"Creating Graduates for Positive Change: the Evidence of Changed Perceptions and Practices"

Proceedings of the

14th Annual SLAIHEE Conference on Higher Education in Sri Lanka

Jointly organized by

Center of Excellence in Teaching, Learning & Innovation (CETLI)
Sri Lanka Technological Campus (SLTC)

and

Sri Lanka Association for Improving Higher Education Effectiveness (SLAIHEE)

Thursday, 26 July 2018

9.00 am to 4.00 pm

held at

CETLI, SLTC City Campus

DEDICATION

Dedicated to the ever-reminiscent memory of Dr Shrinika Weerakoon

BSc, MSc, MBA(Perth), DBA (Bath, UK), SEDA Accredited Teacher, ASTHE

- an irreplaceable Higher Educational Developer
- a colleague, a friend, a guide, a change agent: who always found time to be there for you
- who epitomised a life that: "*what you leave behind is not what is engraved in stone monuments, but what is woven into the lives of others*" (Pericles)

and

- in whose memory SLAIHEE today institutes an annual Award: "Dr Shrinika Weerakoon Memorial Award for the Best Paper in Changing HE student skills"

CETLI - SLAIHEE Conference 2018

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14th CETLI - SLAIHEE Conference

on

"Creating graduates for positive change: the evidence of changed perceptions and practices"

Thursday, 26 July 2018, 9.00am to 4.00pm

at Center of Excellence in Teaching, Learning & Innovation (CETLI), Technological (SLTC) - City Campus, TRACE Expert City, Colombo 10. Sri Lanka

(the materials of this conference are available at www.slaihee.org)

A WARM WELCOME TO THE CONFERENCE

This is the fourteenth year since SLAIHEE was established as a non-profit voluntary organisation. From its establishment in 2005, SLAIHEE (Sri Lanka Association for Improving Higher Education Effectiveness) has, jointly with a Staff Development Centre (SDC), organized an annual conference, taking pleasure to provide the only opportunity in Sri Lanka for our university staff to document and discuss the learning enhancements that they have been able to achieve through their subject-related teaching. For the first eleven years, the SDC at the University of Colombo was the organisational partner hosting this annual conference. Then, in its 12th year, the SLAIHEE-SDC conference was hosted by the Staff Development Centre, Wayamba University of Sri Lanka and in the 13th year, was hosted by the Open University of Sri Lanka. This conference has become a Community of Practice and the only national conference in Sri Lanka that focuses exclusively on learning and teaching in the Higher Education (HE) context (SoTL, Scholarship of Teaching and Learning). This year's conference celebrates fourteen years of SLAIHEE, 20 years since the Colombo SDC was established and also, the establishment of a new centre, CETLI to continue with SDC activities and for their expansion. Our 20-year history gives us an the opportunity to look back and use that experience to move into a new era, specially with the untimely death of Dr Shrinika Weerakoon who stood, with immense credibility among academics, at the forefront of HE change and improvement in Sri Lanka. She played her role excellently and moved on, much to our disbelief and sorrow. What we will have to say, and do, over the next ten to twenty years is now up to you all. As pioneers in the quality enhancement of HE in Sri Lanka, SDC and SLAIHEE have jointly faced and traversed huge challenges and our simple beginnings have enabled us to face these. What challenges the future holds are already palpable, specially with a change in quality at the SDC, Colombo Uni.

This year's conference theme, "*Creating graduates for positive change: the evidence of changed perceptions and practices*" (for previous conference themes and proceedings, see: www.slaihee.org) is relevant because though all of us are teaching in universities, it is difficult for us to objectively capture evidence of what some of us achieve in making improvements to HE. This theme is therefore meant to gather evidence and show convincingly to others that, with training and a changed mindset, we can make change happen that all quality-conscious people would value.

We take great pleasure in welcoming you, and our Keynote speaker, Prof P.S.M. Gunaratne.

The conference is of particular interest to all those with a concern and commitment to the quality and fate of future Higher Education in Sri Lanka, including;

- lecturers, managers and administrators in Higher Education
- educational and staff developers
- policy makers

We hope you have an extremely enjoyable experience that will motivate all of us to enhance the quality and usefulness of the higher education experience, mainly to our students.

From CETLI and SLAIHEE – a big thank you;

- for your participation,
- to the presenters, reporting how they overcame challenges to do changes,
- specially to Prof P.S.M. Gunaratne for the Keynote speech,
- to Eng Ranjith Rubasinghe, President of the Sri Lanka Technological Campus (SLTC),
- to all the special invitees,
- to the reviewers for their speedy and efficient reviews with helpful feedback.

The Conference Organising Committee;

Professor Suki Ekaratne - University of Colombo
Dr Prasanna Ratnaweera - Open University of Sri Lanka
Dr Iroja Caldera - University of Colombo
Ms G I D Isankhya Udani - University of Colombo
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This Proceedings Volume: Edited by Professor Suki Ekaratne - CETLI, SLTC

Programme

08:30 – 08:55 am – Registration

Session 1 (at TRACE Auditorium)

09:00 – 09:05 am - 'Housekeeping Announcements'

09:05 – 09:10 - ***Welcome:*** by Dr Prasanna Ratnaweera, President SLAIHEE

09:10 – 09:15 ***Address*** by Guest of Honour: by Eng Ranjith Rubasinghe, President, Sri Lanka Technological Campus (SLTC)

09:15 – 09:30 - 20 years of Sri Lankan HE staff Development history & honouring the role of Late Dr Shrinika Weerakoon, Founder Secretary SLAIHEE: by Prof Suki Ekaratne, Director – CETLI; Founder Director SDC - Colombo Uni; Founding President - SLAIHEE

09:30 – 10:10 - ***Keynote*** Address: by Professor P.S.M. Gunaratne, Vice Chairman, University Grants Commission

10:10 – 10:15 - ***Vote of Thanks*** by Professor Suki Ekaratne, Director, Center for Excellence in Teaching, Learning and Innovation (CETLI)

10:15 – 10:45 - ***T e a***

Session 2: (in 2 parallel sessions: at Auditorium & at SLTC upstairs lecture room: see p iv)

11:00 am - ***Paper presentations & discussions*** of peer-reviewed papers
Parallel Sessions 2A & 2B (see next pages for papers)

12:30 pm - for SLAIHEE members: lunch followed by SLAIHEE ***AGM***
12:30 pm - for non-members - ***L u n c h***

Session 3: (in 2 parallel sessions: at Auditorium & at SLTC upstairs lecture room: see p v)

1:40 pm - ***Paper presentations & discussions*** of peer-reviewed papers
Parallel Sessions 3 A & 3 B
3:40 pm - Feedback form filling; Conference ***Closure & T e a***

CETLI – SLAIHEE Conference, July 26 2018 - Session Timetable for paper presentations

(page #s refer to pages in Conference Proceedings Book: you can use the 'conference time-planner' on p vii)

	Session 2: Paper Presentations	
Session & Venue:	**Session A: at** Auditorium	**Session B at:** SLTC Seminar Room (located upstairs)
Session Chairs:	***Dr T Sivakumar***	***Dr Prasanna Ratnaweera***
Time	**Paper Title,** author(s), page numbers	**Paper Title,** author(s), page numbers
11.00 – 11.20am	**A 1** - on pp. 1-5 (by) **Bandara, RMPS & Fernando,WCDK** **Use of group work to promote Design Competencies of Mechanical Engineering Undergraduates**	**B 1** – on pp. 51-54 (by) **Kuhendran, T.** **Impact of staff development to improve Graduate Attributes with course assessment redesign using Constructive Alignment**
11.20 – 11.40am	**A 2** - pp. 6-10 **Ranathunga, Dr Surangika** **Developing Active Explorers from Listeners: Encouraging engineering students to explore by asking Questions during Lectures**	**B 2 -** pp. 55-58 **Sooriyaarachchi, Dr BSMM** **Use of a Memory Matrix tool to develop undergraduate relational thinking skills by reorganising subject matter**
11.40 – 12.00	**A 3** - pp. 11-15 **Kirupananda, Abarnah** **Use of a scaffold flipped classroom teaching approach to develop post-millennials as effective self-learners**	**B 3 -** pp. 59-63 **Rizwana, Dr A.A & Dr M.H.M Hafeel** **Enhancing readiness to practice community-based health awareness in indigenous medicine graduates using communication-skill development**
12.00 – 12.20pm	**A 4** - pp. 16-20 **Perera, MYA** **Use of lecturer-guided peer-teaching opportunities to initiate Skills Development in Final Year Engineering Undergraduates**	**B 4 -** pp. 64-68 **Ranasinghe, Dr RLDS & Dr KNA Dharmasena** **Use of selected learner-centred activities to drive positive student perception changes for increasing student engagement**
12.30 – 1.30pm	**SLAIHEE AGM** and **LUNCH**	

	Session 3: Paper Presentations	
Venue:	**Session A: at** Auditorium	**Session B at:** SLTC Seminar Room (located upstairs)
Session Chairs:	***Dr Iroja Caldera***	***Dr Enoka Corea***
Time	**Paper Title,** author(s), page numbers	**Paper Title,** author(s), page numbers
1.40 – 2.00pm	**A 5** – on pp. 21-25 (by) **Perera, Srimala** **Use of Feynman Technique as peer teaching to facilitate deeper student learning**	**B 5** – on pp. 69-73 (by) **Jayaratne, A.P.H.S. & Samarakoon, I.S.** **Use of lecture break activities in a humanities faculty course to sustain student attention and interest**
2.00 – 2.20pm	**A 6** - pp. 26-30 **Samaraweera, H.U.S.** **Using 'small groups' as a tool to enhance student participation in a discussion class**	**B 6 -** pp. 74-77 **Karunarathne, H.V.V.M.P.** **Student perceptions on use of group assignments in initiating Information Technology skills in social science undergraduates**
2.20 – 2.40pm	**A 7** - pp.31-35 **Wijeratne, V.P.I.S. & S.A.F. Shanaz** **Group-work based Active Learning methods that improved test performance and student perceptions in two Social Science disciplines**	**B 7 -** pp. 78-81 **Malsha, RLR. , VPN Senadhi, Sunethra Perera** **Changing student perceptions on their initial skill & self-image enhancement through course-based research engagement**
2.40 - 3.00pm	**A 8** - pp. 36-40 **Danthanarayana, C.T.** **Use of Reinforcement Learning in lectures to help u'grads progress towards developing Higher Order skills**	**B 8 -** pp. 82-85 **Hettiarachchi, Dr Dineshani** **The use of clinical case scenarios to improve critical thinking in medical students**
3.00 – 3.20pm	**A 9** - pp. 41-45 **Perera, ENC & DT Jayawardana** **Student perceptions on the effect of Geospatial Science field-based training to enhance student self-confidence**	**B 9 -** pp. 86-91 **Mayakaduwa, D.M.R.G.** **Use of scaffolded syndicate group activities to enhance scientific communication skill-practices of students**
3:.20 – 3.40pm	**A 10** - pp. 46-50 **Dhanushika, M P** **Development of a Teaching Philosophy to meet and improve Teaching Practices suited for effecting positive change**	Fill Feedback form & Proceed to Tea
3:40 - 4:00pm	Fill Feedback form**; Conference Closes with T E A**	

Useful Notes & Contacts

Conference time-planner ('A' sessions at Auditorium; 'B' sessions at SLTC Lecture Hall, upstairs)

Time	**Session** A or B	Paper # (e.g. 1, 2 etc)	Page #s of Paper in Book	Title Key-words/ Author(s)	**What aspect I can use in my work or explore in this paper**
11.00 - 11.20 am					
11.20 – 11.40 am					
11.40 – 12.00					
12.00 – 12.20 pm					
Plans for **12.25 – 1.30 pm AGM, Lunch**	While having lunch, I will 'do':				
	Over any spare time, I will 'do':				
1.40 – 2.00 pm					
2.00 –2.20 pm					
2.20 – 2.40 pm					
2.40 – 3.00 pm					
3.00 – 3.20 pm					
3.20 – 3:40 pm	A	10	p 46	Teaching Philosophy	
3.40 – 4.00 pm	Fill Feedback form; Proceed to Tea; Meet with contacts; Conference closes with Tea				

Reviewers of papers;

Dr Iroja Caldera - University of Colombo

Dr Prasanna Ratnaweera, Open University of Sri Lanka

Dr Enoka Corea, University of Colombo

Prof Suki Ekaratne, CETLI - SLTC

The paper submission and peer-review process: papers that appear in this Book of Proceedings are in the form of 'Full Papers', made up of sections comprised of Background / Purpose (i.e. Introduction), Methodology, Results, Discussion and Conclusions, References. Each paper has been accepted and printed after having undergone a thorough and rigorous peer-review process. In this process, a Short Abstract had first been submitted together with a self-assessment Scoring Sheet. These abstracts were reviewed and relevant authors were invited to submit Full Papers. Each 'Full Paper' then underwent a 'blind' double-refereeing process by two independent reviewers who provided referee reports and supportive feedback to be sent to authors justifying acceptance, improvement or rejection of each submission. A third referee was used whenever the first two referees were in disagreement. The "Papers Committee" met to discuss, again 'blindly', the reports of both referees and to approve sending the combined feedback to authors to accept, reject or to do modifications, if any, to the Full Papers as recommended by both referees to meet the 'quality standards'. Authors had the option of not making the changes if they were able to justify why the referee-recommended modifications were not acceptable. Abstracts that were rejected, or not received by the deadline with the recommended modifications, were not 'accepted' and so, do not appear in this Book of Abstracts.

Abstracts plagiarised from others' work, when not acknowledged in the submitted Abstract or have a substantial component of plagiarised material, were rejected and was normally followed-up by formally writing to the authors, through their institution heads, as practices that are unacceptable and looked down by the entire academic community worldwide.

All referees and presenters have, in this way, collaboratively contributed to enhance the quality of Higher Education in our motherland. Even where papers were not accepted, we hope the detailed feedback given would have helped authors to improve their subsequent writing and submissions.

Use of group work to promote Design Competencies of Mechanical Engineering Undergraduates

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Abstract

Developing the design competency of a Mechanical Engineer is undertaken in the final year of the Kotelawala Defence University's Engineering degree, by building on the basic 'knowledge' developed in previous years. This design competency is a vital tool for professional advancement, reinforcing graduates with higher order thinking skills and giving self confidence to perform when they become graduates. In this module, students are expected to apply Mechanical Engineering and Aerodynamic design aspects to design and optimize the performance of engineering systems. As the existing instructional methods seemed to require improvements in order to promote students' design thinking skills, it was explored whether group work, when used as an active learning method, would promote undergraduates' design competencies. Undergraduates in a class of thirty were grouped into five-member groups. All groups engaged in Computational Fluid Dynamics group work sessions were assigned the task of modelling aerodynamic performance of a vehicle in motion using standard modelling tools. The groups were given the freedom to try different vehicle designs and boundary conditions. The effectiveness of the modelling process used by each group was evaluated by in-class observations while groups were engaged in doing the assigned task and the modelled product was evaluated in group presentations made at task completion where peer groups asked questions and gave feedback on the work of other groups. It was observed that all groups were motivated to engage actively to produce different vehicle designs with enhanced aerodynamic performance, with two groups developing three dimensional computational models. All groups had gained sufficient insight into the modelling process, as evaluated by their ability to validly peer-defend their innovative designs during presentations. The development of enhanced interactive and communication skills was also observed. The study shows that active learning in small groups was able to promote design competencies of undergraduates successfully.

Purpose/Background

Design competencies are vital tools in the professional career of a Mechanical Engineer. Such competencies contribute to professional advancement, reinforcing graduates with higher order thinking skills and giving self confidence to perform successfully when they become graduates. Design competencies have been given high priority by the Institution of Engineers Sri Lanka (Institution of Engineers Sri Lanka [IESL], 2014), the national apex body of the Engineering profession, by incorporating this aspect as one of the graduate attributes of fully fledged Engineering degree programmes offered in Sri Lanka. Furthermore, Quality Assurance and Accreditation Council of the University Grants Commission of Sri Lanka

(Quality Assurance and Accreditation Council [QAAC], 2011) has also emphasized this matter in the subject benchmark statement on Mechanical Engineering.

General Sir John Kotelawala Defence University produces Mechanical Engineering graduates mainly for the Sri Lankan armed forces. The undergraduates study Computational Fluid Dynamics (CFD), a core design related module during the final year of the Engineering degree programme specialized in Mechanical Engineering. In this module, students are expected to apply Mechanical Engineering and Aerodynamic design aspects to design and optimize the performance of engineering systems by building on the knowledge acquired during previous years. The module is comprised of five learning outcomes and two of them are accomplished through case study approach. When case studies are conducted in the classroom, the general practice had been to provide all necessary instructions to the students on the related design task and allow them to follow the same on individual basis. Subsequently all students perform the task exactly as they are instructed by the lecturer and produce the same mechanical/aerodynamic design. It was observed on a regular basis that this approach often hindered the Higher Order Thinking Skills (HOTS) and eventually showed lack of accomplishment of design competencies by the undergraduates. As the existing instructional methods required improvements in order to promote students' HOTS, it was decided to explore whether group work, when used as an active learning method, would promote design competencies of undergraduates.

As per Biggs and Tang (2007), teaching in higher education is not merely transmitting information, but to engage students in active learning in order to buildup their competencies based on their existing knowledge and experience. Dee Fink (2003) stated that for active learning to take place information/ideas, experience and a reflective dialogue need to be integrated. He further argued that following two principles should influence the choice of learning activities in promoting active learning (Dee Fink, 2003):

- Include activities from each of the aforesaid three components of active learning
- Implement direct kinds of learning activities whenever possible, since they expand quality of student learning

As per Gibbs and Habeshaw (1992) and Svinicki and Mckeachie (2011), group work is an effective approach in promoting active learning through buzz groups, syndicate groups, pyramids etc. They further stated that active learning in small groups promotes deep learning in students. This is a crucial aspect as far as imparting design competencies are concerned since it takes place at a deeper level of processing of information. Gibbs and Habeshaw (1992) further argued that working in small groups is especially important if the aim is to develop students' ability to work creatively with different ideas, promote higher order thinking and to enhance communication skills through which ideas are presented logically or being able to build on the ideas of others. Moreover, Brown and Atkins (1988) stated that working in small groups contributes to the development of intellectual and professional competencies of group members in terms of analytical skills, critical thinking, logical reasoning, problem solving and transferring skills to new contexts.

