



ENHANCING STUDENT CRITICAL AND ANALYTICAL THINKING SKILLS AT A HIGHER EDUCATION LEVEL IN DEVELOPING COUNTRIES: CASE STUDY OF THE BRITISH UNIVERSITY IN DUBAI

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Abstract

Most higher education institutions do not systematically measure student learning and the extent to which their experiences lead to a growth in learning. It seems important to measure the degree of both general learning and development of critical and analytical thinking. Consequently, the primary objective of this project is to establish the degree to which a taught postgraduate education programme at a postgraduate university in a developing country develops student critical and analytical thinking skills. This paper will also investigate best practice and discover ways to promote critical thinking through identifying content and methodological issues, which may influence the ability of students to learn to think critically. The British University in Dubai (BUiD) was selected as the case study for this work and three different faculties with seven taught postgraduate programmes were covered. This study will use a major internationally standardised critical thinking (CT) test, administered first to the entry cohort and then again after students have completed their six modules. By comparing pre-test and post-test scores it is possible to establish whether these programmes do increase critical thinking skills. Surveys and interviews were also used; with the participants including students themselves, academics and senior management. The aim of these surveys and interviews is to identify content and methodological issues which may influence the ability to learn to think critically, as well as to identify demographic, social or cultural variables which may have an impact on that ability to think critically. The findings of this research may have significant value for other higher education institutions in the wider Gulf region.

Keywords: Critical Thinking, Higher Education, Developing Countries, BUiD, UAE.

INTRODUCTION

It appears that almost all academics delivering any postgraduate level study programme believe that developing the ability of students to think critically is very important and an essential goal of education. Economists suggest that the labour market values highly analytical individuals who can think from an abstract position.



This project will demonstrate whether the curriculum, teaching methods and evaluation of student learning as currently established in the master's programme in different faculties achieves the goal of helping students to improve their critical thinking. The findings will be of importance not only to our institution but for any institution involved in postgraduate teaching in the region. It is worth mentioning here that the findings have the potential for saving money by providing information which may stimulate interest in the programmes offered. Furthermore, the findings may lead to the discovery of aspects of the programmes, which may be changed to improve overall quality in any higher education institution in any developing country.

LITERATURE REVIEW

"I assume critical thinking to be reasonable reflective thinking focused on deciding what to believe and do...(Ennis:1985)". "When teachers refer to teaching for 'critical thinking' they typically mean teaching for analytic thinking. Teaching for analytical thinking means encouraging students to analyze, critique, judge, compare and contrast, evaluate, and assess" (Sternberg) .

Teaching students how to be effective thinkers should be one of our highest priorities alongside teaching them to be both ethically and morally solid and to have integrity. The modern world requires that people become deeper and better thinkers in order to respond to and help shape the information-rich globe on which we live. It should be a given that all teachers want their students to be high quality thinkers.

There has been a major change in the economic and social environment throughout the world. This is an information revolution that is a key development in the role that information has come to play in the global economy. Information has become a major factor in production as well as a commodity or product which is sold on the market. This revolution can be seen as a result of technological advances which have brought about the vast expansion of the capabilities of computers - particularly small ones – allowing significant improvements in the production process and increasing the quality and quantity of goods and services available to the market. Exemplified by a fast evolution of technology in daily life, as well as in educational lifestyles, the Information Age has allowed rapid global communication and networking to shape modern society.

Not only does the increase in information help productivity, it also functions through new consumer products like computers, mobile phones, recording, video and text reading devices and applications such as productivity software and games. The revolution has also included a significant increase in innovations, patents and improvements in almost all fields from magnetic resonance imaging to hand-held inventory control devices in supermarkets.

In this new age jobs traditionally associated with the middle class - assembly line workers, data processors, foremen and supervisors - are beginning to disappear, either through outsourcing or automation. Individuals who lose their jobs must either move up, joining a group of 'knowledge workers' - engineers, attorneys, scientists, academics, executives, journalists or consultants - or settle for low-skill, low-wage service jobs. These 'knowledge workers' currently form about twenty per cent of the workforce and that percentage is growing. One basic aspect of their work is that they must know how to think analytically and be able to solve problems. They are able to compete successfully in the world job market and command high wages. How they work represents a major challenge to traditional content heavy and teacher-centered education. More than ever before knowing how to think clearly, logically and critically is becoming vitally important. Teaching students to become effective thinkers is becoming recognised as an important and immediate goal of education today.

