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Brain Dominance and Learning Style Preference of Quantity Surveying Students in South Africa and Malaysia

Andries (Hennie) van Heerden[1*], Michelle Burger[2] and Elzane van Eck[3]

[1] School of Built Environment, College of Sciences, Massey University, Auckland, New Zealand
[2] Department of Construction Economics, EBIT Faculty, University of Pretoria, Pretoria, South Africa
[3] Department of Construction Economics, EBIT Faculty, University of Pretoria, Pretoria, South Africa
a.vanheerden@massey.ac.nz, michelle.burger@up.ac.za, elzane.vaneck@up.ac.za

Abstract. The purpose of this study was to investigate the brain dominance of quantity surveying students in South Africa and Malaysia to determine the learning style preference to which they best relate. It further aims to establish if there is any correlation in brain dominance of quantity surveying students in different countries. A quantitative research methodology was applied, making use of a questionnaire consisting of short questions. The research respondents were third-year undergraduate quantity surveying students at the University of Pretoria and Universiti Teknologi Malaysia. Data collection and analysis was undertaken at the University of Pretoria. The most dominant brain quadrant for South African quantity surveying students was the lower left quadrant B (organised, sequential, controlled, planned structured, detailed, and scheduled). For the Malaysian students, it was the upper left quadrant A (analytical, technical, logical, rational, and precise). A comparative analysis between the two student groups indicated that there was a difference in brain dominance, although not significant. Adapting teaching techniques according to these findings may help students to better process and engage with module content at a higher educational level.

Keywords: Quantity Surveying · Brain Dominance · Learning Styles · Higher Education

1 Introduction

The construction industry-focused traditionally on hard skills and less on the soft skills. Although industry still acknowledges the importance of the much needed technical requirements, employers are seriously seeking students with employability skills or soft skills [1]. The construction industry moved to a service industry that is competing in the international arena [2]. There is a soft skill gap among construction

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school graduates [3]. They further elaborated on the fact that the construction industry requires people who are well versed with a deep level of soft skills, as this increases the efficiency of work, processes, and technology.

The students enrolled both at the University of Pretoria (UP), and the Universiti Teknologi Malaysia (UTM) has a multicultural background. A previous research study demonstrated significant ethnic group differences in the learning style preferences of Southeast Asian and White students [4]. This study further substantiated statistically significant differences in the learning style preferences within diverse Southeast Asian groups.

The traditional Quantity Surveying (QS) programme was mostly taught methodically and logically around left-brain activities. It is necessary to have basic knowledge about specific topics to have a comprehensive understanding of the preferred learning methods. These topics include quantity surveying as a profession, the University of Pretoria's quantity surveying curriculum, and brain dominance. First, it is necessary to understand what quantity surveyors must be able to do in their profession. Secondly, to the need to investigate if there is a correlation in brain dominance of quantity surveying students from different countries and lastly, it is necessary to establish if there is a need to increase the right brain activities within the various courses presented in the quantity surveying curriculum at the University of Pretoria.

2 Literature Review

2.1 South African Quantity Surveying Profession

The modern quantity surveyor can be seen as the "construction cost advisor or construction cost consultant with a broad knowledge of construction economics" [5]. The Royal Institution of Chartered Surveyors (RICS) elaborated further and stated that a quantity surveyor is "an expert in the art of costing a building at all its stages".

The professional quantity surveyor should be able to provide services within the six-stages of construction [6]. The first stage refers to the "Inception," and this is where the initial brief is prepared and needs approval from the client before cascading down to the next stage, "Concept and Viability". During the second stage, the concept design is completed, and the client receives an initial cost estimate and feasibility for approval. After approval, the third stage, "Design Development," is reached. During this stage, the architect will develop more detailed designs that will enforce more accurate cost estimations. Again the client needs to sign approval to move into the next stage, "Documentation and Procurement". Bills of quantities and comprehensive tender documentation are prepared during this stage. The tender evaluation process follows and contract documentation between the successful tenderer and the client is signed. The "Construction" stage follows where the quantity surveyor will become responsible for the cost management of the project. During the last stage, "Close-out," the quantity surveyor will be responsible for the financial close-out of the project [5].