All the aforesaid aspects are vital in promoting design competencies of Mechanical Engineering undergraduates and hence the methodology of present study has been decided upon having carefully considered the same.

Methodology

Thirty Mechanical Engineering undergraduates taking the CFD module were grouped into five-member groups. All groups were assigned the task of modelling aerodynamic performance of a vehicle in motion using standard modelling tools. Assessment criterion for the case study shown in Table 1 was given to each group in advance. Firstly, students were motivated by explaining relevance of the task to Engineering design, emphasizing on how they will benefit from this experience as professional engineers. Subsequently, they were demonstrated on how to create the solid model of the vehicle, generation of computational mesh, application of boundary conditions, conduct simulations with CFD software and to visualize simulation results using relevant tools. A simple vehicle design and sample boundary conditions were used for this purpose. Subsequently students were asked to carry out the task. However, groups were given the freedom to try different vehicle designs and boundary conditions and they were encouraged to apply their innovative thinking whenever possible. Although the main focus was on developing two-dimensional vehicle designs with enhanced aerodynamic performance, the task did not restrain students from progressing to three-dimensional designs. The groups were closely monitored while performing the modelling process in order to ensure that all engaged actively in the exercise and also to avoid possible "free riding". On completion of the activity all groups presented their designs where peer groups asked questions and gave feedback on the work of other groups.

Table 1. Assessment criterion for the case study

#	Aspects considered	Allocation of Marks (%)
1	Creation of the geometrical model of the vehicle	20
2	Generation of the computational mesh	15
3	Application of boundary conditions	20
4	Interpretation of results	15
5	Innovativeness in design	20
6	Answers for oral questions during the presentation	10

Results

It was observed that body language of students was very positive and the groups were enthusiastically involved in active learning while having extensive discussions in their respective groups, as shown in Figure 1.

Figure 1. Students engaged in active learning

All groups produced different two-dimensional vehicle designs with enhanced aerodynamic performance and some of them are shown in Figure 2.

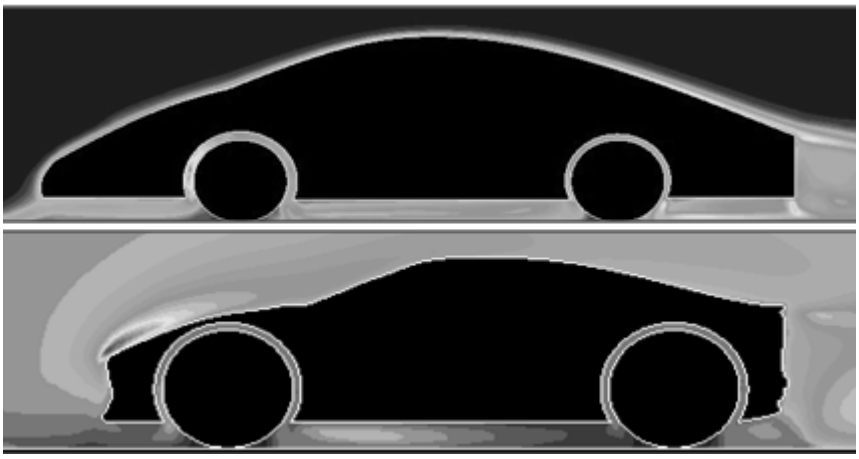

Figure 2. Two-dimensional vehicle designs with enhanced aerodynamic performance

Two groups progressed to the extent of developing three-dimensional computational designs as shown in Figure 3.

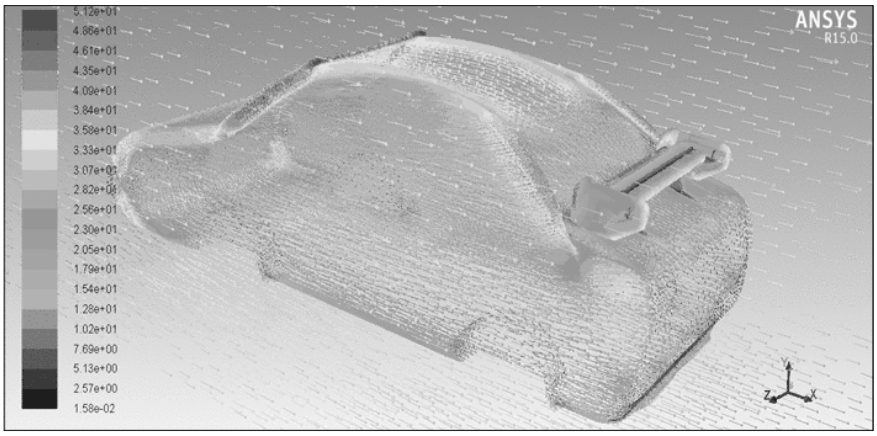

Figure 3. Three-dimensional computational design

Members in each group worked towards a common goal which is considered as one of the essential characteristics in a successful professional design team. All groups had gained sufficient insight into the modelling process, as evaluated by their ability to validly peer-defend their vehicle designs during presentations. Table 2 shows that average marks obtained by students through active learning is higher than that of the traditional approach.

Table 2. Average marks obtained with respect to traditional and active learning approaches

Case study	1	2	3	4
Traditional approach	61	65	68	72
Active learning approach	70	76	79	84

With the active learning approach students appraised the concept of “optimization of Engineering systems” enabling them to progress from the level “Synthesis” to “Evaluation” in the cognitive domain presented by Bloom *et al.* (1956). The development of enhanced interactive and communication skills was also observed during this exercise.

Discussion and Conclusion

The study showed that active learning in small groups was able to promote design competencies of Mechanical Engineering undergraduates successfully. Students developed their HOTS by generating different vehicle designs in view of optimizing the aerodynamic performance of the same. They gained confidence by designing and modelling three-dimensional computational models of vehicles that needed deep analytical thinking and innovation. This effort can be further extended to design, model and optimize other engineering systems such as naval vessels, aircraft structures, underwater vehicles etc. as well. The design competencies gained by students will be highly useful when they graduate as commissioned military Mechanical Engineers enabling them to apply the same for design and fabrication of machines, armed vehicles and naval vessels in particular, that are presently undertaken by the Sri Lankan Armed forces for the domestic usage as well as for the international market. Hence, this whole endeavour ultimately will not only contribute to ensure national security but also lead to economic development of Sri Lanka.

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Developing Active Explorers from Listeners: Encouraging engineering students to explore by asking Questions during Lectures

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Abstract

Moving students from lower order thinking skills (LOTS) to develop as graduates with higher order learning and inquiry skills is challenging. I explored whether the use of questioning strategies in class could develop students' 'elaborative interrogation' skills, which can assist in this transformation. Questioning is two-fold: lecturer asking questions from students, and students asking questions from the lecturer. In the latter, the lecturer gets a clear indication on specific content that students struggle to comprehend. However, in the South Asian culture, many students hesitate to ask questions in lectures due to lack of confidence in what they just learned, and poor English communication skills. Related literature suggests using (1) elicitation moves by the teacher encouraging students to ask questions, and (2) comfortable discursive classroom environments helping students ask questions. Two supporting actions were implemented in a course for Semester 2 Engineering students in a Sri Lankan university. These actions were: allowing students to write their questions on paper and pass to the lecturer, and lecturer walking around the classroom enabling students to ask their questions in private. Student development-changes were evaluated using direct observations and questionnaire responses. An increase in student questions was observed with respect to both changes. After 5 weeks, students were given the questionnaire. Out of 86 respondents, 53.5% preferred writing down the question, followed by asking questions when the lecturer walked around the class (44%). Only 2.3% preferred asking questions while the lecturer was in front. By the third semester, none of these same students wrote down their questions but there was an increase in asking questions while the lecturer walked around the class, indicative that the development of 'elaborative interrogation' skills were being facilitated in these students. This suggests that the implemented changes helped students overcome the initial barriers to ask questions in class.

Background / Purpose

To direct students into higher order learning activities, it is important that the lecturer makes sure that the students are comfortable in lower order thinking skills (LOTS). One possible way to check this is by questioning. Questioning is two-fold: lecturer asking questions from the students, and students asking questions from the lecturer. In the former, the lecturer can only test the student's knowledge in few particular areas/concepts. Moreover, once one student answered the question, the lecturer might not bother to worry about whether rest of the class knows the answer. In contrast, in the latter, given that students do ask questions, the students

get a chance to clarify a multitude of points related to the material discussed in the class. More questions from students on the same topic is also an indication that the delivery method of the same has not been fully successful.

Researchers have identified many benefits of student questions, both for students and the lecturer. According to Chin and Osborne (2008), allowing students to ask questions enables students to articulate their current understanding of a topic, to make connections with other ideas, and also to become aware of what they do or do not know. In other words, it enables students to move into the relational stage of their understanding, according to the SOLO taxonomy (Biggs & Tang, 2007, p. 80). The process of a student trying to make connections between the isolated ideas through questioning is known as 'elaborative interrogation', which has been proven to be very successful in promoting meaningful learning (Menke & Pressley, 1994). Student questions are also helpful to lecturers in prompting reflective thought and student engagement (Chin & Osborne, 2008). A study carried out by Aguiar, Mortimer, and Scott (2010) showed that questions raised by students are important in providing feedback from students to the teacher, which enables adjustments to the teaching explanatory structure.

Scardamalia and Bereiter (1992) distinguish two broad types of questions: basic information questions and wonderment questions. Basic information questions can be further categorized as factual and procedural. Factual questions require only recall of information and are often closed questions. Procedural questions seek clarification about a given procedure or probe how a task is to be carried out. Wonderment questions are often aimed at explanation or at resolving discrepancies in knowledge, thus are what truly related to elaborative interrogation.

Despite the benefits, not many students ask questions in the classroom. Tatar (2005) notes that according to literature, this silence is mainly attributed to cultural background of students (i.e. asking questions means disrespecting the lecturer) and difficulties in communication in English. Moreover, some students may not be confident enough to ask questions in front of the class; student does not want to appear stupid in front of the class by asking what she thinks is a silly question (Barnes, 1997). We can hypothesize that these factors hold in the context of Sri Lankan universities as well, where for almost all the students who learn in English medium, English is their second language.

Van Zee, Iwasyk, Kurose, Simpson, and Wild (2001) point out a number of factors that enhances students' questioning. According to the authors, elicitation moves by the lecturer encouraging students to ask questions and comfortable discursive classroom environments enhance students' questioning. These factors are important in making the students feel secure before risking an important question.

Methodology

As discussed above, elicitation moves by the teacher can encourage students to ask questions. Thus two supporting actions were implemented in a course for Semester 2 Engineering students in a Sri Lankan university (class size is 110). These actions were: allowing students to write their questions on paper and pass to the lecturer, and lecturer walking around the

classroom enabling students to ask their questions in private. Students were informed regarding these actions at the beginning of the lecture. Moreover, at the beginning of each class, students were given a chance to pass down the questions/doubts they had related to the previous lecture. Thus, in addition to the traditional mode of student questions where students are expected to raise their question when the lecturer is in front, students are given two more mechanisms to ask questions.

In order to identify which method the students preferred the most, Questionnaire 1 was given to students in week 5.

Questionnaire 1
You have been given different options to ask questions from the lecturer:
(a) Raise your hand and ask when the lecturer is in front of the class
(b) Ask questions when the lecturer comes to you
(c) Pass a small note with your question

(1).Out of these, which option do you prefer, and why?
(2).What are the advantages of option(c)?

Results and Observations

When asked the students to pass on their questions in the first week, only two questions were received. Figure 1 shows these two questions. After giving a learning activity, the lecturer walked round the class. During this same lecture, three students stopped the lecturer and asked questions. Out of the questions received over the following weeks, one question is of particular importance (see Figure 2), because the lecturer did not know the answer to this question! In fact, this question challenged one point the lecturer raised in the class. This question is a very good example for a wonderment question. In contrast, the two questions shown in Figure 1 fall into factual type of information questions – the students just wanted to recall the basic concepts that were discussed earlier, and are closed questions.

86 students provided feedback to this questionnaire. 46 (53.5%) students preferred writing down the question, followed by asking questions when the lecturer walked around the class (38 students (44%)). Only two students preferred asking question while the lecturer is in front.

Table 1 contains the advantages of writing down the question, according to student feedback. They are ordered most-frequent reason, to least frequent reason. According to Table 1, the most prominent advantage is that writing down the question eliminates the language barrier, followed by it preserving student anonymity. However, according to the lecturer's observation, a main limitation of this option is that if the lecturer is not clear of the student's question, there is no way to get it clarified. This drawback is not there when students are allowed to ask questions in private when the lecturer moves around the class. Here, students can engage in a discussion with the lecturer, until their doubts get clarified. Some have even written down why they do not want to ask questions when the lecturer is in front of the class: it disturbs the

whole class, and the attention of the whole class is drawn towards the student who is asking the question.

The same lecturer taught this same student sample in the next (third) semester. None of these same students wrote down their questions, however there was an increase in asking questions while the lecturer walked around the class – more than 15 students, even back-benchers ask questions every day. Students were even keen to show their answer to the in-class activities and get the lecturer's feedback on the same.

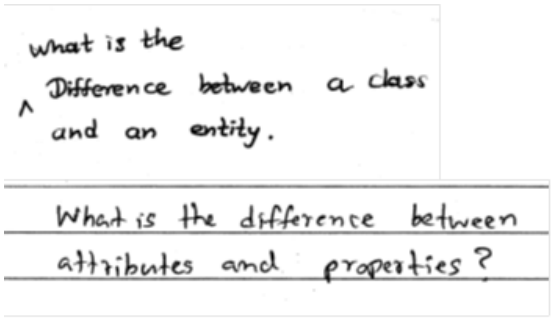

Figure 1. Questions received on the first week

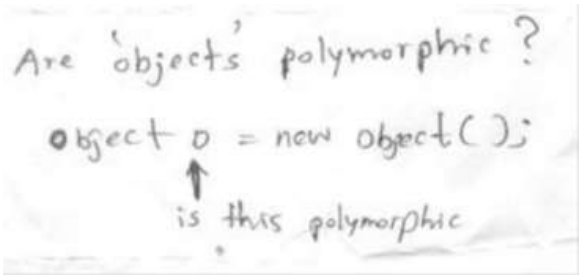

Figure 2. A wonderment question

Table 1. Benefits arising from writing down the questions

Benefit	**No. of responses**
Language is not a problem – Even those who are not good at speaking in English can ask questions. Many students are better at writing than speaking English.	31
Anonymity – Those who are shy to ask questions can also ask questions. Moreover, even if the question is a silly one, no one would know who asked the question	18
The whole class benefits, since everyone hears the question and the answer	9
No need to wait till the lecturer gives time to ask question. Student can write down the questions so that he does not have to remember it to be asked later. Can even ask a question related to a previous week as well.	7
Everybody gets a chance to ask questions	2
It does not disturb the class	2
Higher engagement in the class	1

Discussion and Conclusion

This paper reported the implementation of two elicitation moves carried out by a lecturer to improve undergraduate students' questioning in a Sri Lankan university. These are: allowing students to write down their questions, and allowing the students to question the lecturer in

private when she is working around the class. The observations show that over time, these moves created a behavior change in students, where they were actively seeking support from the lecturer. The increase in student questioning indicates that these elicitation moves created a more comfortable environment for students to ask questions.

Student feedback suggests that the reasons for silence of students in the class as reported in literature also hold in the context of Sri Lankan universities: students do not want to ask questions in public mainly because they are not proficient in expressing themselves in English, and they are nervous of being taken as asking silly questions.

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Use of a scaffold flipped classroom teaching approach to develop post-millennials as effective self-learners

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Abstract

Post millennials are those born after year 2000 and said to access internet from birth as well as use social media and emails even from schooldays. These post-millennials, in having considerably less attention span, less focus, higher expectations and wanting to be early starters, challenge lecturers when they first start higher education. These students found adopting traditional teaching methods difficult. As I too saw this nature in a student majority, I explored whether change to a flipped classroom would meet their learning needs. Using research findings on the effectiveness of flipped classroom and lesson breaks to keep post-millennials refreshed and engaged, I combined flipped classroom with lesson break in a first-year programming class with 20 students. To be referred at home, they were given topics from the lesson along with topic-related materials, and then, followed by in-class discussions. In introducing these changes, knowing that there could be student resistance when change is introduced at once, I used a scaffold so that initially I gave them one concept from the lesson to be self-learnt at home. Then, I increased it to few concepts and later, the entire lesson itself. In the in-class discussions, after about every 15 minutes, I had lesson breaks with carefully designed activities such as quizzes and pair discussions. At the end of the semester and after three discussion sessions, the effectiveness of this method was evaluated using observations on student readiness to engage in discussions, to complete assigned tasks, as well as using student feedback on how students felt. Classroom observations showed that students developed readiness progressively to complete the assigned reading and tasks, before class discussion. By semester end, they were completely trained to undertake self-learning to participate actively in class discussions. Student feedback showed agreement as they viewed the change positively, meeting their learning needs.

Background

Post millennials who are born between late 1990 and 2010, are exposed to technology from the day they were born. Researchers say that they have access to internet since their birth, had access to email since elementary school, uses social networking since high school and simply they were born into innovations. They are wide users of internet form their early age and are very much comfortable with technology.

Post millennials lives in a world of continuous updates and they process information faster than other generations. Now a day the young generations are more interested in using whatsapp stories and snapchat where the content disappears in 24 hours time. They also have very less attention span. It is predicted that many young children between the age of 16-18 will opt to start working than going to high school. The accelerator programs we see these days give them the option to learn what they want in a shorter period. Familiarity of the

technology is an advantage for them (Laskaris, 2016). They are not afraid of the technology. Rather they embrace it as a tool for learning. They easily get connected globally and they are exposed to a larger information. So in class they expect more beyond just information. (Dale, 2016)

When the information is repeated in the class, I saw them not paying attention to the lesson and getting engaged in other activities. With this characteristics of the millennials I understood the need for a change in the traditional teaching methods. I researched different sources and found few techniques that will help to teach the post millennials effectively. Some of them are flipped classroom, lesson break, active learning activities and activity based learning. Also some research has stated that millennial students have more preference for interactive and experiential learning (Phillips et al, 2014).