Various participants take on different roles in learning to think (Chadwick, 2011) a basic explanation of how the roles of students and teaches intersect is outlined in Table 1, which also shows what should be happening and what does not happen.

Table 1: Aspects of critical thinking and roles of students and teachers (Chadwick,2011).

Aspect	Student's Role	Teacher's Role	Problems
Acquisition Strategies	Learn the strategies & apply them in their daily learning process	Teach the strategies to their students & show them how the strategies improve acquisition, with attention on questioning.	Teachers mostly teach content not strategy. Parents often do not understand the nature & role of cognitive strategies.
Metacognitive Strategies	Learn to reflect on what they are doing, how & with what results, apply planning & knowledge of results of thinking to improve acquisition & performance.	Teach their students to reflect on what they are doing, mostly by prompting, & show them how this improves acquisition & performance	Teachers do little to stimulate awareness of process and results. They are interested in content mastery.
Structure & Logic	Search for the structure of the subject they are learning, & develop a sense of logic in viewing learning	Present content in such a manner as to highlight the basic structure of the subject they are learning, & stimulate the use of logic in the learning process.	Teachers often have only a superficial knowledge of the structure of the subjects they teach.
Dispositions	Develop positive temperament toward responsibility, persistence, quality, truthfulness, etc	Stimulate, support, activate temperament toward persistence, quality, truthfulness, etc	Teachers do take little responsibility for the child's attitudes and dispositions .
Intellectual Standards	Become aware of the standards for high quality learning & thinking & apply them in the learning process	Become aware of the standards for high quality learning & thinking & teach students to apply them in the learning process	Most teachers are unaware of the concept of intellectual standards except in an ambiguous & general manner, so the standards are not an integral part of their teaching practice
Problem Solving Skills	Learn, apply & practice problem solving skills such as the analytic method, the pragmatic method, the intuitive method, etc.	Teach students how to apply content appropriate problem solving skills such as the analytic method, etc.	Teachers teach problem solving in unsystematic manners.

METHODOLOGY

A review of the literature on measuring critical thinking skills (Behar-Horensein :2011) indicates that there are many ways to measure the improvement of critical thinking in higher education systems. They include the Cornell critical thinking test (CCTT) (<http://www.criticalthinking.com/cornell-critical-thinking-tests.html>), Watson-Glaser Critical thinking Appraisal-FS (WGCTA-FS) and California Critical Thinking Skills Test (CCTST).

A standard CCTT will be used to monitor the critical thinking skills of students for this research project. The CCTT Level Z develops a clear picture of critical thinking abilities. The tests can be used to teach critical thinking skills, to predict student performance on state proficiency exams, or for honours/AP programmes. Level Z covers the skills of semantics, definition and prediction in planning experiments (<http://www.criticalthinking.com/cornell-critical-thinking-tests.html>).

Students will be given a pre-test upon entry of the program and a post-test upon completion of their modules. Student demographic data will be gathered as is currently the practice of BUiD. A validated questionnaire will be used to gather student opinions and comments after the completion of the second administration of the critical thinking test. Permission will be sought from BUiD for the use of student demographic data from student records. Confidentiality will be maintained as the proposed project will be implemented within the university.

Thirty two students participated in this first stage of the test. Only eighteen of these managed to take the test after completion of their master's degree. Five from the Faculty of Education (FoEd) undertook education programmes, nine from the Faculty of Engineering and IT (FoE & IT) undertook Masters of Sustainable Design

of Built Environment and four students from the Faculty of Business (FoB) undertook the MBA programme. All students were given fifty minutes to finish the exam for both the first and second test. Testing took place in 2013, at the end of 2014 and then at the beginning of 2015 when they had completed their master's dissertation. Critical thinking improvement percentages were calculated based on the second stage results relation to those from the first. Table 1 illustrates student scores and results, the first row for each student represents the first stage and the second represents the second stage test.