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2.2 University of Pretoria's Quantity Surveying Programmes

Students at the University of Pretoria can enroll for both a degree and honours degree in quantity surveying. Several subjects are taught at the university in preparation for the quantity surveying profession. At the undergraduate programme, these subjects can be divided into building essential modules, such as building sciences, building services, building drawings, and site surveying. A robust numerical basis is instilled through subjects such as mathematics, various structure modules, and statistics. Further to these, the quantity surveying students complete subjects such as economics, financial management, and their most essential year modules, quantities. During their honours degree, they focus more on contract law, construction management, and cost- and feasibility studies [7].

As indicated above, these subjects taught at the University of Pretoria aims to provide quantity surveying students with a comprehensive knowledge of building methods, procedures, and materials. Further to this, the student is equipped with economics, finance, contractual matters, and detailed measuring of quantities. The subjects aim to sufficiently prepare students to face the realities of the quantity surveyor profession. Further to the honours, degree programme the University of Pretoria also requires quantity surveying students to accumulate 240 hours of work experience before obtaining their honours degree [7].

2.3 Hermann's Whole Brain Model

The Whole-Brain Model divides the human brain into four major quadrants, which are exemplified by the upper left A (analytical, technical, logical, rational and precise), B (organised, sequential, controlled, planned structured, detailed and scheduled. C forms part of the lower right and D the upper right quadrant. Quadrant C is sensory, emotional, people-oriented, teamwork, personal relationships and communications. Quadrant D refers more to visual, holistic, creative, integrative, conceptual, intuitive, entrepreneurial and future-oriented thinking [8] [9].

A table with the different associations of skills, actions, and perceptions with the four Whole Brain Model quadrants were created. The table highlighted words in quadrant A such as, mathematical, accounting, technical, working alone, running objects, processing numbers, logical operations, problem-solving, analysis, financial management, and rational thinking. Planning, scheduling, implementation, organising, mechanical, legal, administrative, controlling, disciplined and management in quadrant B. Quadrant C, producing ideas, synthesis, strategy building, innovation, risky, communication and ability to grasp the whole. Interpersonal communication, understanding people, supporting, writing, participant, speaking and helping people just to mention a few from quadrant D [9].

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Fig. 1: Hermann Whole-brain model [13]

It was confirmed that there is "compatibility between the processes associated with each of the four modalities that constitute whole-brain learning and the processes associated with reaching outcomes-based education's (OBE) critical outcomes". They indicated that outcomes such as critical thinking, problem-solving, appreciation, evaluation of information, and communication are all associated with all four quadrants. It further indicated quadrant B (application) quadrant A (analyzing) and quadrant D (synthesizing) [10].

A research study further revealed that there is a noteworthy difference in the learning styles of White and Southeast Asian students. Quantity surveying students are industry-specific and, even though from different ethnic backgrounds, should fulfill the same job descriptions, thus indicated similar brain dominant profiles [4].

"Deep structured learning takes predominately place when all four quadrants are engaged [10]." Although each quadrant is different, it is regarded as equally important, and to be more industry ready, the quantity surveyor students need to be well balanced in all four quadrants [11] [12].

3 Research Method

Data collection and analysis was undertaken at the University of Pretoria. A quantitative research method was applied, making use of a questionnaire consisting of 24 short questions. Each question was associated with a different brain quadrant, and questions were presented in random order. Students answered each question by using a 1 to 5 Likert scale. The numerical representation of the Likert scale ranged from

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strongly disagree (1 on Likert scale) to strongly agree (5 on Likert scale). Empirical research was conducted in South Africa and Malaysia. The research respondents were third-year undergraduate quantity surveying students at the University of Pretoria and Universiti Teknologi Malaysia. 18 UTM students completed the questionnaire, but only 17 responses were valid. 45 UP students completed the questionnaire, and all responses were valid.