Understanding the need to change the traditional teaching method, I decided to blend flipped classrooms with lesson breaks to teach the post millennials. In flipped classrooms material pertaining to the day's lecture will be distributed to the students in advance and they will have to go through, learn and come prepared for a discussion in the class(Hudson ,2016). Teacher will not be explaining point to point or word to word. Rather there will be a discussion to enhance the knowledge by clarifying the doubts. Even though teaching tools have improved, still we most commonly find the teacher's role to be the same. Introducing flipped classroom will help you to change the role of the teacher. It is found that flipped classroom creates a win-win situation for both students and teachers (Mihai, 2016, Acedo, 2017). According to Blooms Taxonomy, the low order thinking skills are expected to be practiced outside the class room and higher order thinking skills are expected to be explored in during the session (Cynthia et al,2014).

According to the studies it is said that the student's attention span is usually is 15-20 minutes. Considering this I have carefully designed activities in between to keep the student active and focused.

This study was conducted to analyse the effectiveness of flipped class room and lesson breaks to teach post millennials.

Methodology

The research conducted was an action research, which helped to study the millennials and to suggest a suitable teaching learning technique to make them effective learners. First year Business Information Systems students were selected to participate in this study. I taught Programming Principles for the specified batch. This module had two hours of lecture and two hours of tutorial per week. As this is a technical module and cannot be taught theoretically, students were expected to bring their own laptops for the classes. This was a small group which had only 20 students.

As I decided to use the flipped classroom technique, I reasoned that the students first need to be educated about the technique(Szparagowski,2014). During their first lecture, I explained them the technique and motivated them to adopt to it, by stating the advantages of it. I also realized that there will be reluctance in accepting this technique. Therefore, I introduced this

in a scaffold manner. First two weeks, they were given referencing related to one section. As weeks went it was increased little by little, and after the 7th week of lecture, they were given the entire lesson to be referred outside the class.

I identified good resources and shared them with students and made them to refer to that at home and come. One week before the lecture I sent them the relevant materials via email. First I gave them less to read, but more to watch. Video tutorials related to the concepts were shared with them along with lecture slides. They were asked to watch the video and make a note on the important points. I also asked them to mark the difficult words or concepts in the lecture slides and bring it to the lecture. With time I also changed the reference materials type too. I started with less to read and more to watch and gradually changed to equally read and watch.

I gave them a set a questions to be answered before they come to the lecture. They need to complete this task one day before the lecture. This helps me to understand how much support they need to understand particular concepts. These questions were simple and I made sure t doesn't take more than ten minutes to answer these questions. Also I sent this via google forms so that it was easy for me also to summarize the responds.

On the day of the lecture, I start with giving them a small problem to be solved by using the concepts they had to learn. Next I get them to put the difficult words on the board and have a discussion. Students themselves contribute in explaining the difficult task to others. I also get them involved in discussions and debates. Further as this is a programming module they get involved in solution designing process too. Finally, at the end of the session I distribute them the tutorial questions for the week. I get them to work in pairs and submit the solutions before they come to the class. I do encourage them to submit partially completed solutions as well to make sure they attempt the questions. These questions are also discussed during tutorials and they are encouraged to explore the different methods of solving the same problem. At the end of each tutorial session, every students gets the feedback for the particular week's work. I also used to have surprise mini mock exams to evaluate them.

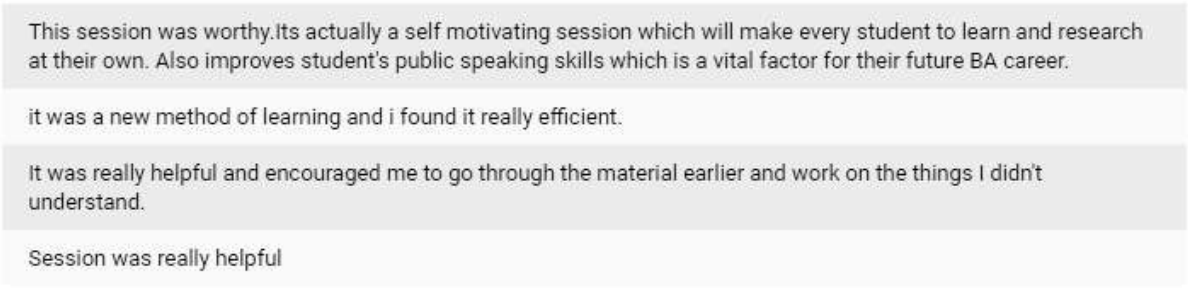
During the sessions, I always made sure I have some interesting activities for them to refresh. After every 20 minutes I have some carefully planned activities. These activities also include not only academic activities but also fun activities such as, changing their seating positions, re arranging the class orientation, etc.
This method was followed throughout the entire semester and at the end of the semester, students' feedback was taken and their performance was monitored to understand the effectiveness of the method. Also the students' behavior was monitored to understand the readiness to adapt to the new method.

Results

When the method was introduced, few students in the class were not ready to accept this. Their opinion was that they will have to do some additional tasks above the homework they had. During the first few days, there were few students who had not referred the materials at home. I did not stop what I planned to do. Considering those three students, if I teach everything from the beginning they will never change. Also those who have done their part

at home will also get frustrated and will never follow the instructions later. Hence I started the discussion. It went well than I expected. Those who went through the materials actively contributed and they enjoyed it too. Those who did not refer the materials were felt left out. This made them eventually practicing the method and actively participating.

After three weeks, I observed that there was a significant improvement in students' active participation. They were more ready to self-learn. Also they were getting interested toward this approach, where they completed the outside classroom activities with lot of willingness. At the end of the semester a formal feedback was taken and it was surprising to see that this technique had made a significant impact on them. Representation 1, below, shows the feedback given by a few students.



Representation 1. Feedback for flipped class room technique

Discussion and Conclusion

As the first session went well than expected, I decided to follow this continuously. I gradually increased the self-learning component and reduced the components I teach. From video materials, I also gave them reading materials to read from their reference books and other web resources. As the students got interested at the beginning they followed it without much complains. Also as I increased the load on their side gradually, they did not feel it getting increased. During the first day, those who did not read could not contribute the discussion and they felt isolated. This made them to at least read a little for their next lesson. Gradually entire class was doing the homework referencing and it helped me a lot to give them more practical problems to be solved.

As millennials were more accepting generation, post millennials will take the idea of different lifestyles to a new level. It is so much evidence from the comment they have given. They have related that this approach even has helped them to become good public speakers, as they got involved with lot of in-class discussions and presentations.

Studies have revealed that millennials are different and they learn differently. Knowing this it is also the responsibility of the facilitators to change the teaching technique to suit them. This will help them to learn better as well as the facilitator to get satisfied with what they have done.

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Use of lecturer-guided peer-teaching opportunities to initiate Skills Development in Final Year Engineering Undergraduates

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Abstract

Whereas critical thinking, creativity, communication and collaboration (4Cs) are identified as 21st Century learning skills, in the conventional teacher-centred learning environment undergraduates get little or no opportunities to experience, learn and develop such skills. Using social motivation theory to give students the responsibility of teaching peers under lecturer guidance, the author explored whether peer teaching could make students experience, discover and initiate a development of 4C skills while facilitating a learner-centred environment. A class of 25 final year undergraduates taking the Advanced Yarn Manufacture module was divided into six groups. Having given guidance on the scope of the topic and on learning resources, each group was given a topic to teach peer groups. The students were allowed to make mistakes and after each teaching episode gaps were addressed by the lecturer through a discussion with the students. Whether 4C skills were initiated was evaluated by scoring basic aspects of critical thinking, creativity, communication and collaboration, noting it to be only an initiation at this stage. Peer teaching revealed students to have critically analysed information sources to construct learning. Linking between group topics and individual teaching indicated how students had collaborated effectively to plan and deliver content. Peer teachers were able to effectively communicate learning outcomes to peers with lecturer guidance. Initiating creativity was scored as increased questioning. Student feedback identified that a learner-centred environment was developed. Observations and results of subsequent learning activities demonstrated that a student perception developed towards being responsible for their learning and initiation of a self-learning culture. Students were supportive towards experiencing change, but managing time was a challenge. The study showed that the use of social motivation to make students take responsibility for their learning brought about the initiation of needed skills. For further skill development, experimenting on integrating problem solving tasks to this activity is suggested.

Purpose/Background

The higher education needs of the 21st century have more emphasis on information and knowledge skills over manufacturing skills in the past. The Partnership for 21st Century Skills has identified 21st century critical learning and innovation skills as critical thinking, creativity, communication and collaboration (4Cs) (Pacific Policy Research Center, 2010). A Textile Engineering graduate from the Department of Textile and Clothing, University of Moratuwa, Sri Lanka is expected to demonstrate independent and lifelong learning in the broad context of technological change (Department of Textile and Clothing Technology, 2016). Therefore, to meet this challenge teaching and learning activities must evolve to help students develop the needed 21st century learner skills they will require to be successful in their studies, work

and life. In the conventional teacher-centred learning environment, the lecturer is solely responsible for the teaching of a course module and students unquestioningly take the lecturer's teaching for granted. The students' general behaviour towards such teaching is to become passive learners and cram. This only results in surface learning. The students' attitude is developed towards rote learning and no meaningful learning or learner skill development takes place. The teacher is made responsible for teaching, but the learner is not given the opportunity to be responsible for learning and to develop learner skills.

According to Gibbs & Habeshaw (1992), students tend to develop their skills well when they are given the responsibility for their learning. Good teaching helps the students take control of their learning and students see themselves as their own teachers. This develops student skills as they explore their own learning. According to Biggs & Tang (2011) social motivation can be used to motivate the students and make a task important for them to actively engage. Here the student willingly learns in order to stratify the needs of the others whose opinions are important to them (Biggs & Tang, 2011). Peer teaching is one of the activities that could aid learning and the development of skills through this social motivation theory. Further, student teachers are identified as a way of improving teaching by Gibbs & Habeshaw (1992) as the responsibility of learning and teaching others is shared with the student. In peer teaching student is motivated to learn for self to fulfil the task of teaching others which is a responsibility rested on him/her. This would bring about a student centred active learning environment in the class and give the students more opportunity to engage in the learning process which leads to deep learning of the subject matter and initiation of the learner skills development. However, since students are not trained teachers, they may need guidance from the lecturer. Based on the above social motivation theory to give students the responsibility of teaching peers under lecturer guidance, an experiment was designed to assess whether peer teaching can make students experience, discover and initiate a development of 4C skills while facilitating a learner-centred environment.

Methodology

The study was focused around transforming the learning experience from a teacher-centred perspective to a student-centred perspective with peer teaching. The experiment was conducted among B.Sc. final year Engineering Undergraduates (Semester 8) studying Textile Process Engineering at the Department of Textile and Clothing Technology, University of Moratuwa, Sri Lanka. The course module chosen was TT 4142- Advanced Yarn Manufacture, which had a class size of 25 students. The class was divided in to six groups, five groups having four students each and the last group having five students. The student groups were given six topics from the syllabus to teach peer groups along with a guideline.

All the topics had similar weightage to be fair by everyone, and cumulatively accounted for about 50% of the syllabus. The guideline included the scope and depth of each topic to be covered as bulleted lists, the duration of the teaching session for each topic, information on learning resources and the peer teaching schedule. One hour was given to each group and each person in the group was required to teach by taking different sections of the topic. Students were directed to a wide variety of paper-based and electronic learning resources as sources of information for their topics and were given three weeks of time to prepare. In addition, they were required to produce a note for their colleagues for future reference. The

note was pre-checked by the lecturer and was shared among the students. The students were required to print and bring the distributed note to the class to aid the peer teaching activity. Students were stimulated to ask questions and to actively engage in the peer teaching activity.

Students were given time to read through the note, which was used as material for subsequent discussion. The students were allowed to make mistakes and after each teaching episode, mistakes and gaps, as well as questions in the subject matter were addressed by the lecturer through a discussion with students. The lecturer followed the teaching session carefully and was available to offer any assistance as needed. Whether 4C skills were initiated was evaluated by scoring basic aspects of critical thinking, creativity, communication and collaboration, noting it to be only an initiation at this stage. Mid-semester and end-semester student feedback was analysed to see how students have responded to the new learning experience. Observation was made in subsequent learning activities to identify whether initiation of the development of 4C skills had taken place. Further observation was made with respect to the student examination performance in the areas covered by peer teachers.

Results

The students had made very good use of learning resources following the guidance of the lecturer. After the topics and guidance was given to the students, student had queries from the given learning resource and sought for support in preparation. During the teaching episodes, peer teaching revealed that students had critically analysed information sources to construct learning. The explanation and answers to questions revealed that an initiation of critical thinking skills had taken place through their learning experience. This was further evident in the examination answers. The examination answers revealed that students were very confident especially in the area they taught in the class. Initiating creativity was scored as increased questioning. Usually students tend to hesitate to ask questions from their colleagues. However, to the lecturer's surprise students asked questions on the presentations from their teaching peers, from the lecturer and participated well in the discussions. Though questioning does not directly develop creativity it can lead to creativity in the long term. Questioning increased in this peer teaching activity as the students needed to ask questions to be certain of their learning. In the conventional teaching environment students would take the lecturer's teaching for granted. However, here the students asked questions because their learning had to be meaningful for them to make sense.

The students worked in groups of four or five and collectively put in their teaching effort to teach the given topic to the peers. Linking between group topics and individual teaching was scored as students having collaborated effectively to plan and deliver content. Further, the students had collaborated effectively in groups to produce a good note which was shared in the class for their peers to follow-up with them in the lecture, for discussion and for future reference. Peer teachers were able to effectively communicate learning outcomes to peers with lecturer guidance. There was doubt as to how the peer teaching experiment would be successful due to the diverse communication skills of the students. However, it was observed that students had practiced well and all the students were able to communicate effectively at the required level. Analysing mid-semester and end-semester student

feedback summary showed that a learner-centred environment was developed and students valued the learning activity. Extracts from student feedback summary relevant to this experiment are shown in Table 1.

Table 1. Extracts from student feedback summary

Feedback / Question	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly Disagree	Average
Stimulates students to think independently	12	6	1	0	0	4.58
Makes a genuine effort to get students involved in discussion	12	5	2	0	0	4.53
Encourages students to express their own opinions	11	7	1	0	0	4.53
Lecturer motivated me to do my best	15	6	1	0	0	4.64
Asked questions from the class	16	5	1	0	0	4.68
Encouraged students to ask questions	14	6	2	0	0	4.55
Recommended useful textbooks, websites, periodicals etc.	15	6	1	0	0	4.64
Syllabus was substantially covered in the class	16	5	1	0	0	4.68
Lecturer promotes self-studies of students	16	5	1	0	0	4.68
Overall teaching could be recommended as good	15	6	1	0	0	4.64

Observations of subsequent field visit and laboratory class activities demonstrated that students were asking a lot of questions and were keen on analysing what they experience. Field visit and laboratory class reports further substantiated that initiation of the needed 4C skills have taken place. These subsequent observations showed that student perception had developed towards being responsible for their learning and initiation of a self-learning culture.

Discussion and Conclusion

Peer teaching has been used over a long period of time in teaching to create better learning experiences for the students. In a review by Kristen L. Benè & Bergus (2014), use of peer teaching was found very successful in medical student education. The benefits are both for the learner and the teacher. The review emphasises the fact that peer teaching enhanced the learning of the student and highlights the need of lecturer support to make this successful. From table 1, it can be seen that students have accepted that this activity leads them to think independently, motivated them to engage more in discussion and encouraged them to clarify matters via questioning. Further, this activity helped enhance the students' use of library facilities which was a very positive sign of self-learning. There was doubt that there might be a possibility that students would see the content being not properly covered in the class, however the feedback shows this is not the case and the students have well embraced the student-centred learning.

Analysing the overall results it is evident that the students were able to develop their critical thinking, creativity, communication, and collaboration skills in researching the given topics, analysing the information and sharing their learning with the class. The classroom learning environment during the peer teaching sessions were dynamic, enjoyable and brought a new experience to everyone. Since each person used only about fifteen minutes of time, the lecture time was not boring as the next person's teaching style brought about a change in the learning environment. In a conventional lecture series students get bored due to this monotonous nature of the teaching environment. Enthusiasm in seeing their colleagues teach broke the monotonous teaching routine in the class. Students were supportive for experiencing change, but managing time was a challenge with the teaching episodes and the subsequent discussions taking a lot of time. The experiment was successful since it was done with the final year students in a small class of 25 students. These students are mature and have developed their confidence over the years, so that they were confident being teachers. This may not be the case with first year and second year students. If the class size is too large it will be difficult managing time and discussions while being fair by everyone.

The results of this study showed that it is possible to initiate the development of critical thinking, creativity, communication and collaboration skills in the students using peer teaching which are identified as 21st century learner skills (4Cs). Social motivation was the underlying foundation of this experiment. Making students responsible for their and their peers learning motivated them to explore their learning and to develop learner skills which made a positive change in the way they learn. However since this is the final year, such an initial skills development may not be sustainable if subsequent learning and teaching activities are not designed to substantiate this initiation. The broader applicability of peer teaching to initiate the development of 4Cs could largely depend on the maturity of the students and the class size. For further skill development, experimenting on integrating problem solving tasks to this activity is suggested.

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Use of Feynman Technique as peer teaching to facilitate deeper student learning

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Abstract

It is said that when teaching others, the teacher begins to reflect, to identify and to fill existing knowledge gaps. Then, a process begins so as to examine whether knowledge is phenomenon or merely to 'know' a set of new words. Nobel Laureate and famous physicist Richard Feynman used teaching as a method to master difficult concepts he came across in learning advanced physics. This study explored whether students could be facilitated towards deeper subject learning using a peer teaching technique based on Feynman's 'teaching for mastering' of new knowledge. After a discussion on concepts and giving relevant notes, students were paired and a few randomly selected pairs were asked to teach the class a concept which had been discussed. Students were discouraged of the use of technical jargon when teaching and were encouraged to notice knowledge gaps while teaching the given concepts. Effectiveness of student-pair teaching explanations was rated by both the students and the teacher. After this activity, all student-pairs were given one hour to read and learn some additional notes on the concepts selected to teach that day. Finally, the same student pairs were asked to re-teach the class based on the additional knowledge and a new evaluation was done by the teacher. This exercise was continued three times. On the first day, in their first teaching, student-pairs showed hesitation to explain given concepts and many pairs simply repeated the notes in hand. From the second day onwards, anticipating a call to teach, students came prepared to class and, evaluation on their peer-teaching clearly showed the achievement of expected learning outcomes. All three days, students achieved the expected outcome of re-teaching. The results indicated that paired peer teaching could provide facilitation for students to truly engage in gaining deeper knowledge rather than surface learning by merely memorising words.