An online survey was sent to all the current students at BUiD in different departments. The aim was to examine their progress in terms of developing critical thinking skills during their studies. 214 viewed the electronic survey, 151 students started and then fifty one dropped out leaving a hundred students who completed the survey in its entirety. The response rate was high at some sixty six per cent. For a full list of questions, please refer to Appendix (A).

The survey was also sent electronically to BUiD academics. The aim of the survey was to obtain their thinking on the results and to explore whether they were implementing methods of critical thinking in their teaching style and discussing ways to improve. Twenty seven academics viewed the survey, seventeen began to complete it and just five dropped out. This meant that twelve academics completed the survey, representing a seventy per cent response rate. For a full list of questions, please refer to Appendix (B).

As a method of triangulation, interviews were conducted with four Deans at BUiD as well as two decision makers after presenting them with a copy of the results. For a full list of questions of the interview, please refer to Appendices (C) and (D). The aim was to investigate their potential to promote critical thinking and find more ways to stimulate it among academics. Qualitative Triangulation involves a conscious combination of quantitative and qualitative methodologies as a powerful solution to strengthening a research design based on the fact that a single method can never adequately solve the problem of rival causal factors(De Vos: 1998). It is worth mentioning here that Methodological Triangulation entails combining both quantitative and qualitative data collection methods (Banister, Burman, Parker, Taylor, M. & Tindall,;1994). This is based on the rationale that a single data collection method is insufficient to provide adequate and accurate research results. Outside the quantitative section, this study is focused on assessing critical thinking level for students, so it will adopt qualitative methods for analysis. There are many types of qualitative analysis including: basic, phenomenology, ethnography, ground theory, narrative analysis.

Table 2: Summary of results of critical thinking test

Student N.	Faculty	Date of first test	Date of second test	Time taken to finish the test	number of unanswered questions out of 52	number of questions right out of 52	number of wrong out of 52	Score (%)	Critical thinking Improvement Percentage
1	FoEd	2/3/2013	3/12/2015	47	0	38	14	73%	4%
				36	0	41	11	79%	
2	FoEd	4/4/2013	7/11/2015	49	3	22	27	42%	9%
				36	1	26	25	50%	
3	FoEd	1/3/2013	29/1/2015	50	4	24	24	46%	11.5%
				46	0	30	22	58%	
4	FoEd	5/4/2013	3/4/2015	50	0	30	22	58%	8%
				37	0	35	17	67%	
5	FoEd	13/3/2013	6/2/2015	48	1	18	33	35%	7%
				37	0	21	31	40%	
6	FoE. & IT	19/3/2013	3/11/2015	49	2	23	27	44%	26%
				33	0	39	13	75%	
7	FoE. & IT	3/2/2013	17/11/2015	50	4	18	30	35%	34%

				49	0	37	15	71%	
8	FoE. & IT	2/3/2013	5/10/2015	50	0	29	23	56%	13%
				47	0	38	14	73%	
9	FoE. & IT	8/4/2013	15/11/2015	49	1	29	22	56%	16%
				32	0	40	12	77%	
10	FoE. & IT	2/3/2013	13/12/2015	50	0	19	33	37%	25%
				35	0	32	20	62%	
11	FoE. & IT	4/2/2013	26/2/2015	50	2	32	18	62%	14%
				34	0	43	9	83%	
12	FoE. & IT	1/3/2013	18/3/2015	50	1	20	31	60%	17%
				35	0	44	8	85%	
13	FoE. & IT	5/4/2013	8/11/2015	50	3	21	31	40%	32%
				29	0	40	12	77%	
14	FoE. & IT	13/3/2013	19/10/2015	50	3	20	29	38%	34%
				28	0	40	12	77%	
15	FoB	15/3/2013	15/11/2015	48	1	24	27	46%	6%
				33	1	27	24	52%	
16	FoB	3/3/2013	19/9/2015	45	2	27	23	52%	2%
				49	0	28	24	54%	
17	FoB	19/3/2013	2/10/2015	44	0	19	33	37%	9%
				25	0	23	29	44%	
18	FoB	3/2/2013	1/11/2015	50	1	20	31	38%	19%
				45	1	29	22	56%	

This study has, however, adopted the critical research approach where the goal is not only to study and understand but rather to critique, challenge, transform and empower (Merriam, 2011). For the interview with the Deans and their constrained time, a structured interview was used. This method features a rigorous set of questions from which one is not permitted to divert. For a full list of interview questions with Deans, please refer to Appendix (C).