4 Data Analysis and Findings

Data were analyzed by firstly calculating an average percentage per question. Once this was done, each question was related to the relevant brain quadrant and an average percentage per quadrant was calculated. These percentages are indicative of the preference students have towards utilizing a particular brain quadrant.

Figure 2 indicates that the most dominant brain quadrant for South African QS students was quadrant B (86%), followed by A (80%), D (71%), and C (69%), respectively. The average of each quadrant was calculated and ranged between 69% and 86% for South African students. Figure 2 further indicates that the most dominant brain quadrant for Malaysia QS students was quadrant A (81%), followed by D (80%), B (79%), and C (77%). The average of each quadrant was calculated and ranged between 77% and 80% for Malaysian students. A comparative analysis between the two student groups indicated that there was a difference in brain dominance but not significant. The South African QS students are inclined towards the left side of the brain (quadrant A & B) more than the right side (quadrant D & C), were it seems that the Malaysian students are more balanced between the left and right side of the brain. Both QS student groups seemed to prefer quadrant C least.

In both groups, the average of each brain quadrant scored a high percentage (above 69%), indicating that there is a strong preference towards utilizing all four brain quadrant. Quadruple dominant profiles constitude to aprroximately 3% of the population and often makes excellent CEOs [14].

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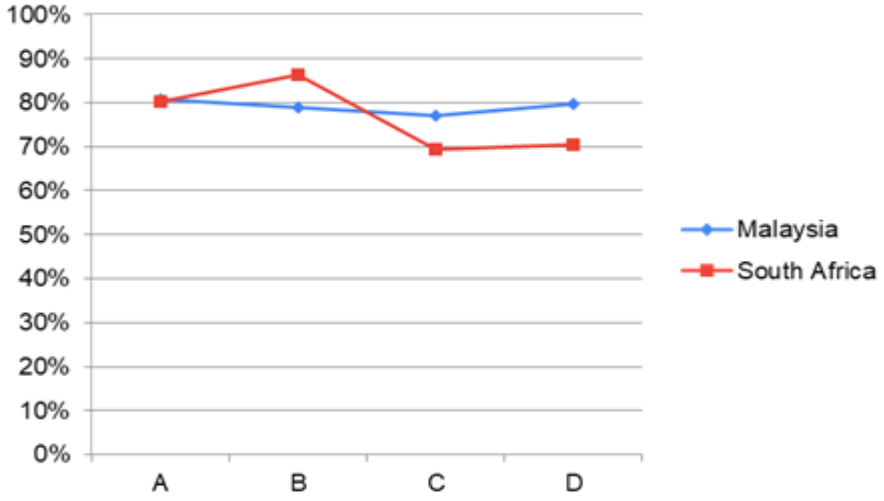

Fig. 2: Brain dominance comparison – UP and UTM QS students

QS students should thus relate best to teaching and learning strategies that are balanced between all four brain quadrants. When it comes to facilitating learning, there needs to be a shift from the predominant left-brain approach to a balanced whole-brain approach.

5 Conclusion

The traditional quantity surveying programme was mostly taught in a methodical and logical manner structured around left-brain learning preferences. The findings of the study indicates that QS students have a strong preference to utilize all four brain quadrants. Quadrant C is the least preferred and thus can effect brain processes that includeds other brain quadrants where all four is needed, such as, critical thinking, problem solving, appreciation & evaluation of information. Some of the other important activities laking from quadrant C that is very important in the construction industry is, teamwork; passion, explain ideas, supporting, ability of persuation; interpersonal communication, teaching, socializing and speaking fluently.

Brain dominance is thus balanced between all four brain quadrants. It can be concluded that there is a need to increase right brain activities in order to achieve a balanced approach to whole brain learning. Quantity surveying lecturers should present module content in a way that is representative of all four brain quadrants.

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