Background

According to Bloom's taxonomy, evaluation and creation are at the top of the learning pyramid. To achieve these two challenging levels, a learner must pass the other four levels stacked at the bottom. However, this process does not happen very easily. Mostly, the current examination based discourse of knowledge leads students to memorize and spew content at the examination, which is only at the ground levels of the Bloom's taxonomy. However, as soon as these graduates start their careers, a high level of conquest of subjects might be required to find solutions to variety of problems they face in their work place which also demand self-regulated learning (Stewart, 1997). One way to achieve this is by using Feynman technique. Nobel Laureate and famous physicist Richard Feynman used teaching as a technique to master difficult concepts he came across in learning advanced physics.

Teaching requires deep understanding of the subject which leads to go through all lower levels of the Bloom's taxonomy because the teacher will begin to reflect, to identify and to fill existing knowledge gaps. Then, a process begins so as to examine whether knowledge is actually at a deeper level or only to 'know' a set of new words. This examination happens through questioning. Questioning is an essential part in any learning process and leads students towards thinking and grasping the concepts more fully (Watts & Alsop, 1995; White & Gunstone, 1992). Further, questioning makes students to identify gaps in their own reasoning of or confusions over any concept (Maskill & Pedrosa de Jesus, 1997; Donaldson, 1978).

This study explores whether students could be facilitated towards deeper subject learning using a peer teaching technique based on Feynman's 'teaching for mastering' of new knowledge. To master any knowledge, he said to teach someone else that topic in simple terms, which will quickly show you the gaps in your knowledge (Falletto, 2016). Therefore, in this study his technique was adopted and altered to match the requirements of my class.

Method:

After having discussions on concepts and giving the students the relevant notes, the students were paired and a few randomly selected pairs were asked to teach a discussed concept to the class.
Students were discouraged of the use of technical jargon while they were teaching and were encouraged to notice knowledge gaps while teaching the given concepts. Effectiveness of student-pair teaching was evaluated by the students and the teacher. A rubric as given in Table 1 was introduced for the evaluation. This was continued three times. The lecture was of four-hour duration each for all three days. A one-page printed note was given to students at the beginning of the lecture. The script of the first hour lecture for each day is given below. Next hour was used for pairing and teaching activity. During the last two hours, all student-pairs were asked to read and learn some additional notes (Hard copies or Google) on the concepts selected to teach that day. Finally, the same student pairs were asked to re-teach the class based on the additional knowledge and a new evaluation was made by the teacher.

<u>Script of the first hour of the lecture</u>
Day 1 – the lecturer explained the topic and the note for about forty minutes. Two types of technical terms were there in the lecture; 'new' and 'used before'. At least two 'new' and many 'used before' technical terms were there in any lecture. However, only new technical terms were explained each day. One example/analogy was used for further explanations in each lecture. At the beginning and at the end, 10 minutes were given to read the note.

Day 2 - the lecture note was shared before the lecture. Other procedures were the same.

Day 3 - same as Day 2.

Table 1. Rubric to evaluate student teaching

Criteria to evaluate student teaching	5	4	3	Technical jargon (count) ~~////~~
Start	Introduced the topic confidently with a simple English explanation. Used an example/question to start. Connected to a point of lecture learnt before.	Showed some hesitation to start. But could recall what has just been learnt and started with some changes/simplification to words of the lecturer/note.	Showed hesitation to start. Did not know where to start. Simply repeated lecturer's words/note.	
Middle	Clearly understood the main points of the lecture. Used simple English to explain the main points/ technical terms of the content confidently. Connected to a point of lecture learnt before.	Showed some hesitation to explain the main points of the lecture/note and at a few places repeated the same technical terms.	Showed hesitation to explain the main points of the lecture/note. Simply repeated lecturer's words/note.	
End	Clear simple end to the explanation. Showed readiness to answer questions.	Just ended the way lecturer/text did it.	Showed some hesitation where/how to end. No clear ending.	

Results

The following table 2 shows the results of the first and second evaluations done by the teacher. Students' evaluation sheets were handed over to student pairs the same day after each teaching they did.

Table 2. Evaluation results of student teaching

Day 1: first teaching	Student pair 1	Student pair 2	Student pair 3	Day 1: second teaching	Student pair 1	Student pair 2	Student pair 3
Start	3	3	3	Start	4	4	4
Middle	3	3	3	Middle	3	4	4
End	3	3	3	End	3	3	4
Technical jargon	7	5	5	Technical jargon	4	3	1
Day 2: first teaching	Student pair 1	Student pair 2	Student pair 3	Day 2: second teaching	Student pair 1	Student pair 2	Student pair 3
Start	5	4	5	Start	5	5	5
Middle	4	5	4	Middle	5	5	5
End	4	5	5	End	5	5	5
Technical jargon	1	1	2	Technical jargon	0	0	0
Day 3: first teaching	Student pair 1	Student pair 2	Student pair 3	Day 3: second teaching	Student pair 1	Student pair 2	Student pair 3
Start	4	5	5	Start	5	5	5
Middle	5	5	5	Middle	5	5	5
End	5	5	5	End	5	5	5
Technical jargon	0	0	0	Technical jargon	0	0	0

Both on the second and third days, during the last 10 minutes reading time,a few students started questioning on their doubts. Further, those two days, many pairs were not hesitant at all to use the white board to explain.

Discussion and Conclusion

As shown in Table 2, the first day students got low marks for evaluation results as they were hesitant to explain the given concepts and many pairs simply repeated the notes in hand in both teachings. 'New' or 'used before' technical terms were clearly in their unknown zone.
In the second and third days, with the notes in hand many students came prepared to perform their teaching well, which is also clearly shown in the Day 2 and 3 evaluations in table 2. Many have gone through the content in the note and googled and discussed technical terms.
As the results indicate, the students' peer teachings were evaluated and found to have achieved the first teaching part within the expected learning outcomes. All three days, students achieved the expected outcome of re-teaching too. There can be many reasons for

the success of peer teaching activity on the last two days. After the first day, they got a clear idea of the teaching activity, what was expected in their teaching and also with the shared note, an idea of what the lecturer was going to teach next day. This made the students to prepare well for the peer teaching.

The Feynman Technique inspired peer teaching activity conducted three days in the class showed results above expectations. The results indicate that paired peer teaching could provide facilitation for students to truly engage in gaining deeper knowledge rather than merely memorizing words.

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Using 'small groups' as a tool to enhance student participation in a discussion class

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Abstract

A primary aim of having a discussion class is to have students speaking and sharing knowledge to identify facts they already know and to recognize the areas that are not clear for students. However, as it was evident that these do not happen in discussion classes, and as Race (2007) highlighted that using small groups is useful, I explored whether 'small groups' can be used in my discussion class as a way of opening space to make students participate and engage in talk and discussion. Using purposive sampling method, one second year discussion class of 25 students following Classical Sociological Theory was selected and divided into groups of five. Each week, for ten weeks, groups were given a specific topic from what had been taught in the main lecture and asked to do a group presentation with the use of the whiteboard to show important facts. This was followed by an overall discussion of 25 minutes. Direct classroom observations, student filled questionnaires and informal interviews (with 2-3 randomly selected students on each day) were used to collect data to evaluate group work effectiveness in enhancing participation. The direct observations showed a change in student behavior from passive listeners to active speakers during the discussion class leading to gradually develop a student-centred classroom. Students started working with a group belongingness' which was the development of 'working in groups'. The questionnaires and interviews showed that small group setting led them to learn new facts from other students in the group and to share knowledge and ideas. In conclusion, it can be said that small group work enabled the enhancement of student participation in discussion classes, including knowledge sharing. [Title: Using 'small groups' as a tool to enhance student participation in a discussion class.

Purpose / Background:

In the Department of Sociology a large number of students get registered per course and the department organizes a discussion class parallel to the main lecture as a way of giving space for students to clear their doubts and develop their theoretical understanding to develop knowledge at the apply, analyse and evaluate levels. Each course is allocated 3 hours per week and 2 of these hours are used for the main lecture usually conducted by the lecturer-in charge who is usually a permanent staff member and one hour is allocated for the discussion class which is usually conducted by junior staff members in the department.

A primary aim of having a discussion class is to have students speaking and sharing knowledge to identify facts they already know and to recognize the areas that are not clear for students. Even though the purpose I provided above is the purpose of the discussion class, what I identified from my previous experience was that students did not speak in the discussion class and expected a

summary of the main lecture which I termed 'mini lecture' in which a summary of the two hour lecture that is provided in 45 minutes.

In this context I have identified the four following areas which should be improved in my discussion classes:

- Encourage students to talk during the discussion class.
- Identify facts that students already know.
- Recognize the areas that are not clear or doubtful for students.
- Train students to work in a group.

Adding a point to the required change of 'training students to work in a group,' I have observed that students do not attempt to work with a group of their friends and usually prefer individual assignments because they are not used to working in a group. That was the concern that resulted in adding that as a required change.

As it was evident that purpose of having a discussion class is not achieved much, and as Race (2007) highlighted that using small groups is useful, I explored whether 'small groups' can be used in my discussion class as a way of opening space to make students participate and engage in talk and discussion. In this context following four areas were expected outcomes in the discussion class using 'small groups' as the tool; encourage students to talk during the discussion class, identify facts that students already know, recognize the areas that are not clear or doubtful for students and train students to work in a group.

In this point it is required to highlight the importance of using 'small groups' as a method to enhance student learning and my teaching in a discussion class. According to Race (2007) using small groups within the class is very important and useful. "Group learning is about getting people to work together well, in carefully set up learning environments. The human species has evolved on the basis of group learning. Learning from other people is the most instinctive and natural of all the learning contexts we experience, and starts from birth" (Race 2007, 133). Similarly, when the students were set up in a setting with a group of a small number on the one hand they start sharing their ideas and knowledge and on the other hand it would lead them to raise questions, discuss doubts and engage in a discussion which is the actual purpose of having a discussion class.

Methods

Using purposive sampling method, one second year discussion class of 25 students following Classical Sociological Theory was selected and divided into groups of five. Each week, for ten weeks, groups were given a specific topic from what had been taught in the main lecture and asked to do a group presentation with the use of the whiteboard to show important facts. This was followed by an overall discussion of 25 minutes. While they were having discussions within the group, I visited every group and facilitated in certain ways. Students' presentations were done as a rotation in each class to provide each student a space to present. Importantly, I explained some facts at the last overall discussion in each day, when I realized that students had missed the

conceptualization or continued to have doubts. I used relevant examples to clear some doubts and used the examples raised by students in their presentations. Direct classroom observations, student filled questionnaires and informal interviews (with 2-3 randomly selected students on each day) were used to collect data to evaluate group work effectiveness in enhancing participation.

Results

Changes that occurred in the discussion class: Development of student-centered classroom

The research findings revealed the importance of using small groups to make students voluntarily speak in the class in that manner it is directed students to raised their individual doubts under the term 'our group' in which showed it is not just an individual concern or 'not know' but a group of people do not know the particular fact. In that manner students did not individually make mistakes or identify as 'do not know' but a group of students. Similarly, Race (2007, 133) points out that "sociological research tells us repeatedly that it is human nature not to be involved with people we don't know. We might make a mistake, or look stupid, or be attacked."

The main expected outcome was to encourage students to speak and share their views during the discussion class and direct observations evidently proved that the number of students who speak and share their views increased over the time, because from the very first class they had not another choice, but to speak among their small group and present it to the class where again they had to speak. Both questionnaire data and informal interview data revealed that it became a habit of speaking and raising questions, after engaged in a small group discussion, in which they have started speaking, sharing, questioning and answering doubts in relation to their learnt topics.

However according to my direct observations notes, in the first discussion class it was only group discussions and presenting students' identifications to the class that took place. During my explanations I had to raise questions and encourage students to share their views with others in the class. From the second discussion class, students started using relevant examples, sometimes not that accurately. I had to explain them further during my explanation at this point, but with time, students started using most relevant examples.

Then gradually students started raising their doubts individually as well as a group, and interestingly, some other students attempted to respond to those doubts. Therefore a discussion emerged among students at some point where I just had to be a facilitator to clear some doubts while students actively engaged in sharing their expressions and thoughts. Significantly, I observed that students started bringing their doubts to their groups, then attempted to clear them with the help of other group members and eventually shared them with the class if they still had doubts and unclear areas. All assessing methods used which were direct observations, students filled questionnaire and informal interviews revealed the fact that emerging the discussion within students and voluntarily students speaking, sharing knowledge and raising doubts had happened as the small group opened the space for them to first engage and discuss. In simple terms students' engagement during the discussion class has increased.

Working with the feeling of the 'Group belongingness'

Importantly, I observed that students started working with a group feeling. Quite similarly, Race (2007, 133) says "learning in groups allows students to develop cohesion with their peers…" In the first discussion class I had to look at my wristwatch and inform students that the 5 minutes given for their group identifications was over. From the second discussion class, students started signaling and gesturing their presenter that time is over or one minute to go etc. In this manner it led to students to work as a group. The interviews revealed that they learnt not only to work as a group but also the time should be a consideration of theirs.

Race (2007) explains that skills such as oral communication skills, problem-solving skills, self-organisation skills, and reflection which he identifies as transferable skills could be achieved through small groups. As Race (2007, 133) writes "Many of these skills can only be learned from, and with, other people, and cannot be developed solely by reading and studying what others have written about them. It is now increasingly accepted that the most important outcomes of education and training are about developing people, and not just what people know or understand. Employers and managers plead for employees who are able to work well with others, and organise themselves. Working in small groups can allow students to embrace a range of interactive and collaborative skills which are often hard to develop in individual study situations, and impossible to develop in large-group environments such as lectures". Therefore the skills I observed students developing, such as working in a group with group feeling, oral communication skills within the group as well as while presenting to the class, problem-solving skills, self-organisation skills, reflection as well as personality development skills such making a presentation in front of group of people, talking voluntarily when they feel like expressing their views, were developed to some extent during the implementation period. These skills are graduate attributes sought by employers when they hire graduates.

Similarly Race (2007, 133) says "the small-group skills are precisely those required in employment and research, where graduates need to be able to: work in teams; listen to others' ideas sympathetically and critically; think creatively and originally; build on others' existing work; collaborate on projects; manage time and processes effectively; see projects through to a conclusion; cope with the normal difficulties of interactions between human beings", which were evidently proved through collected data and information that students achieving during the implementation process while working in a group. The author has observed the gradual improvement of student's presentations not only in terms of the content but also in relation to their soft skills and analytical skills. These are the 'affective' skills recognized in the three Domains of Knowledge.

Conclusion

It was evident that 'small group' could be used as a tool to encourage students to share the facts they already know in order to reach for higher levels of knowledge. The presentations started at lower levels such as 'define' and 'identify,' then gradually increased to higher levels such as 'apply', 'analyse' and 'evaluate' in the Bloom's Taxonomy (1964). Significantly for me, it was

helpful to locate the level of a student's knowledge to go for further discussions as a facilitator. Here I used the constructivist learning theory to identify what students already knew, then build it further till they reached the analyse and evaluate levels. Importantly, then I observed that it led gradually to develop the student's soft skills like working in a group with a group feeling. A majority of the class wrote on the in their course evaluation at last date of the class that the practice was truly a space in which they identified the sense of discussion and one even wrote that this was felt from the very first day and that this was the only discussion he/ she continuously attend without missing as he/ she found it was very helpful. Therefore, it can be concluded that small group work enabled the enhancement of student participation in discussion classes, including knowledge sharing.

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Group-work based Active Learning methods that improved test performance and student perceptions in two Social Science Disciplines

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Abstract

Active learning means "doing things and thinking about what they are doing" (Bonwell & Eisen, 1991). It increases student engagement with subject materials, active participation in class and collaboration with colleagues. As social science classes are criticized for lack of these aspects, we examined whether teaching and learning activities (TLAs) can improve active learning. Participants were undergraduate students who followed two social science subjects; Geography and Communication & Media Studies. A range of small-group active learning TLAs practices such as poster sessions, group presentations, field visits, incomplete handouts and practical works were used. Student group size range from 10 to 20, and over a period of 12 weeks research had been conducted. Their effectiveness was evaluated using assessment marks, classroom observations and student feedback. Data were analyzed statistically. At their first classroom test, students scored low marks (below 40%). This showed them their challenges and what they needed to develop further. After TLAs assessment marks gradually increased. Classroom observations showed that students engaged with classroom activities poorly at first, but gradually their active participation increased in group and lecture discussions. Student attendance also increased after implementing the active learning TLAs. Student feedback showed that most students (more than 80%) liked group activities and to practice active learning TLAs. The study showed that the use of group-based TLAs that enhance active learning leads to improve test performance in social sciences students, increase their attendance as well as to make them interested and engage in classroom activities. In this way, teaching methods can bring about change from teacher-centered to student-centered methods to enhance the effectiveness TLAs in higher education.

Background

Group-Based Learning (GBL) is commonly used in higher education because, it employs active learning to promote deep learning and enhances student adaptability in communication, interactive and problem-solving situations. Active learning is a student-centered approach based on engaging students in activities and creating classroom environment that permits student ownership of the learning process. According to this approach, improved student performance and it has measured in traditional tests, as well as creating positive student attitudes towards the learning process (Bonwell and Elson, 1991).

Active learning always improves students' deep learning and deep learning is an essential skill for social science to obtain accurate knowledge and understand the concept of different subjects.

Group-Based Active Learning (GBAL) is beneficial to both lecturer and students. It improves student test performance and student perceptions of both academically weak and strong

students. Active learning methods help students to achieve the better knowledge and enhance the learning skills than using more traditional methods. Moreover, active learning strategies incorporate multiple learning styles, such as strategies are consistent with educational models based theories of learning and motivation (Mohamed, 2008).