When the two decision makers were interviewed, a semi-structured interview method was used. This is an open method, allowing new ideas to be brought up during the interview as a result of what the interviewee says. The interviewer in a semi-structured interview generally has a framework of themes to be explored. For a full list of interview questions, please refer to Appendix (D). In writing the questions, many sources helped with setting them and most came from a book on research design (Creswell, 2014).

RESULTS

In this section results will be presented from the students, academics and Deans. The last section will be devoted to the decision maker interviews. It was decided to leave some questions open-ended because this offers many advantages including acquiring an unlimited number of possible answers, revealing the logic of a respondent logic, thought processes, frames of reference and finally some unanticipated findings may be discovered.



Student perspective

The first question asked which faculty the student was studying in. 58.59% of the participants were from the FoE & IT, representing the highest percentage. Following them was the FoB who represented 24.24% of total participants. Finally, 17.17% of the participants were from the FoEd. Students were then asked about the number of modules they had completed so far, fifty one had completed six modules, twelve had completed five, ten had completed four, six had completed three, thirteen had completed two and finally seven students had just completed one module so far. Question three asked whether they were familiar with the term 'Critical Thinking', ninety students were positive and ten answered negatively. The next question was to find out that if they believed that BUiD tutors were trying their best to increase 'critical thinking skills' in themselves. Seventy two per cent confirmed that they had this trust in their tutors leaving twenty eight per cent who held a negative view. The percentages for the flowing questions were not that far from the latter. Seventy four per cent of the students believed that their critical thinking skills had been increased since joining BUiD. Most of these participants were from the group that believed BUiD tutors were trying their best to increase their critical thinking skills. The rest were still denying that they gained those skills representing twenty six per cent of participants. The next question was about the student's own role in increasing critical thinking skills and to what extent they were keen to apply them. The students were asked to rate themselves on a sliding scale.

In order to quantify student assessment of themselves in terms of critical thinking, they were introduced to the six aspects of critical thinking mentioned earlier in the literature review section (see Table 2) along with a definition for each aspect including: acquisition and metacognitive strategies, structure and logic, dispositions, intellectual standards and problem solving skills. It became apparent that most of the student rates were close to each other and that problem solving skills scored the highest among the six factors. This skill relates to analytical, pragmatic and intuitive methods and how these can help students to practice problem solving skills (see Figure 1).

Finally, yet importantly, they were asked what things they think that BUiD lacks in terms of tools, resources or instruments that may be of benefit to the promotion of critical thinking. Since this question was open-ended, many students stressed the point of a lack of hands-on work – in terms of physical work or experiments to develop critical thinking through experience. The need for laboratories with updated software and training services was also highlighted.

