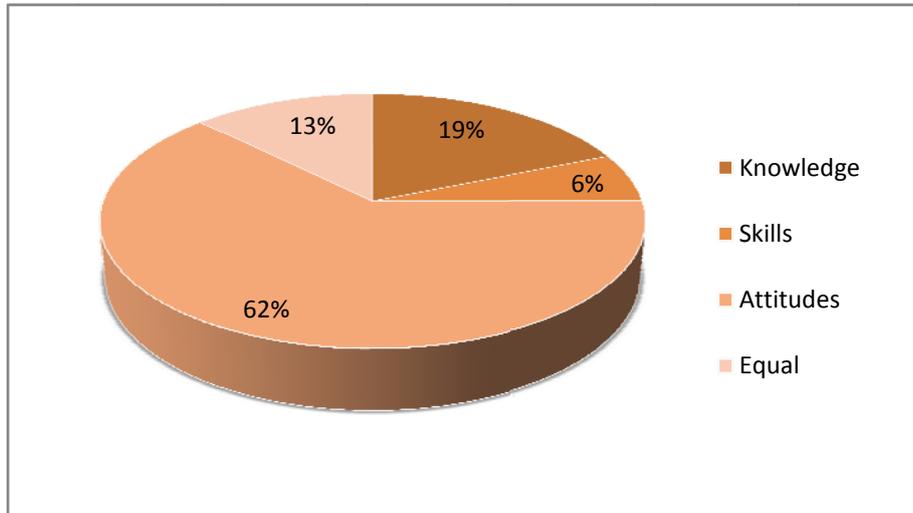


Figure 3: Pie Chart of Which Education Objective is More Important

7.6. SHOULD THE COMPOSITION CHANGE ACCORDING TO PROFESSION?

42.85 % believed that KSA composition in education programs should change by profession while 57.15% said that being professionals it should not change by profession. Out of the ones who believed that the composition should not be changed according to profession 91.66% have also believed that attitudes are important.

7.7. SHOULD EDUCATION PROGRAMS IN CONSTRUCTION EDUCATION FOSTER CREATIVITY?

100% agreed that education programs within construction industry at all levels should foster creativity.

7.8. CURRENT RATING FOR FOSTERING CREATIVITY

Rating was done on a scale of 1 to 7 where 1 is being the lowest. Out of the rating of current situation following are the averages.

Table 1: Rating of Education Programs for Fostering of Creativity

Profession	Average Rating
Overall Construction Education	3.5
Architecture	4
Civil Engineering	2.5
Quantity Surveying	3.2
Town and Country Planning	2.8

It is noted that majority have said that the current education system is fostering creativity at an average level. Especially that architecture is fostering creativity at a higher level. The low figures in civil engineering and town and country planning are due to low rating of those disciplines as fostering creativity in current context.

8. SOME CONCLUDING REMARKS

Deriving solid conclusions out of the discussion are totally out of the pure intentions of this paper and this aims to trigger inner thoughts among professional within the constructions industry. There seem to be

interesting and valuable ideas among professionals both in profession and academia regarding the creativity within construction industry and the utmost need for its emphasis within education programs.

87% of the interviewed were under the strong belief that construction industry is a creative industry. The most unique reason for it was that it produces original different project every time a construction take place in a different location. The construction industry was also viewed as a creative industry since its visual components. Its products are seen on ground. Therefore people tend to perceive it as a creative industry.

It is also important to understand why some have doubts in categorising it as a creative industry. The comment was the process is important. If it is merely a mass production process of infrastructure development it is not fair to term the industry as a creative industry. But any industry will have this component. Even dress designing which can be categorised as a highly creative industry has a mass production process as well as a designer creative process. It understands the background setting in which it operates one will be able to understand its true creative nature.

Defining the meaning of creativity within construction industry most frequent answer was that it is a problem solving exercise and ability to solve complex problems is being creative in the industry. Even among architects who are considered to be creative professionals the analytical problem solving nature of the creativity was the emphasis for construction industry. Even the responses to other themes have stated that finding solutions to complex problems within the construction should be addressed within education programs. This pave way to think that education in totality should be more focused on problem solving, professional and practical aspects but at the same time building attitudes that is common for all professionals.

100% agrees that education programs within construction education should foster creativity which is a positive starting point in promoting creativity in education programs.

It is also important to emphasise on the fact that rating at present on overall construction education has given an average of 3.5 in a 1 to 7 scaling. Only architecture is given a value above overall rating where all others below it. This reflects the need to address this issue within all construction education programs including architecture which should yield a higher much value in a rating for fostering creativity.

There can be many ways used and can be used to effectively foster creativity in education programs. But focusing on a specific education objective is one such suggested method that can be used and the finding is also interesting where 62.5 % was with the view that attitude are the dominant factor in fostering creativity in any education program. And 88% who said attitude is important is also believed that the composition should not change from profession to profession. All the professionals should be educated more focused on attitudes.

It is again emphasised that above are some remarks not solid conclusions that could pave way to think on these lines. The viewpoints presented are an architectural point of view where others might have different stands on how to be creative in the industry. Further studies could be done with interviews covering other professionals getting a more comprehensive view on the concept and finding more methods to foster creativity in education programs. It is also important to emphasis the holistic nature of the construction industry in its education programs rather than educating isolated professionals. Being workforce of one industry proper integration will make efficient system of operation.

Whatever steps we take what experiments we do what remains important fact is that the industry educates its professionals fostering creativity to meet the demanding global challenges of the 21st century so that the industry is not left behind and the next wonders of the world may not become telecommunication products but construction outputs again and again.

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