"Over the past several years, a significant amount of research has been conducted in order to measure the effectiveness of active learning techniques in a host of academic disciplines, these studies have led to mixed results for a variety of reasons" (Mello and Lees, 2013) and use of active learning methods are vary from study to study. It may be differ from natural sciences to social sciences and it can be used differently in various subjects under those main categories.

Therefore, in this research mainly focus to identify the use of Group-Based Active Learning methods in social sciences and different subject areas can be identified under the social sciences. The identification of suitable active learning methods and student-centered learning will be helped to enhance student knowledge and their learning skills. It can also identified as the most important methods than the passive learning methods.

Methodology

The effectiveness was evaluated using assessment marks, classroom observations and student feedback. The summary of methodology can be identified as shown in figure 01.

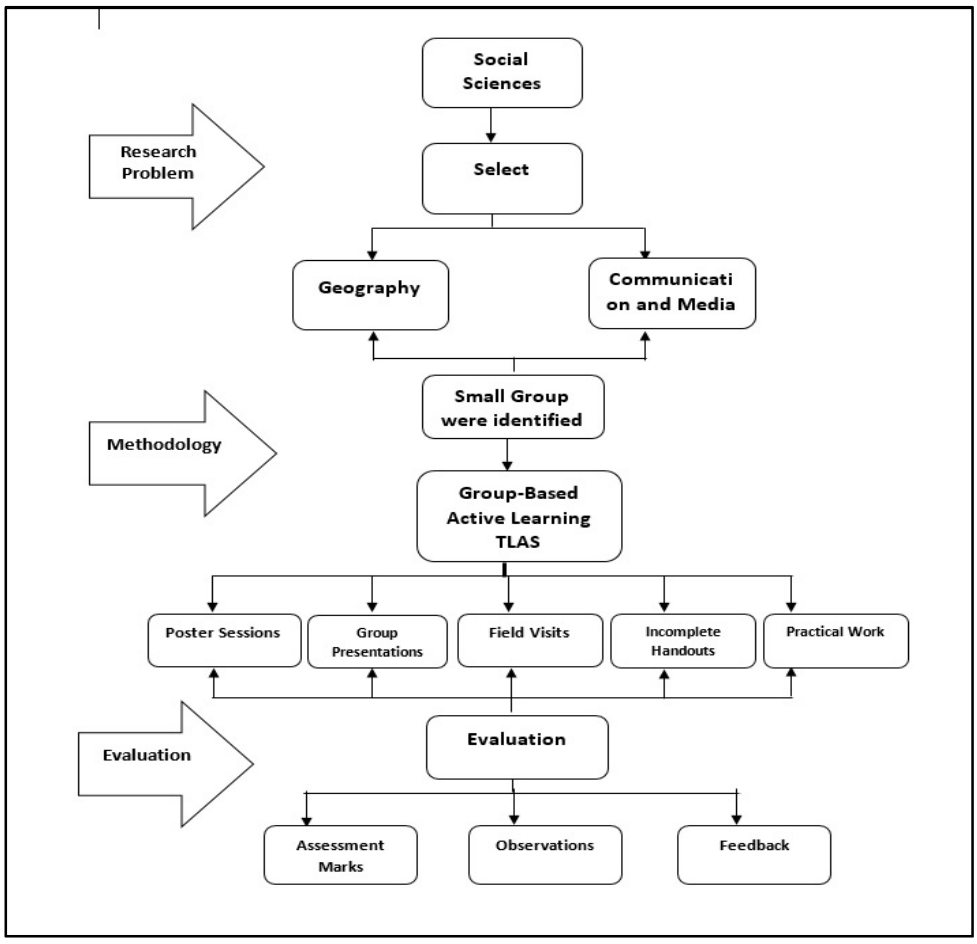

Figure 1. Research Methodology

To identify the effectiveness of use of Group-Work Based Active Learning Methods in social sciences following two social sciences subjects were used: Geography and Communication & Media Studies. The small group activities were used in this research and the student group size range can be identified as 10 to 20 students in both geography and communication & media studies. Maximum five students were allocated to the small group and pair sessions were also conducted in the classroom as an active learning method. Over a period of 12 weeks semester were concerned to conduct this research and two different course unit were identified accordingly to two different disciplines. Such as GYG 4181- Applied Hydrology and CMS 2114 – Language of Moving image Film and Television.

A range of small-group active learning TLAs such as poster sessions, group presentations, field visits, incomplete handouts and practical works were implemented to achieve the main outcome of this research.

Results

According to the analysis, it was revealed that the student test performance and perceptions had increased by using Group-Based Active Learning TLAs and not only subject knowledge but also students' skills were developed. When comparing the two selected subjects, the test performance has shown significant difference (F = 2.03125) between Group-based active learning and traditional lecturing. According to the lecture based learning, students have shown poor results and after moving to the active learning methods it can be shown a good progress. Figure 02 and figure 03, where relative frequency histograms depict the distribution of tests score and the 1st test score shows test which have conducted in lecture- based traditional classroom environment. It depict lowest marks and there are no any students under the highest marks category. However, after moving to the active leaning classroom, it can be shown very attractive changes of students test marks.

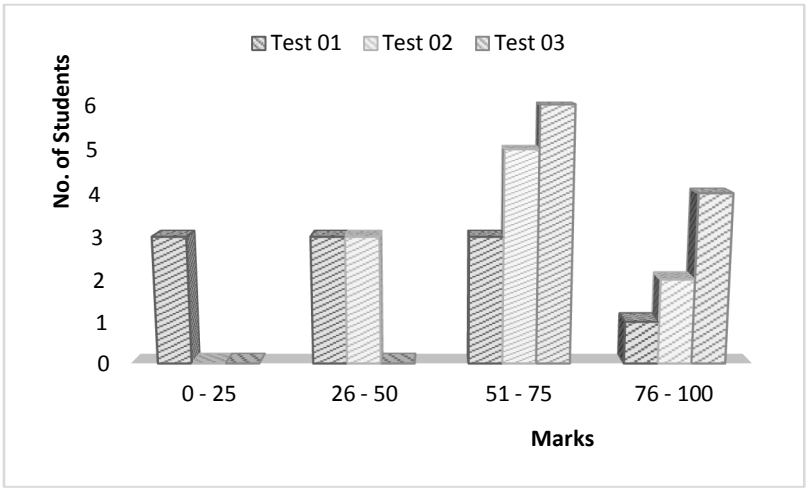

Figure 2. Distribution of Grade-changes for GYG 4181, based on student assessment marks, 2017

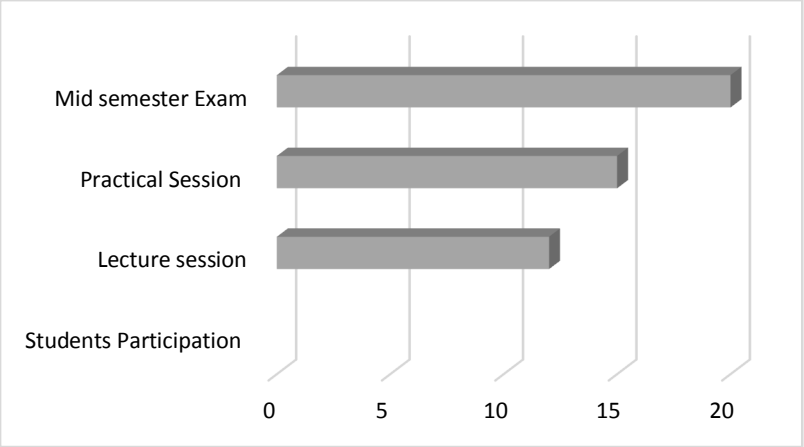

Figure 3. Students participation in different activities, based on student attendance, 2017

There introduced a practical session on Shot Types to the same students of the CMS 2114 to 'understand' about the camera shots and camera angles. It was a group activity and there was a process starting from incomplete handouts, group practical work and practical on mid semester examinations. First students completed incomplete handouts on camera shots and angles while lectures. Then they did practical group exercise on same lesson. Finally, they faced to mid semester examination on camera shot types out of the class room. While reflecting this process, students got opportunity to get theoretical explanation and use them in a practical scenario and made a platform to discussions within the group about their work. Finally, they were fully prepared and all students' active participation could be recognized for the mid semester examination.

Along the same period of semester the field visits were done as an active learning method for Geographic students and it was consists with different group-based activities and according to the students' attendance and ability of group presentations, it evaluated. The field visit was not for the one day work and there was a work series on before, during and the after field visits. This was the best method to understand the student preferences for active learning methods than the lecture-based methods. All students of the class depict the more than 80% attendance during this period. Also their active participation could be identified during this period.

Finally, this research evaluated the students' feedback and they have shown very positive ideas about the Group-Based Active Learning TLAs. According to those results, more than 80% students were agreed with group activities, improved their skills and also they agreed to continue as a very useful tool to improve their knowledge.

Discussion and Conclusions

In summary, we can conclude that the Group-Based Active Learning TLAs are more effective than the traditional Lecture-Based classroom. Also, use of active learning methods are change from study to study and course unit to course unit. The students' test performance were

shown it. Actively participation and high attendance of the students can be identified under the Group-Based Learning.

Therefore, Group-Based Active Learning Methods are very useful to enhance student knowledge and the learning skills in higher education.

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Use of Reinforcement Learning in lectures to help undergraduates progress towards developing Higher Order skills

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Abstract

Today's graduates require learning Higher Order Thinking Skills (HOTS) such as how to 'apply', 'analyse', 'design' etc, for which they first need to recall basic subject-content items that make up the raw material for HOTS. Without assistance on reinforcement methods to aid the recall of such basics, I observed student reluctance to participate in discussions and their question answering difficulties during HOTS involving lecture-discussions, resulting ultimately in their preference to regurgitate at examinations only what they had rote-learnt. Since Active Learning makes students deep-learn subject-items by re-visiting learnt items through re-doing and re-thinking activities, I explored whether Active Learning in lectures can develop content reinforcement and student confidence for them to begin participating in HOTS involving discussions/questions. Second-year Business Environment students were given a question paper with maximum ten questions as homework, containing subject-items taught in lectures, asking that they answer questions taught at a given lecture and hand-over answers at next lecture commencement. Towards the middle of each lecture, when student attention-span began declining, several questions were asked on previous lecture items they had answered, making them revisit previous content and seek 'brush up' clarification in ensuing HOTS discussions, illustrating how reinforcement-for-content-recall can be done and how it assisted HOTS participation. Evaluations used student feedback, my observations on student discussion responses and whether participation increased in HOTS discussions. Student feedback showed this Active Learning change helped 86% students to improve subject content applications and 92% to increase attention and active participation in class discussions, in agreement with my own observations. The study showed that development and use of HOTS require students to be assisted, such as with content reinforcement and Active Learning techniques that can be used in lectures as shown in this study. Students revealed it was difficult for them to align readily with such changes, when other subjects had heavy workloads.

Purpose/Background

Students need to learn to find and use knowledge on specific facts, concepts and procedural patterns in their learning process for them to develop their higher abilities and skills. In the University education system, developing these Higher Order Thinking Skills (HOTS) of undergraduate students is imperative to make them gain generalised benefits so that they obtain higher levels of competency for their everyday personal lives and to perform well within the current labour market.

The Cognitive Domain of Blooms Taxonomy (1956) illustrates six levels/stages of student learning to start from the simplest to the more complex stages depicting which tasks learners

can progressively do, using content they learn. This illustrates student thinking process from low order thinking skills to high order thinking skills and lower level skills are essential to be completed in order to build higher level skills effectively. Students do not learn much just by sitting in classes listening to teachers, memorising pre-packaged assignments and spitting out answers (Washington Centre News 1987). As such, today's graduates require learning HOTS such as how to 'apply', 'analyse', 'design' etc, for which they first need to recall basic subject-content items that make up the raw material for HOTS.

Even though some students are enthusiastic and try to find knowledge through a 'Deep Learning' process, some students can work only at a 'Surface Level', reflecting lower level thinking. It is obvious that most of the students try to 'understand' the concept through their knowledge, but it is common that all students memorize lecture notes with the aim of having good grades at the examinations. The use of the word 'understand' that is commonly used in classrooms can also lead to confusion and so. its use is also not helpful, should be avoided and a corresponding verb under that level should be used (Biggs and Tang, 2007). According to Gibbs & Habeshaw (1992), instead of treating students like tape recorders, it is sensible to mobilize whatever related knowledge they have and find ways of helping them to bring this existing knowledge to bear on newly taught information and concepts, and then to articulate the meaning of these new concepts using their own framework. Without assistance on reinforcement methods to aid recall basics, I observed student reluctance to participate in discussions and their question answering difficulties during HOTS involving lecture-discussions, resulting ultimately in their preference to regurgitate at examinations only what they had rote-learnt. A key distinction of deep approach involves the intention to generate meaning from what is being learned or being applied for a particular task. According to Biggs (2003), the deep approach comes from a felt need to engage in the task appropriately and meaningfully, so that the student tries to use the most appropriate cognitive activities for handling it. Since Active Learning makes students deep-learn subject-items by re-visiting learnt items through re-doing and re-thinking activities, I explored whether Active Learning in lectures can develop content reinforcement and student confidence for them to begin participating in HOTS involving discussions/questions.

Business Environment Course module (ENH 2109) which is offered by the Department of Economics for second year students as an optional subject was followed by 14 students in 2017 and it was recongnised that some students did not demonstrate their knowledge appropriately during the discussions. It was obvious that answers of some students at class room discussions were completely pre-structural (*sensu*: SOLO Taxonomy - Biggs and Tang, 2007) and they used irrelevant information or meaningless responses reflecting a lack of remembering subject matter and lack of insight on the concept as the main reasons for this issue. The main aim of introducing reinforcement learning was to encourage students to learn the subject in a deep process in order to recall and then be able to apply the subject matter in a continuous manner towards developing Higher Order Thinking Skills whilst increasing complexity of students' levels of learning (*sensu*: Bloom) of a subject and improving their engagement in discussions.

Methods

As the Business Environment course module consisted of a small group of students, it was easily noted that some students were reluctant to participate in discussions and found it

difficult to answer the questions appropriately. As such, the students were given a question paper with maximum ten questions as homework, containing subject-items taught in lectures. Students were asked to answer questions taught at the relevant lecture and hand-in answers at next lecture commencement. Before giving the first of these question papers, students were briefed on benefits they can gain through this change for instances; improving awareness and constant memory on subject matter, enhancing ability to answer a question accurately, improving attention and active participation during the lecture while improving Higher Order Thinking skills.

Towards the middle of each lecture, when student attention-span showed signs of declining, several questions were asked on previous lecture items they had answered, making them revisit previous content and seek 'brush up' clarification in the HOTS discussions that followed. This experience illustrated to the students how reinforcement-for-content-recall can be done and how it assisted their HOTS participation.

To evaluate this Teaching Learning Activity (TLA), I used student feedback, my observations on student discussion responses and whether participation increased in HOTS discussions. A feedback form was given at the end date of the Semester in order to evaluate students' attitudes on this reinforcement method. Table 1 depicts the aspects considered in the feedback and taken in to consideration to ascertain their responses, using a Likert scale with 1=Highly Disagree(HDA), 2=Disagree (DA), 3=Neutral (N), 4=Agree (A) and 5=Highly Agree.

Table 1. Questions categories and outcomes targetted in the Student Feedback Form

Question Code / Category	**Brief description of targetted outcome**
Qans	Oral ability to answer verbal questions accurately during the lecture
Ans Qp	Ability to answer the question paper accurately in written form
Awe&Memo	Improving awareness and memory on subject matters
Att&Aptc	Improving attention and active participation for discussions
SubcontAp	Improving subject content applications
Osatis	Overall satisfaction

Results were analysed using descriptive statistics and interpreted through percentage values and mean values of the Likert scores.

Results

The descriptive analysis of the student feedback showed (Table 2) that this reinforcement method helped 86 percent students to improve their subject content applications and 92 percent to increase their attention and active participation in class discussions. Further, 71 percent students revealed that this change helped them to improve their ability to answer the question paper accurately in the written form.

Table 2. Student Feedback responses on Reinforcement Learning (as percentages)

Question Code / Category	HDA	DA	N	A	HA	Total
Qans	0	0	14.3	64.3	21.4	100
Ans Qp	0	0	28.6	71.4	0	100
Awe&Memo	0	0	14.3	71.4	14.3	100
Att&Aptc	0	0	7.1	85.8	7.1	100
SubcontAp	0	0	14.3	64.3	21.4	100
Osatis	0	0	0	78.6	21.4	100

Highly Disagree(HDA); Disagree (DA); Neutral (N); Agree (A);Highly Agree (HA)

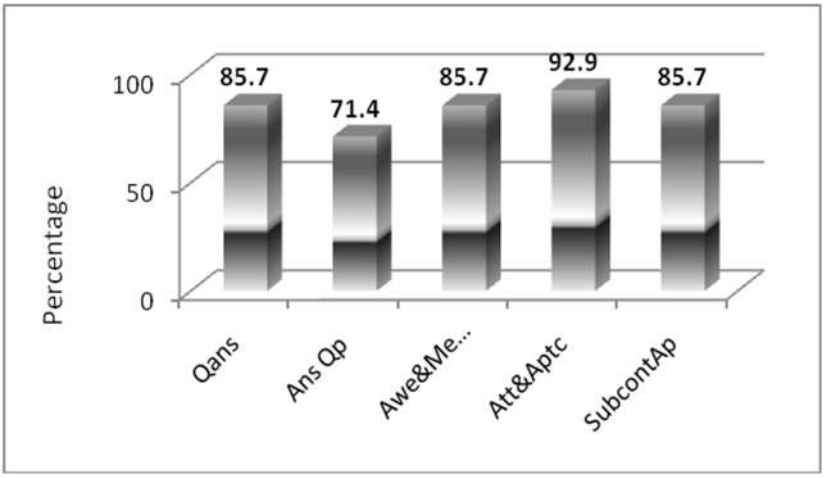

Figure 1. Student Attitude (Agree and Highly Agree) on Reinforcement Learning

Table3. Descriptive statistics of student feedback responses

	ANS_QP	ATT_APTC	AWE_MEMO	OSATIS	QANS	SUBCONTAP
Mean	3.714286	4.000000	4.000000	4.214286	4.071429	4.071429
Median	4.000000	4.000000	4.000000	4.000000	4.000000	4.000000
Maximum	4.000000	5.000000	5.000000	5.000000	5.000000	5.000000
Minimum	3.000000	3.000000	3.000000	4.000000	3.000000	3.000000
Std. Dev.	0.468807	0.392232	0.554700	0.425815	0.615728	0.615728
Skewness	-0.948683	0.000000	0.000000	1.392621	-0.020937	-0.020937
Kurtosis	1.900000	7.000000	3.500000	2.939394	2.804663	2.804663
Jarque-Bera	2.805833	9.333333	0.145833	4.527395	0.023281	0.023281
Probability	0.245879	0.009404	0.929678	0.103965	0.988427	0.988427
Sum	52.00000	56.00000	56.00000	59.00000	57.00000	57.00000
Sum Sq. Dev.	2.857143	2.000000	4.000000	2.357143	4.928571	4.928571
Observations	14	14	14	14	14	14

The mean value of the overall satisfaction of student feedback (Osatis) was 4.2 (4.2>3) and this reflects students were satisfied with this reinforcement learning method in general. In

addition, as the mean values for all responses to questions reflected values greater than 3, it denotes that students were agreeable that abilities targeted in the questions (Table 1) had improved.