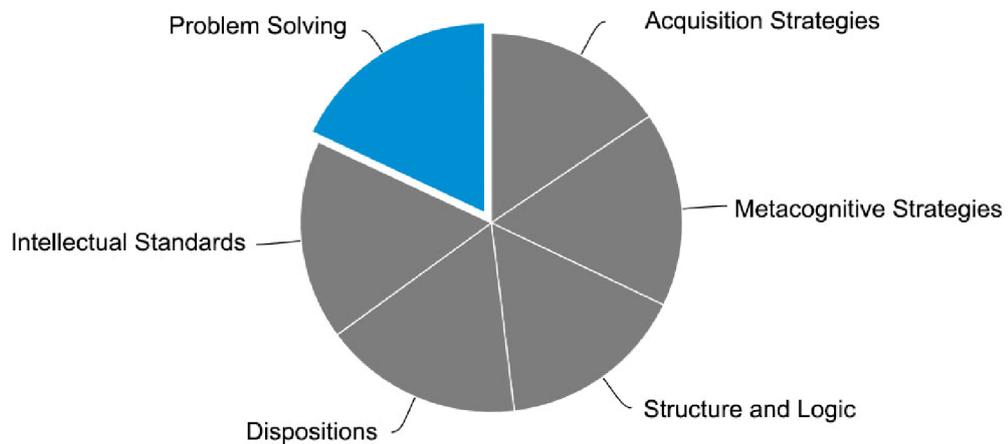
Academic perspective

Eleven academics completed the survey out of the twenty seven who viewed the survey online. The completion rate was seventy per cent, excluding the five who dropped out and the average timing to complete the survey was 6 minutes. The eleven academics include four from the FoEd, five from the FoE & IT and one from FoB. All the academics confirmed that they were aware of the concept of critical thinking. When the academics were asked whether 'increasing critical thinking among students' was one of their module outcomes, ten of them confirmed it was and only one said no.

Table 1, which illustrates the aspects of critical thinking and roles of students and teachers, was shown to the academics. They were then asked to what extent they were keen to apply and also asked also to rate themselves. Figure 2 collates their responses.

Comparing the results with Figure 1, it seems that eighty one per cent of students eighty eight per cent of academics think that they apply problem-solving skills – very similar figures.

When it came to their perception towards the summary of the results of the critical thinking test (Table 2) most of the academics from FoE & IT were very happy and positive that their students achieved the highest results. Some were somewhat frustrated and expressed some concerns with regard to the time taken by each student. Others statements included "Would such a small number of student sample be enough to arrive at a conclusion" and "others may need more attention to develop CT".



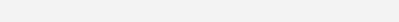
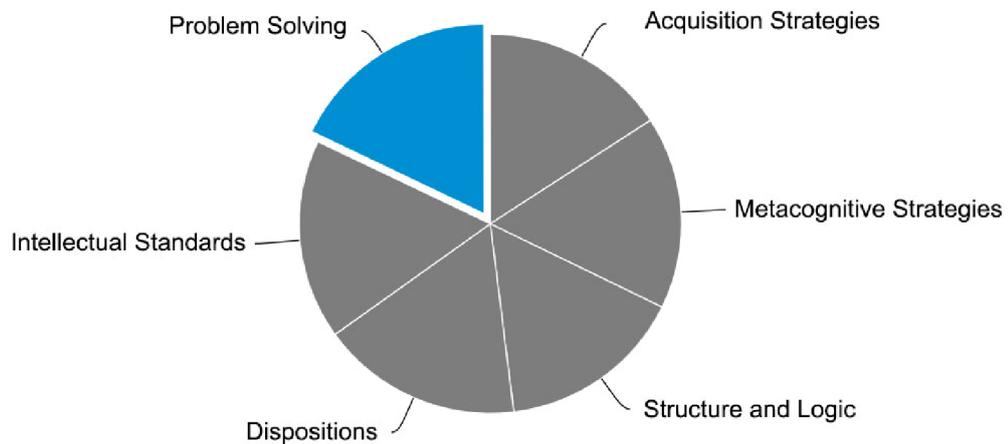
Question	Count	Score	0	100
1. Acquisition Strategies: students should learn the strategies & apply them in their daily learning process	99	70.02		
2. Metacognitive Strategies: students should learn to reflect on what they are doing, how & with what results, apply planning & knowledge of results of thinking to improve acquisition & performance.	97	74.93		
3. Structure & Logic: students should Search for the structure of the subject they are learning, & develop a sense of logic in viewing learning	97	72.39		
4. Dispositions: students should develop positive temperament toward responsibility, persistence, quality, truthfulness, etc	97	76.28		
5. Intellectual Standards: students should become aware of the standards for high quality learning & thinking & apply them in the learning process	96	77.64		
6. Problem Solving Skills: students should learn, apply & practice problem solving skills such as the analytic method, the pragmatic method, the intuitive method, etc.	96	81.19		
Average		75.41		

Figure 1: Student roles in increasing 'critical thinking' skills and to what extent they are keen to apply them

Dean's perspective

The Deans of four different faculties were interviewed and the average time taken was ten minutes. All four confirmed that they are aware of the concept of critical thinking. The four Deans all teach alongside their administrative responsibilities and all confirmed that increasing critical thinking among students was one of their module outcomes. They were also shown Table 1 and asked to rate themselves. Similarly to the academics, they gave skill number six the highest score of 85.25%. They were then asked "What things do you think that we lack at BUiD in terms of tools, resources or instruments that may be of benefit in promoting critical thinking?" Responses included communication with staff and students from top universities, more assignments and fewer exams and labs and instruments that encourage students to study and test ideas that are of interest to them even if they are not part of any module.