Continuous observations during the lectures confirmed that students had improved in several ways. For instance, it was observed all students in the class began to pay greater attention to the lecture as the lecture series progressed. They began to attend lectures well prepared with lecture notes, slides and reading materials and they had good preparation for answering questions that were in the question paper. Students also began to improve gradually in writing answers accurately. Thus, their memory on learnt subject matter gradually improved and it was observed that their active and enthusiastic participation increased during discussions whilst showing desired Higher Order Thinking levels.

Discussion/Conclusion

The study showed that development and use of HOTS require students to be assisted, such as with content reinforcement and Active Learning techniques that can be used in lectures as shown in this study. Students found it difficult to answer the questions from every lecture as they were following about four or five course modules for a Semester. So it was realised that some students were stressed with this change and some students do not regularly attend even lectures as they would not be able to answer the question paper due to their heavy work load. Taking student views into consideration, it was recognised that three changes would benefit students further in this learning reinforcement method: first, giving students a question paper after every lesson topic instead of after every lecture, whilst giving fewer questions, about three to five per question paper; secondly, including few questions to the question paper in order to improve student's thinking levels combining the questions with practical situations; third, allowing students to ask questions that arose when they were studying the slide presentation and course notes during HOTS involved discussions. Finally, the results of this study indicate how reinforcement learning can be used as a TLA in higher education today to enhance students' comprehensive knowledge on subject matters, which can in turn help improve Higher Order Thinking Skills.

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Student perceptions on the effect of Geospatial Science field-based training to enhance student self-confidence

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Abstract

Graduates' lack of self-confidence, such as in undertaking accountability, is criticized as they are then unprepared to undertake challenging tasks either as undergraduates or graduates. It is, therefore, necessary for students to be given practice tasks that generate confidence for them to proceed to Higher Order Thinking Skills (HOTS) as in Bloom's taxonomy. Recent Higher Education (HE) reform initiatives emphasize the significance of developing several such skills by introducing teaching and learning methods. Fieldwork is regarded to have potential to enhance students' HOTS. This study aims to examine whether fieldwork in Geospatial science can be used to enhance student self-confidence. This study was conducted based on the field visit to Moragahakanda development project with 35 final year students. At the initial stage intended learning outcomes (ILOs) were defined for this fieldwork. Students' performance at the Pre-field stage, Field stage, and Post-field stage were monitored and assessed. Students were collect spatial and socio-economic data to evaluate the resettlement programme at the development project; then data were analyzed to evaluate resettlement programme. A short questionnaire was used to evaluate students' self-confidence on project evaluation process before and after the fieldwork. At the completion of the post-fieldwork stage, student feedback was obtained using a structured interview. The major finding of this study is students' self-confidence levels showed significant improvement ($t=-6.340$, $p<.001$) after the fieldwork. Results revealed that 100% of students agreed ~~to~~ that this fieldwork contributed to providing experience to apply the theory to evaluate a real field-based situation. It was evidenced that student's skills for identifying, designing and collecting data to evaluate the resettlement programme were at a satisfactory level. Further, the results showed that 90% of students agreed that the fieldwork contributed to developing their ability to evaluate critical spatial issues based on scientific-facts and figures. In summary, fieldwork with well-defined ILOs has potential to enhance students self-confidence significantly, but has to be tried with larger numbers and more field activities.

Purpose/Background

Self-confidence is considered one of the most influential motivators and regulators of behavior in people's everyday lives (Bandura, 1986). However, graduates' lack of self-confidence, such as in undertaking accountability, is criticized as they are then unprepared to undertake challenging

tasks either as undergraduates or graduates. Many researches have been emphasized that there is a correlation in between students' self-confidence and higher forms of thinking skills as defined in Bloom's Taxonomy (Jones et al., 2009). It is therefore essential for students to be given practice tasks that generate confidence for them to proceed to Higher Order Thinking Skills (HOTS) as in Bloom's taxonomy.

Bloom's Taxonomy provides an important framework for teachers to use to focus on HOTS to enhance students' learning and confidence. By providing a hierarchy of levels, this taxonomy can assist teachers in designing performance tasks, crafting questions for conferring with students, and providing feedback on student work (Adams, 2015; Johnson and Scott, 2009).

The exposure to real-world application and practical training is one of the basic stages in higher education to develop professional's personality in undergraduates (Yurievich, 2014). Literature has demonstrated that field-based training can be designed to more effectively support student learning to develop their confidence (Behrendt, 2014).

Field-based training is widely recognized as an essential part of higher education (HE) in Geospatial science (Kent et al., 1997). Despite the long tradition of field activity in this discipline, however, the value and effectiveness of fieldwork as a learning strategy is largely assumed. Because, Field-based training creates opportunities for students to acquire practical technical skills alongside individual and social experiences (Demirkaya and Atayeter, 2011).

However, it is a challenging task to design effective field-based training to acquire the generic and subject-specific skills for future employment especially in the field of Geospatial science (Orionand Hofstein, 1994).

Field-based training was designed for final students to apply theoretical knowledge of Geospatial Science, Town & country planning, and Community & Regional Settlements to equip them with professional experiences and skills. During the field based training, technical equipment such as Handheld GPS, ProDSS Multiparameter water quality meters, satellite images, and drone camera was deployed to enhance students' technical skills and experiences. This study aims to examine whether fieldwork in Geospatial science can be used to enhance student self-confidence

Methodology

This study was conducted based on the field visit to Moragahakanda development project with 35 final year students. At the initial stage intended learning outcomes (ILOs) were defined for this fieldwork in line with the levels of learning defined in Bloom's Taxonomy. Then filed activities were assigned for every ILOs with observable outputs as shown in table 01.

Table 1. Defined ILOs, corresponding levels of leaning defined in revised Bloom's Taxonomy and field activities

Intended Learning Outcomes	Levels of learning	Field activities with observable outcomes
Design alternatives to existing resettlement programme addressing spatial and community issues	**Creating**	Project report including (*Po) ○ Resettlement Approaches ○ Community feedback on resettlement ○ Spatio-temporal variability of Land-use ○ Conclusions and recommendation
Evaluate the resettlement programme Conduct Environmental Impact Assessment	**Evaluation**	
Analyze questionnaire data Examine environmental data	**Analysis**	
Construct Questionnaire to collect primary data Utilize equipment for data collection *(pH meters, Conductivity meters, Air Quality Temperature Humidity Meter, etc)* Identify the resettlement approach	**Application**	Develop a questionnaire and collect primary data on Community Resettlement programme (*Pr) Collect data to examine environmental conditions of the region (*Fi)
Explain Geospatial arrangement with Satellite data Describe the Spatial variability (LU, Geology, and Geomorphology, etc.)	**Comprehension**	Prepare land-use map of study area using RS images (*Pr) Collect GPS Coordinate to update LU (*Fi) Develop land-use change map (*Po)

**Pr- Pre-field stage, Fi-Field stage, and Po-Post-field stage*

Student performance at the Pre-field stage, Field stage, and Post-field stage were monitored and assessed. The assessment criteria were derived from the ILOs. Before starting the activities, limited temporary support was given, which gradually passed responsibility to the students to operate on their procedures.

Students were collect spatial and socio-economic data to evaluate the resettlement programme at the development project; then data were analyzed to evaluate resettlement process taken place.

A short questionnaire was used to evaluate students' self-confidence on resettlement project evaluation process before and after the fieldwork. At the completion of the post-fieldwork stage, student feedback was obtained using a structured interview.

Results

Statistical analysis was performed based on the primary data collected through the questionnaires. Paired sample t-test was performed to test the null hypothesis, H_0; there is no improvement after the fieldwork. The test results indicate a test statistics was -6.340 where

the p-values test statistic was not significant at 0.05 (t=-6.340 < 0.05) significant level. Therefore, the null hypothesis cannot be accepted; then it can be proved that there is a significant improvement after the fieldwork.

Student feedback obtained by structured interview was summarized in Figure 1. Results revealed that 100% of students agreed that this fieldwork contributed to provide experience to apply the theory to evaluate a real field-based situation. It was evidenced that student's cognitive skills for identifying, designing and collecting data to evaluate the resettlement programme were at a satisfactory level. Further, the results showed that 90% of students agreed that the fieldwork contributed to develop their confidence to evaluate critical spatial issues based on scientific-facts and figures. As well as, 70% of them claim that they have sufficient confidence was built after the fieldwork.

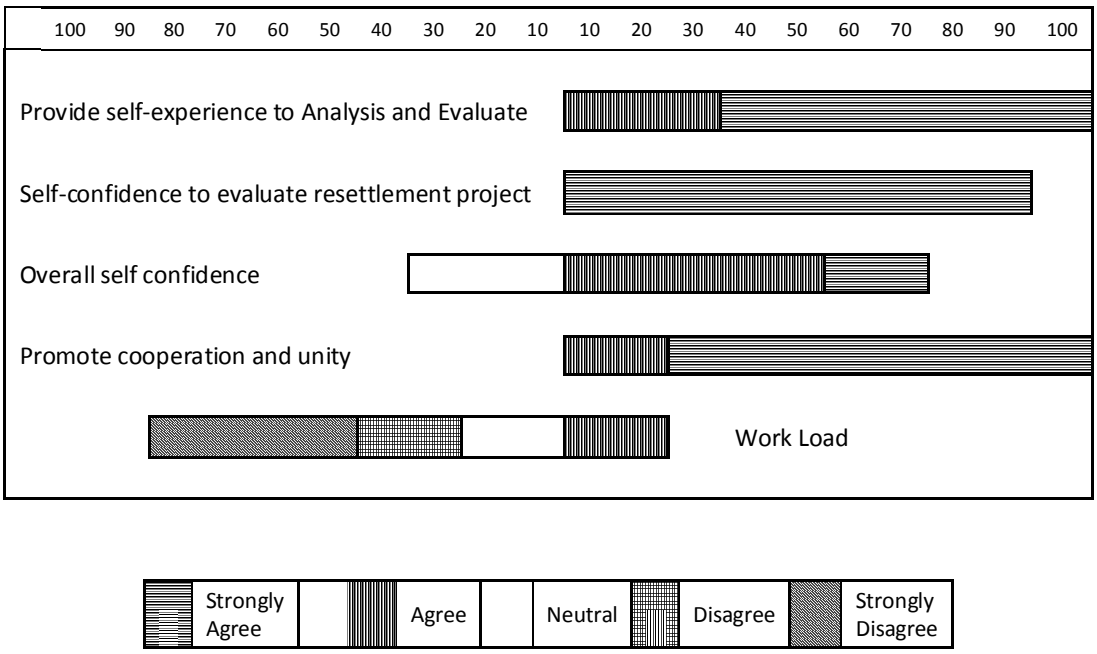

Figure 1. Summary of Student feedback on Fieldwork

Further, students believe that fieldwork can promote the corporation and unity among the students. However, it was noticed that 70% of the students disagreed with the workload.

Discussion and Conclusion

This fieldwork suggested that, though this experience contributed to increasing their self-confidence towards professional life it is not sufficient.

Literature supports the development of field trips as a valid methodology to support students´ learning process developing HOTS and building self-confidence (Boyle et al., 2003; Wong and Wong 2009). Fieldwork offers an opportunity to motivate and connect students to appreciate and understand classroom concepts, which increase a student's knowledge foundation,

promoting further learning and higher level thinking strategies. With understanding comes confidence and intrinsic motive to continue this practice for the future fieldworks.

The results revealed that level of confidence is a function of effectiveness, duration, exposure to field activities**.** Finally, it can be concluded that fieldwork with well-defined ILOs has potential to enhance students' self-confidence significantly, but has to be tried with larger numbers and more field activities.

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Development of a Teaching Philosophy to meet and improve Teaching Practices suited for effecting positive change

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Abstract

Higher Education (HE) teaching to meet today's needs require a mind-set change. As I began Higher Education (HE) teaching, I felt challenged due to the complexity of items that needed to be considered, while retaining their interactivity to different degrees under different contexts. As I followed a teaching development course and practiced teaching, it was easy to assemble items set down in the course and in literature for improving HE teaching. As mere itemization was insufficient, I explored whether use of Bloom's affective learning taxonomy would allow integration of these items into a holistic teaching philosophy (TP), as a living tale that expresses teacher's values, views, beliefs and goals on teaching, allowing to produce a better teacher. A TP having theories and personal values was first developed, by using Biggs's 3P model, Biggs's three levels of teaching, and X-Y teaching climates. Next, applying these models, student backgrounds were identified, followed by planning teaching methods that could touch the different capabilities of students. Reviewing Level-3 and Theory-Y teacher characteristics, a teaching process was planned to initiate active learning in my class and action my personal values and belief for students to be given more freedom and opportunities. This TP, based on theory and my values, was then actioned in teaching. How effective it was on teaching and learning was evaluated using student feedback, keeping in mind the need to change teaching experimentally, by reviewing student marks, self and student feedback. Student feedback rating teaching quality before and after adopting my TP, showed a change from 2.8 to 5, on a 1 (weak) to 5 (excellent) scale. The study showed how a TP can be used as a type of equipment to enhance teaching quality. Though teaching can be planned without a TP process, having a TP enables achievement of teaching quality and self-satisfaction.

Purpose / Background

A teaching philosophy (TP) should be a type of tale which expresses teacher's values, views, beliefs and goals on teaching. According to Cornell Graduate School (n.d.) "a teaching philosophy statement is a narrative that should include your conception of teaching and learning, a description of how you teach, justification for why you teach that way". According to them, components of TP statement should be educational purpose and learning goals for students, teaching methods, methods for assessing students' learning and assessment of teaching. There are many theories and concepts in the education field that can be considered when developing a TP. Use of Bloom's affective learning taxonomy (Allen and Friedman, 2010) in this study facilitated me to integrate my values with the most important theories such as, Biggs's 3P model, Biggs's level of teaching and teaching climate X and Y. Biggs's 3P model shows the interaction between lecturers and students as 3P (**P**resage-**P**rocess-**P**roduct) model (as cited in Sanderson (n.d.)). John Biggs (as cited in

Sanderson, (n.d.)) has illustrated three Levels of Teaching. According to his explanation "Level 1 is teaching as *assimilate*, Level 2 is teaching as *accommodating*, and Level 3 is teaching as *educating"*. This model describes at the each level what the teacher and student focused on. In 1960 Douglas McGregor defined two theories as Theory-X and Theory-Y which became very popular in the field of management. Later these two theories were discussed from the point of education. Based on these theories, types of climates that teacher can create for classroom management have been defined as Theory X and Theory Y (Erkilic, 2008).

Ultimate objective of the study was achievement of quality in teaching through well developed TP. According to Ramsden (1992) good teaching is one of the most enjoyable and exhilarating human activities while poor teaching becomes one of the most embarrassing and boring activities. Hence, being a better teacher is not as simple as some may think that only transmission of the knowledge from teacher to student can make a better student. With this background, this paper describes how to develop a TP and how to plan teaching in the class room based on that TP. Further effectiveness of teaching which was planned according to the developed TP was evaluated using students' feedback.

Methodology

TP was first developed by including Biggs's 3P model, Biggs's level of teaching, teaching climate X and Y, and personal values. Then how I changed my teaching based on the developed TP has been discussed in the forthcoming sections.

Fitting to Biggs's 3P model of teaching and learning

Before I fitted to Biggs' 3P model, my main aim was completing entire syllabus. Therefore, lots of information which I gathered from the various resources were included in handouts and spent considerable time for preparation of interesting PowerPoint slides. I practiced my lecture so many times before delivering. However, I changed my procedure before teaching in the class room as 3P model indicates. I identified background of the students by discussing with my peers and my senior staff members and also by working as an academic advisor in the Faculty. Being knowledgeable about various teaching methods such as discussion forums, reflection, poster presentation, reading and group work helped me to plan my teaching in various ways. Knowing the students before my lecture helped me to complete the presage stage of the process of teaching. It guided me to plan my lecture series in an effective manner. Use of various teaching methods could touch the different capabilities of the students in the process of teaching and it improved my students' level of thinking and learning. Finally doing an experiment on the marks which students obtained for that particular subject, their feedback and my observations on the students throughout the course made me well aware about what I should follow, what I should change, and what I should add in my teaching process.

Being Level 3 teacher

Every effective teacher should be in level 3. Teachers of this level mainly focus on what the students are doing. There is a Chinese proverb as "I hear and I forget. I see and I remember. I do and I understand." This statement clearly supports the objective of the level 3 teaching.

I initiated active learning in my class. I put the foundation and showed the destination and then students had to go towards the destination. I made my classroom active by increasing the students' involvement in their learning process. I always made students realize that "you cannot learn how to swim unless you jump in to the water*".* I allowed them to do mistakes, they may fall but I motivated them to stand on their own feet. However, if necessary I was behind them to push them up.

Changing teaching climate form X to Y

Theory X teachers believe that students naturally do not like learning and they do not want to study. Therefore teachers should be able to make them involve in the learning process under fully controlled environment and students should be supervised thoroughly. Theory Y teachers believe that students enjoy their learning activities and they are determined and self-motivated. By giving more freedom and chances students will learn to take responsibility, and also to exercise self-control in accomplishing tasks. Although Y teaching climate is better than X teaching climate we must change our teaching climate from X to Y gradually with respect to the year of the students. Since I did this study for final year students Y teaching climate was maintained.

Adding my values in teaching

Our personal values can be used to shape our profession. Therefore I have used my personal values to shape my teaching such as friendship, each person's right over his own self-development and realization of his own capability, respecting others' thoughts and honoring the others independence, truthfulness, learning through mistakes, learning through experiences and spiritual relief in mind.

Results

Figure 1 illustrated well developed TP in this study. By following my TP, I involved students in different activities in the class room. However based on students' feedback, peer evaluation and my own observations following are the most effective ways of teaching for that particular set of students: use of real world applications and sample problems to teach new concept or theory (CORD, 1999), allowing students to do mistake (Nelsen, 1996), allowing students to define definitions through brainstorming (Iowa State University, 2014), imagination and storytelling in teaching (Hamilton and Weiss, 2005), providing a help sheet which support their learning (Dhanushika, 2017), answering and getting marks (Dhanushika, 2017), scaffolding (Scaffolding learning, (n.d.)), and designing lecture break with reflection, setting questions, discussion of a question, sharing notes, relaxing and etc (University of Sussex, 2014). Table 1 shows the summary of the feedback obtained from the students to evaluate my teaching which was based on the developed TP.

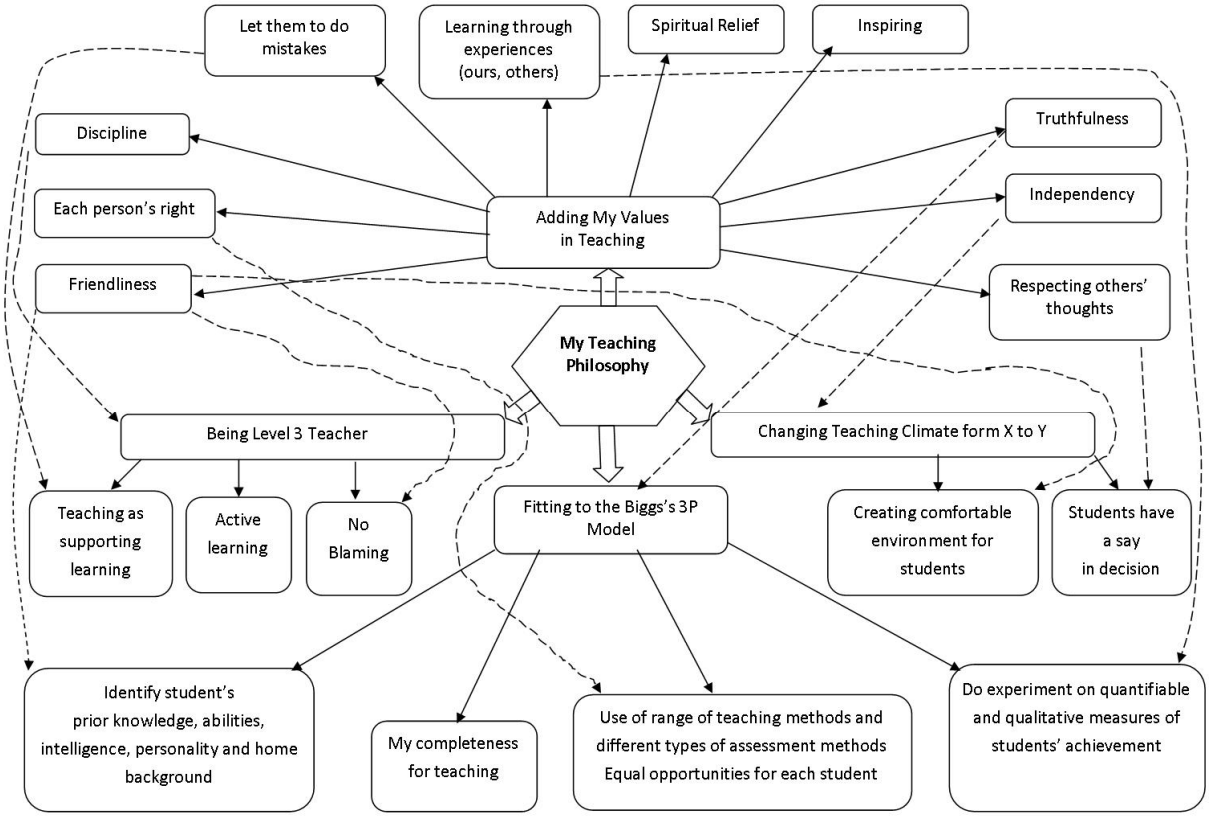

Figure 1. Concept map of Teaching Philosophy

Table 1. Summary of Student Feedback

Evaluation aspects	Before I adopted my TP	After I adopted my TP
Introduction to objectives and content of the course	3.0	5
Quality of the course materials provided	3.4	5
Quality of teaching	2.8	5
Conduct of lecture as scheduled in the time table,	3.8	5
Level of interactions with the students	3.4	5
Knowledge obtained/skills developed through tutorials and/or practical	2.7	5

1-weak, 2- fair, 3 – satisfactory, 4- good, 5 - excellent

Discussion and Conclusion

TP is not a single statement that describes our ultimate goal of being a teacher. It should be a type of equipment which can be used to enhance quality of our teaching. However, without having a TP someone can plan teaching process, but, if we want to attain a higher quality in our teaching with self-satisfaction, having TP and planning according to it are of vital importance. Since teachers are lifelong learners, TP should be dynamic to the experiences we gain through the process of our teaching. Therefore, good TP is progressing in a never-ending exercise.

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Impact of staff development to improve Graduate Attributes with course assessment redesign using Constructive Alignment

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Abstract

I had realised the dearth of quality aspects in the performances and outcomes of continuous assessments, but being a new academic, I was unaware of the appropriate learning, teaching and assessment methods (TLAs). I became aware, through a staff development course, of Constructive Alignment (CA) where changes in TLAs and assessments could elicit quality student performance leading to improvement of student graduate attributes (GAs). I then went ahead to test whether CA principles could be used to change assessment guidelines for students to improve GAs at assessment completion, having selected students' interpreting and analysing abilities as GAs to improve. To change assessment guidelines, I first designed assessment rubrics for the selected GAs, made up as components of the GA task description, task components, descriptions of range of performance for each component, and scale. Next, after each continuous assessment, students used the given assessment guidelines in the rubrics as self-assessment signposts to compare with their own performance and to identify where improvements in their GA performance were needed. Student performance with respect to the GAs were compared before and after the use of these rubric guidelines. The pre and post use of the changed assessment guidelines by students revealed that student performance improved from 34% ('Good Pass') at the 'pre' stage, to 62.5% (performed as 'good' and 'excellent') in the 'post' stage, with the use of the rubric guidelines for improving their GAs. The results show that assessments can be changed to align with CA principles to improve student GA skills as in this study, where students have been enabled to use assessment rubrics as guidance to evaluate their performance capabilities, and to use this guidance to self-evaluate their performance in continuous assessments so as to upgrade their abilities and skills.

Background / Purpose

At the inception of my teaching career I witnessed quality constraints in the performances of the students in their continuous assessments including those that were linked to Graduate Attributes (GAs). Expected outcomes were not produced in the continuous assessments that students did. From grades and feedback I received from students, I identified that a 'problem' was actually existing. However, at that time I lacked the knowledge on appropriate learning, teaching and assessment methods. When I gathered this knowledge through a staff development teacher training programme, I became aware of Constructive Alignment (CA) for effective design of courses. Then, I was able to identify that there was a lack of CA which had led to the above problem.

Constructive Alignment is where "we systematically align the teaching/learning activities, and the assessment tasks to the intended learning outcomes, according to the learning activities required in the outcomes" (Biggs and Tang, 2007, p 7). As it was in the assessments

of this CA model that seemed an area of concern with my students, improving student assessment was further examined. Here, Barkley (2010, p.106) had highlighted that there should be a methodical way to give timely and effective feedback to the students regarding their assessments, which could be accomplished through rubrics. It is apparent that developing analytic rubrics for the assessments consumes ~~more~~ time and needs effort. However, once the rubrics are created and implemented the tasks of conducting the assessments and providing feedback to students would be simplified, thereby supporting their development, especially as continuous assessments can be used by students as formative assessment events for their improvement. Biggs and Tang (2007, p. 196) emphasized that rubrics provide signposts to the students for them to prepare for assessments after which they can compare their grades with the criteria mentioned in the rubrics.

The purpose of my study was therefore to explore whether CA principles could be employed in continuous assessments by changing the assessment guidelines to guide student development as they complete their continuous assessments. Hence, considering these aspects, this research explored whether CA principles could be used to change assessment guidance, by using analytical rubrics in continuous assessments. The outcome was for students to improve assessment performance and, in turn, improve their GAs linked to their assessment tasks.

Methodology

Four basic elements have been identified to construct a rubric. These are Task description, Components of the task, Descriptions of the range of performance for each component, and a Scale such as Excellent, competent, needs work, etc. (Stevens & Levi 2005, as cited by Barkley, 2010, p.107).

In order to begin to implement the study I initially drafted rubrics using the above rubric structure, ensuring that rubrics were closely aligned to the tasks students would be given as having to carry out, and on which they would be assessed. An extract from a sample rubric compiled for the *Group Presentation* task is shown in Table 1, where it can be seen that the 'criteria' or “Components of the task" (column 1) link with GAs such as 'working in groups' and 'time management'.

Table 1. Extract from a Rubric for the "task description" of 'Group Presentation'

Criteria ("Components of the task")	**0% – 4% Very Poor**	**5% – 8% Poor**	**9% – 12% Average**	**13% – 16% Good**	**17% - 20% Excellent**
Group Contribution	Contribution by only an individual	Only few members contributing	Average number of members contributing	Considerable amount of members contributing	All members equally contributing
Time Management	Very poor time management - exceeding beyond 6 minutes	Not exceeding 5 minutes beyond the required time.	Not exceeding 4 minutes beyond the required time.	Not exceeding 2 minutes beyond the required time.	Excellent management of time.

After preparing rubrics such as the above, I explained to students how they could use these assessment rubrics to monitor their level of performance for any specified "component" of a task, as they go on engaging in their continuous assessments. I explained that by the time they have done several such continuous formative assessments and approach their end of semester to do their final summative assessment, use of the rubrics would enable them to have improved considerably.

Thus, this was a collaborative Teaching-Learning Activity (TLA) in the course, where I provided the guidance material as the teacher, and students did the learning activity as the learners. I too gave them feedback using the rubrics so that they could see how these rubrics could be used as formative assessment tools.

To evaluate the effectiveness of the use of these assessment rubrics to improve students doing tasks and subcomponents of the tasks linked to GAs, I compared the assessment results of students, before and after use of rubrics (as 'pre' and 'post' rubric use results, respectively).

Results

I compared the results of the same students in the semester before the rubrics were used with their results of the next semester which was after rubric use. This comparison, as the distribution of student numbers (in percentages) before ('pre') and after ('post') the use of rubrics is shown in Table 2.

Table 2. Distribution of student performance levels (as student %s) before and after use of assessment rubrics (n= 48)

Assessment Levels obtained by students	**% before rubric use**	**% after rubric use**
Excellent Pass	00	37.5%
Good Pass	34.0%	25.0%
Marginal Pass	60.0%	25.0%
Fail	06.0%	12.5%
Total	*100.0%*	*100.0%*

Based on the above results and my observation of the assessments, I was able to witness the changes in the performances of the students, where the outcomes of the assignments and the grades were not satisfactory before the rubrics were used. Only 34% of the students performed to obtain a Good Pass (as fairly well) in their assessment at the pre-rubric stage. The rest of the students did not perform well, as they were not clear about what they should do.

After rubric use, with the same students in the subsequent semester, their results of students getting good passes and above had improved from the previous 34% to 62.5% (*i.e.*, 37.5% + 25%, see table).

Discussion and Conclusion

The above outcomes indicated that students had been able use the assessment rubrics formatively as self-assessment guidance to identify where improvements in their

performance were needed and had carried out the necessary 'learning improvements' to do so. Hence, the assessment guidance had been used as the self-evaluative criteria for the students to measure their previous performance and uplift their future performance.

The outcomes reveal that if the students are given a clear, structured, comprehensive set of instructions as with the assessments rubrics, they will 'know' what should be done to bring about performance improvements. Moreover, linking the performance improvements to the GAs will enable the students to realize these relationships and also to achieve GAs as linked skills and capabilities. The main conclusion can be that there should be constructive alignment with the assessments, which should be communicated to the students through assessment rubrics and GAs, to enable student achievement. Therefore, it is vital to link and clearly provide appropriate guidance, in the form of assessment rubrics, in order to make the students 'know' the exact outcomes of the assessments to have them 'do' and 'achieve' related GAs.

This study in the use of CA to constructively align the course outcomes with assessment, through developing and student use of assessment rubrics, along with aligning relevant GAs, was my fresh attempt that I learned and established during the staff development training. This was indeed a successful endeavor, where I realized how constructive alignment actually improves the students and enable them to achieve the skills and abilities, including relevant GAs. However, I sensed that there is a need to refine the assessment rubrics and make them comprehensive and even clearer and enhancing their quality. Currently, I am including revised rubrics in my course. Depending on the subjects and changes in the topics I teach, I revise them on a timely basis which I feel is vital for continuous learning and development.

Rubric use resulted in saving time and effort in explaining the assignments to clarify expectations. It also served to ensure consistent grading especially when evaluation is carried out by multiple people, with minimizing the anguish of grading as the expected standards are clearly set already. Rubric use also made it easier to provide feedback to the students, reinforcing core learning goals and performance expectations when used for multiple assignments, and communicating the departmental or institutional standards, criteria, and assessment (Barkley, 2010, p 106).

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Use of a Memory Matrix tool to develop undergraduate relational thinking skills by reorganising subject matter

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Abstract

Undergraduates studying indigenous medicine are required to learn and apply a large number of theories. Due to didactic teaching and learning methods, however, most students memorise these as isolated facts just before assessments. When assessments required students to find important facts and to compare, analyze and apply different theories, it was observed that answers were confused, resulting in unchanging failure rates at examinations and disinterest in further studies bringing ineffectiveness to their future careers. This study was therefore undertaken to explore whether the use and practice of a Memory Matrix tool to organise information could develop student skills to interrelate/link theoretical matter. After teaching theories related to Modern Anatomy and *ShareeraRachana*, followed by group discussion, a two-dimensional Memory Matrix having blank row-headings, blank column-headings and blank cells was given to student-groups for filling, asking that learnt items be organised so as to illustrate inter-relationships. Thereafter student-filled matrices were discussed as a class activity. Examination pass rates, direct observations and student feedback were used for evaluation. Students showed that they developed skills to deconstruct learnt theories and place these as matrix components, and then to reconstruct inter-linkages among theories. This enhanced student relational skills, enabling improved knowledge-application for students to develop a holistic view of human structures. These developed skills improved student answers and examination pass rates by 10% and 'A' passes by 3%, compared to previous year when this Memory Matrix tool was not in use. Student feedback and comments stated that mentally-boring study was transformed to active, collaborative and exciting learning experiences that improved student satisfaction. The Memory Matrix tool facilitated students to develop the higher order relational thinking skills. As this learning tool became a new routine for them, its practice would help them become effective doctors. For further improvement, I planned a student-centered seminar presentation by using Memory Matrices.

Purpose / Background

Undergraduates who follow the course in Indigenous Medicine are expected to apply Modern Anatomy and *Shareera Rachana* knowledge in their professional life as *Ayurvedic* physicians when they diagnose diseases and treat patients in the hospitals of government sectoras well as in their private practice in order to produce a good service to the society. A teacher is responsible for moulding students in those needs. Students studying indigenous medicine are required to learn and apply a large number of theories in a traditional classroom.In this context, usuallystudents remain silence, appear well with the theories, taking down lecture notes

without any further activities and the teacher plays the main role. This pattern has been the predominant mode of teaching over the past decades in which the teaching learning activities are confined to passive learning and students has been trained to learn theories by heart with asuperficialengagement in studies, permitting to be in passivity in learning and neverproducing analytical thinking and interrelating of theories.Simply giving students information by telling them, or asking them to read, will have no impact on their understanding unless they can *have sport* with this information(Gibbs and Habeshaw, 1992). Due to didactic teaching and learning methods, however, most students memorise information as isolated facts just before assessments. It is totally teacher centered learning is the main causative factor to limit creative thinking among passed graduates.

When assessments required students to find important facts and to compare, analyze and apply different theories, it was observed that answers were confused, resulting in unchanging failure rates at examinations and disinterest in further studies bringing ineffectiveness to their future careers. Also some students in first and second academic years, have got misconception that only the clinical subjects are essential and non-clinical subjects like Anatomy and *Shareera Rachana* which contains fundamentals in *Ayurvedic* Medicine are not important in management of patients in their future career so that, they prefer assimilate information, memorize the material for tests and regurgitate undigested theories at examinations. In fact, the theories of Anatomy and *Shareera Rachana*are, for the most part, momentary sensations, remaining largely outside of students' awareness unless those percepts garner attention or become consciously accessible.

In effect, without relational thinking, there is no mechanism for building on percepts or for the coupling of those percepts with the concepts that populate the human mind.(Alexander and Baggetta, 2014). Thus, without relational thinking, the innumerable percepts remained separate pieces and did not assemble into impressions and did not potentially influence students' application.

This study was done to explore whether the use and practice of a Memory Matrix tool to organise information could develop student skills to discern meaningful theories and interrelate/link theoretical matter in the subjects of *Shareera Rachana* and Modern Anatomy in the Level I and Level II students of Institute of Indigenous Medicine.