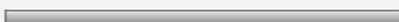
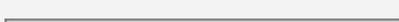
Question	Count	Score	0	100
1. Acquisition strategies: Teach the strategies to their students and show them how the strategies improve acquisition with attention on questioning.	10	78.50		
2. Metacognitive strategies: Teach their students to reflect on what they are doing mostly by prompting and show them how this improves acquisition and performance.	10	81.60		
3. Structure & Logic: Present content in such a manner as to highlight the basic structure of the subject they are learning and stimulate the use of logic in the learning process.	11	78.36		
4. Dispositions: Stimulate, support, activate temperament towards persistence, quality, truthfulness.	11	83.91		
5. Intellectual Standards: Become aware of the standards for high quality learning and thinking and teach students to apply them in learning process.	10	84.40		
6. Problem Solving Skills: Teach students how to apply content appropriate problem solving skills such as the analytic method. etc.	11	88.73		
Average		82.58		

Figure 2: Academic role in increase ‘critical thinking’ skills and to what extent they are keen to apply them

They were then asked how, as Deans, they can encourage their faculties to improve critical thinking levels among BUiD students. Their suggestions included the Board of Studies – a faculty meeting on a regular basis - being used to develop module descriptors which incorporate assessment tools that promote critical thinking. Peer review of lectures was another suggestion, as was providing a stable set of modules to teach with innovation required routinely each year in terms of teaching and learning design. The Dean of research stated that “we need to educate the staff first about what this means then get buy in from them, not an easy task”. The Dean of education suggested adding an outcome to all modules to insure that is properly incorporated.

Decision maker perspective

Two decision makers were interviewed - one being the Vice-Chancellor of BUiD and the other the Registrar, both of them having the power to implement new regulations at BUiD. Audio recording was utilised to capture their response to each question. One of the decision makers began by highlighting the importance of critical thinking by saying “CT power is here, it’s a big determinant or a shaper of society and it is important to understand in arguments how power works. How it influences the dynamics or dominance of working to get you to believe in an argument”. It was also mentioned that critical thinking is important within research and developing from a bachelor degree to a more advanced level of study. At master’s level, people are able to pick up an argument in a different way if that claim is not supported by the evidence. One can claim only what one has evidence for and there is an active persuasion going on in an argument. This means that how a story is



sustained story is really an essential factor for moving on to more advanced study. We have to be able to read other people's arguments and then be able to produce our own.

Among the six skills of critical thinking in Table 1, the two decision makers picked the acquisition strategy as the most important factor. It is vital to teach these strategies to students and show them how those strategies improve acquisition and attention to questioning. One decision maker thought that workshops should be held at BUIID for academics to stress the concepts behind critical thinking and how to implement it in class. The curriculum should clearly include critical thinking activities and assessments, whether examinations or assignments, should be partially based on critical thinking concepts. External reviews should also be informed to comment on whether critical thinking is apparent in exams and assignments. There was a suggestion of a lack of proper training for academics, meaning that critical thinking skills were not transferable to students. BUIID should be happy to arrange such programmes and fund it.

Assessment tools of the level of critical thinking improvement are required to assess how successful academics are in implementing the concept. As an unstructured interview question, a question came up when one decision maker mentioned different social contexts; "Do you believe that there is an influence of each culture on critical thinking? Can we classify; for example, developing countries and developed countries? Can you argue that there is a difference? Unexpectedly, the answer was negative as the participant thought there was no difference in developing or developed countries when it comes to critical thinking, simply believing in the capacity of everyone to learn and develop. It is just a question of if somebody has had that moment of understanding to enable the light bulb to come on. There was mention of how an hour long conversation about critical thinking with a PhD supervisor changed the way the participant thought about the meaning of the word 'critical'.

Both decision makers were asked "how can we promote critical thinking among staff and students?" One responded "by selling the benefits, to show them that if they do such a style they can be constructive, they will have higher quality work from their students and their job will become easier. To teach critical thinking must be an abstract thing to say, so I think you will need to give people the tools." Another said workshops at BUIID for academics stressing the concept and how to implement it in class, curriculum should clearly include critical thinking activities and that assessment, whether by examinations or assignments, should be partially based on critical thinking concepts. External reviews should be informed to comment on whether critical thinking is apparent in examinations and assignments.

One respondent thought that there are many different ways academics can be developed. Some could have a supervisory session with a professor and student, just intervening as a role model. This is in order to have a supervisory conversation with the student, introducing critical thinking to the curriculum. The last question was about formulating new policies within BUIID to enhance critical thinking. One response was that there is a need to persuade and negotiate with academic colleagues and a need to provide them with supportive tools and an atmosphere where they can develop organically. Instead of a policy, it was suggested that levels of awareness should be raised and that BUIID has to take this forward and improve what they do.

DISCUSSION

Critical thinking is an important issue in education and has become quite a buzzword around institutions at both undergraduate and postgraduate level. Obviously, the general perception of the BUIID results was a bit disappointing for many who think the assessment of critical thinking skills is somewhat problematic. One of the suggestions was to teach critical thinking using a single subject unit as a vehicle for action learning. Others think that critical thinking requires academics to elevate the mental workflow of their students beyond just memorisation. In addition, there was a suggestion that education in the Middle East is still too like spoon feeding and in order to promote critical thinking, academics should not jump in to help immediately.

Some students commented that the problem was most of them did not learn how to research until they started their postgraduate degree and that there is a strong link between research and critical thinking skills. Another interesting factor revealed by one of the academics is that religion is a factor for critical thinking,



confirming that some Muslims find it very difficult to switch places and look from a non-Muslim perspective at some problems. There is a strong influence of Islam on Muslim brains, rejecting anything that conflict with its principles and limiting the brain from thinking critically.

A combination of logic problems and lateral thinking exercises can potentially be used to enhance the critical thinking skills of students. From a developing or developed country perspectives there are a few minor differences. Although critical thinking deals with the way that students think and as well from religious influences, it is not taught in the earlier years of higher education. Critical thinking is a skill which should grow as long as students continue to grow, but it is difficult to gain the skill at postgraduate level if students do not have a strong background in this area. One academic believes that putting students in group learning situations is the best way to foster critical thinking where they are asked to reflect on lessons, write questions and obtain different views and opposing opinions. An interesting recommendation by one of the Deans was to focus on creating new and innovative critical thinking activities that are shared between programmes and faculties.

CONCLUSION

Critical thinking is a controlled mental activity involving evaluating opinions and arguments or plans and coming up with judgments that can guide the development of beliefs and taking action. The aim of this study was to enhance critical and analytic thinking skills at a higher education level in developing countries. The British University in Dubai acted as a case study for this research. To fulfill this aim, a mix of methodologies were used, first applying a formal critical thinking assessment instrument as a pre/post treatment experiment, that treatment being the Cornell CT test Level Z. The researchers then used a wide range of surveys to obtain the student perspective as well as that of the academic staff. Finally interviews were carried out to obtain the perspective of the Deans and decision makers. The main findings include the suggestion that creating a single module for teaching critical thinking would be useful rather than formulating a new regulation or policy. Enhanced awareness of the concept among academics and encouraging them to apply critical thinking objectives to their module outcomes was also suggested. Provision of social learning environments such as those inherent in peer group works and small group activities to allow students to see other points of view was another recommendation. Preparing a healthy environment can help students to enhance their critical thinking skills and design appropriate educational experiences. Furthermore, the results show that critical thinking levels have a positive impact even on master's level students. Interestingly, carrying out this research has also had the unexpected impact of raising the awareness of critical thinking among the academics at BUd.

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