Methodology

After teaching theories related to Modern Anatomy and *Shareera Rachana*, giving students learning opportunity as group discussions, a two-dimensional Memory Matrix having blank row-headings, blank column-headings and blank cells was given to student-groups for filling, asking that learnt items be organised so as to illustrate inter-relationships. Students were given freedom to formulate their own ideas and choose headings of the rows and columns of the memory matrix. Afterwards group made Memory Matrices were displayed and students weregiven opportunities todiscuss as a class and give verbal ideas on them. Thereafter student-filled matrices were analyzed and decided the final row headings, column headings and contents with the teacher (me). Then they were discussed as a class activity demonstrating

students' ability to interrelate and compare key concepts. Finally, a students' feedback was taken on this change. Examination pass rates, direct observations and student feedback were used for evaluation.

Results

Student made memory matrices were elegant and most of them were more informative. These activities produced fullest opportunity for active involvement by identifying and tackling problems, sharing and discussing ideas with others as groups being a challenge to them. So it developed reciprocity cooperation among studentsand it provided opportunities for students to learn from each other.Most of them were able to apply Anatomy knowledge comfortably in *Shareera Rachana*.

By this change,firstly students developed the ability to scrutinize and break down theories. Then they were able to perform higher cognitive-level activities as organize information and illustrate relationship between lessons. Students' feedback was that this activity increased motivation to learn, developed retention of knowledge, provided deeper understanding, built more positive attitudes towards the subjects of Anatomy and *Shareera Rachana* and the treatment methodology of *Ayurveda*. Also students had the chance to give constructive feedback on each group.Students commented that organizing information reduced the load to memorise. Student feedback and comments stated that mentally-boring study was transformed to active, collaborative and exciting learning experiences that improved student satisfaction and performances.

Some of the groups discovered alternative treatment procedures as a result of relational thinking through Memory Matrix. It resulted in higher priority on the skills that they need to acquire. These developed skills of collaboration, communication, creativity and analysis and improved student answers and examination pass rates by 10% and 'A' passes by 3%, compared to previous year when this Memory Matrix tool was not in use. The students were able to apply knowledge in clinical case scenarios with confidence. Memory matrix facilitated to perform higher order thinking of learning. Mostof these activities helped students to apply what they have learnt in the classroom.This change improved their performances in viva-voce and other parts of the examination. Memory matrix offered them to think creatively and propose and compose divergent through this knowledgeto themselves in dealing with patients.

Table 1. Level II Semester I *Shareera Rachana* Examination results

Batch	Number of passedstudents	Number of failed students	Number of 'A' Passes	Pass percentage	'A' Pass percentage
2013/2014	112	19	60	85.49%	45.80%
2014/2015	149	06	76	96.12%	49.03%

Discussion and Conclusion

The Memory Matrix tool facilitated students to develop as a Higher Order Thinking skill. As this learning tool became a new routine for them, its practice would help them become effective doctors. For further improvement, I planned a student-centered seminar presentation by using Memory Matrices. Number of lecture hours given to me in this semester was 15 hours so that students were given only two opportunities with this limited number of lecture hours to make Memory Matrices.They were informed that they could use this method in any subject area.

Skills of relational thinking and organizing information in aMemory Matrix are critical in learning because they help to gather information, visualize and solve complex problems.

It is important for all of us, as the teachers to develop relational thinking in our students in view of making future effective professionals.

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Enhancing readiness to practice community-based health awareness in indigenous medicine graduates using communication-skill development

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Abstract

Communication skill is one of 4-Cs requiring development in 21st Century graduates. Its need is seen in indigenous medicine graduates when they are expected to promote community-based social health awareness to bring about health promotion and disease prevention. The needed social communication is the sum total of our ability to communicate interactively with people, to generate behavioural-change outcomes in community members. This needed ability, along with confidence to do so, has been lacking in students and this study was designed to determine whether small-group opportunities for student engagement in field-based community health awareness programmes, followed by practicing presentations, improved their skill and self confidence in communication. Forty level-three BUMS students were divided into four smaller groups and given opportunities to first engage in practice-presentations as learning activities. These were followed by presentations to the communities via authentic community-based health awareness programmes conducted at Chavakachari, Jaffna and Al Ashraf Vidiyalaya, Mabola,Wattala.. Both the practice sessions and health awareness communications to the communities involved making power point presentations and were evaluated by staff (i.e., head of department). The level of confidence in making the presentations was also rated. Students' feedback made up another part of the evaluations. Staff evaluations showed that in 45% of the students, there was a 90% increase in confidence and communication ability. Students' feedback on self-ratings showed that they felt that the teaching-learning activities they practiced had increased their communication skills and self-confidence by 90% for making health awareness communications to people. The results showed that a switch-over from a didactic classroom teaching mentality to having students explore and engage in first-hand community-based health awareness opportunities in small-group settings, followed by monitored practice-communication opportunities, helped students to develop oral communication skills, thereby resulting in enhanced confidence and readiness of these graduating indigenous medicine students.

Background / Purpose

The Bachelor of Unani Medicine and Surgery (BUMS) is a six years programme of study conducted by Institute of Indigenous Medicine (IIM), University of Colombo. The last intake for this BUMS programme had 52 students and although a demand is present for this programme, they are not fully motivated specially at course commencement, as they are students who wanted to enter the Faculty of Medicine but had failed to reach the required

qualifications/marks to do so. A challenge that teachers of such students have to meet is the need to use motivational methods when developing the required skills of these students as they progress through their programme of study.

The subject of Tahaffuzi wa Samaji Tib (Preventive and Social Medicine/Unani) is taught in the third year (i.e., level-three) of this BUMS programme. Its curriculum recognises the importance of preventive measures so that it includes curriculum components having Intended Learning Outcomes (ILOs) to develop in students the practicing of strategies for the prevention of health problems using the indigenous system of medicine and for the creation of healthy lifestyle changes by improving Knowledge, Attitude and Practices (KAP) of the public. This component includes the conduct of community based health awareness programmes for the public, for which developing a communication skill becomes a very important tool to reach the ILOs of this course unit (BUMS Curriculum-2011).

Communication skill is recognised globally as a valuable skill requiring development and is one of the 4-Cs required in 21st Century graduates. The challenges in developing this skill are also well documented. Its need is self-evident in the BUMS indigenous medicine graduates when they are expected to promote community-based social health awareness to bring about health promotion and disease prevention. Communication is defined variously; one such relevant definition has it as a process of sharing of knowledge, skills, feelings, thoughts, attitudes, and behaviors or of making the meanings common (Hacicaferoglu, 2014). The needed social communication is the sum total of our ability to communicate interactively with people, to generate behavioral-change outcomes in community members.

As in other countries and courses, even in the BUMS course, developing this communication skill has been challenging, so that as course teachers we too have been exploring effective methods for this student skill development. Having learnt as well as experienced, at a recent teaching development course we followed, that 'learning together' brings significant student benefits (Gibbs & Habeshaw, 1989), we undertook this study. The intention was to provide opportunities for students to work in groups in a motivated way to bring about active learning to support students to learn and improve communication skills for achieving their course ILO to develop them as effective practitioners in community-based health awareness programmes.

Ilmeideh *et al* (2010) reported that the attitudes towards communication skills among university students are high. This means that it could be easier for universities to develop their communication skills through appropriate activities. Positive environments for communication can provide opportunities for students to practice their communication skills and participate in active learning. With this, lecturers should create as many relevant learning activities as possible to motivate and provide opportunities for students to practice and hone their communication skills (Zanaton *et al* 2012). This needed communication skill, along with confidence to do so, has been lacking in BUMS students and this study was designed to determine whether small-group opportunities for student engagement, first as presentation practice and then followed by field-based community health awareness programmes, would improve their skill and self confidence in communication.

Methods

Forty level-three BUMS students enrolled in this study. These students were divided into four smaller groups of ten students each by random allocation (i.e., lottery method) and allocated group numbers 1 to 4. After explaining the ILOs, the methodology and logistics of the learning opportunities that we were going to provide, the students were asked to select a programme coordinator for each group. Two community based health awareness programmes were organized by the Department of Preventive and Social Medicine/Unani under the theme "health is the greatest wealth". Opportunities for students to engage in community-based health awareness learning activities were designed and included as part of this programme.

The first community- based health awareness programme was conducted at Al Ashraf Vidiyalaya, Mabola, Wattala (with Groups 1 and 2 students) on 16 August 2017. A second programme was conducted at Chavakachari, Jaffna with Group 3 and 4 students on 17 January 2018. As these student-centred activities were to improve self confidence and skills of the students (Gibbs, & Habeshaw, 1992), these learning activities were supported and monitored to evaluate student improvement. In order to evaluate the improvements in the student communication skill, continuous monitoring and evaluation not only of the presentation 'product', but also of the preparatory steps that went into student presentations, were carried out by staff (*i.e.*, head of the department). In this learning and development process, the students first engaged in practice presentations and then in delivering presentations to the communities themselves. Both the practice sessions and health awareness communications to the communities involved making Micro-Soft Power Point presentations and were evaluated by using pre-designed observation criteria as given in Table 1 and which were first shared with the students. The level of confidence in making the presentations was rated by staff as well as self-rated by students.

Table 1. The Pre-designed observation criteria that were used

	Criterion	**Maximum Score**
1	Effective delivery skill with clear flow and language	05
2	Effectively uses body language when presenting	05
3	Ability to stimulate audience	05
4	Self- confidence and control	05
Total		**20**

(Score ranges: to Pass: 10 -15 (Normal), to be marked 'Excellent':15-20)

Students were asked to fill a feedback questionnaire (Table 2) to find out their self-rated perceptions on improving their own communication skills.

Table 2. Structure of Feedback questionnaire used by students to self-rate perceptions on communication skill improvement	**Yes**	**No**
Did your communication skill and self-confidence improve?		
Did your leadership skill improve?		
Suggestions:		

Results

Staff evaluations showed that 18 (total n=40) students obtained 'Excellent' scores during their first practice presentation and 36 students (n=40) obtained 'Excellent' scores during community based health awareness programmes (Figure 1). It showed that in 45% of the students, the learning activities had facilitated a 90% increase in confidence and communication ability.

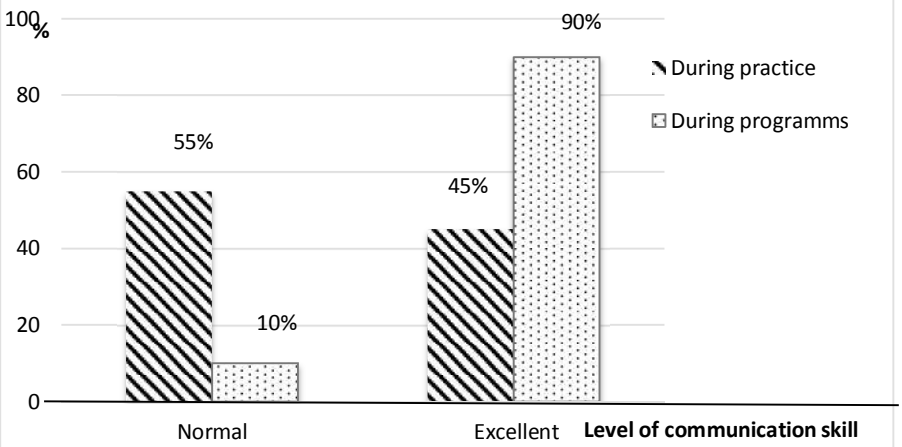

Figure1. Distribution of student communication skill levels (as %s)

Student feedback on self-ratings showed that they felt that the teaching-learning activities they practiced had increased their communication skills and self-confidence by 90% (n=40) for making health awareness communications to people (Table 3).

Table3. Distribution of students who improved their skills (self-rated) (n=40)

Number (and %) of students who improved their communication skill and self-confidence through the community based- programme activities	36 (**90)**
Number (and %) of students who improved their leadership skill through the community based- programme activities	04 (10)

Discussion and Conclusion

The results showed that a switch-over from a didactic classroom teaching mentality and practice to having students explore and engage in practice activities, followed by authentic first-hand community-based health awareness presentation opportunities in small-group settings, helped students to develop oral communication skills, thereby resulting in enhanced confidence and readiness of these graduating indigenous medicine students. In this way, students not only get to develop their communication skills through discussions and presentations in class, but also get to familiarise themselves with authentic situations such as communication situations in the real world, so as to motivate their engagement and development.

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Use of selected learner-centred activities to drive positive student perception changes for increasing student engagement

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Abstract

Students prior experiences on learning result in forming perceptions that can affect their engagement in higher education (HE) learning activities positively or negatively. The collegiate-level education is criticised for generating rote-learning perceptions that students bring into universities which, if continued, make student learning boring, not authentic and disengage students from undertaking deeper learning needed for higher-order skill development. Therefore, we explored whether selected student-centred learning activities can be used to make students change their perceptions on learning, for them to regain interest and increase their engagement in deeper, skill-related learning. With undergraduates following Indigenous Medicine, we used two sets of student-centred classroom activities new to students, giving practice for learning and for assessing, then using these to explore their perception changes. In one activity, students practised collaborative pair-wise problem-centred learning (PCL) extending from think-pair-share to class-share of patient-examined reporting. In the second activity, students practised with mock exams (ME) using spot tests followed by class discussions, aimed to help them improve through formative assessment. We then obtained student feedback to evaluate perception changes in increased learning engagement. With the learner-centred PCL activity, 90% students perceived it to increase engagement. In the ME activity, 88% students perceived its usefulness to recommend it as an examination preparation-assisting opportunity and 85% as a learning reinforcement activity, compared to self-studying. Staff members involved also perceived their increased motivation and interest in supporting and monitoring student progress and skill developments when they perceived improved critical-thinking, problem-solving, decision-making, and communication by students (85%, 76%, 72%, 70%, respectively). Since both students and staff perceptions are criticised in HE, this study showed that perceptions and learning practices linked to student rote-learning can be changed, using learning and assessment related student-centred activities. These changes need to be examined further for use as possible interventions to facilitate graduate skill changes.

Background / Purpose

Education in Sri Lanka, and the secondary school level examinations through which students pass through to gain entry to universities are widely criticised as promoting a rote learning culture (Richmond, 2007). When this is followed by traditional teacher-centred teaching methods in universities, student interest and engagement are not generated and they continue to care little about the usefulness and applicability of the topics that are taught, but perceive subject matter as material to merely rote learn and to pass examinations for obtaining their degree certification. As this leads to a lack work readiness skill in such

graduates, university teaching has in turn been criticised. This has made universities to have training courses in teaching development for university teachers, by which student perceptions to learning could first be changed to promote receptivity to facilitate their skill development. These training courses are meant to shift teachers from the traditional teacher-centred approach to a student-centered approach that requires teachers to change from that of a didactic teacher to that of a facilitator of learning. With student-centered learning, students can take greater initiative for their own learning such as diagnosing needs, formulating goals, identifying resources, implementing appropriate activities, and evaluating outcomes (Towle, 1996) which align with the principles of adult learning (Knowles, 1990).

In courses having an excessive amount of course content, Indigenous Medicine students are usually exposed to traditional lectures which often promote perceptions to continue passive and superficial learning so that opportunities to pursue subjects in depth are not taken up. Further, their assessment system mainly rewards reproduction of factual information.

Using concepts and methodologies learnt in a teaching development training course, we realised the need for changing student perceptions by adopting a student-centred teaching approach. We identified suitable methods for doing so and this study looks at whether the selected student-centred teaching methods could change student perceptions on their learning, to initiate greater engagement that could, in turn, generate interest and motivation to undertake deeper learning.

Methods

As lecturers teaching undergraduates following Indigenous Medicine, we selected two sets of student-centered classroom activities to try out. These were new to the students and the first Teaching Learning Activity (TLA) would give students practice for step-wise learning. The second TLA was to give students practice for evaluating the effectiveness of their own learning. Following these TLAs, we explored whether student perceptions had undergone changes.

In the first TLA, student-centered learning was introduced to a class of 92 Traditional Medicine Level IV undergraduate students, through a collaborative pair-wise problem-centred learning (PCL) activity extending from think-pair-share to class-share of patient-examined reporting. Each pair was given a question, which required examining a patient to be effectively answered. Students first had to reflect on the question independently, then identify what learning matter and resources they needed to use as possible solution pathways, evaluate their applicability to the posed question and then compare/contrast their chosen response/s in discussion with the partner. Next, each pair had to share their selected response with the whole class, and then undertake patient examination to write the follow-up report as their final answer.

In the second TLA, a Mock Examination (ME) was conducted for a class of 145 Ayurveda Materia Medica, Level I undergraduate students in the last week of their first semester as a

supportive practice assessment in the form of a spot test. The test accommodated ten spots, each consisting of four questions to provide 80 marks similar to their First Semester Examination. The answers were corrected and discussed among peers after the ME to enable students to self-evaluate the effectiveness of their own learning.

In both activities, student feedback on the change activity were obtained to evaluate whether they perceived these activities to have changed their learning engagement and attitudes towards how they viewed their learning approach.

Results

Table 1 shows the analysis of the student feedback on the PCL activity that we conducted.

Table 1: Analysis of the student feedback on the Problem Centred Learning (PCL) activity (n = 92)

	The PCL Teaching Learning Activity;	**Strongly Disagree**	**Disagree**	**Neither Agree Nor Disagree**	**Agree**	**Strongly Agree**
1	allows time to reflect and critically think before applying the concepts				15%	85%
2	stimulates my interest in the subject				45%	55%
3	stimulates my involvement and recreating the knowledge				62%	38%
4	enables me to use appropriate problem-solving skills			2%	22%	76%
5	is helpful to get the peer support if I encounter difficulties within the activity			3%	25%	82%
6	stimulates me to participate in discussions and enhances communication				30%	70%
7	challenges my abilities as a student			6%	52%	42%
8	offers space for giving and receiving constructive feedback				25%	75%
9	stimulates me to participate in discussion				32%	68%
10	enhances my decision-making skills			1%	27%	72%

Student responses in Table 1 showed that all students had perceived the TLA to have stimulated increased student interest, engagement as well as in other aspects such as discussions.

Table 2 shows the analysis of the student feedback on the ME activity.

Table 2: Analysis of the student feedback on the Mock Examination (ME) activity (n = 145)

	The mock exam (ME) and discussion Teaching Learning Activity;	**Strongly Disagree**	**Disagree**	**Neither Agree nor Disagree**	**Agree**	**Strongly Agree**
1	was well organised			5%	38%	57%
2	allowed me to reflect subject matters				9%	91%
3	offered me a good preparation for the examination			12%	7%	81%
4	offered constructive and helpful feedback		1%	14%	22%	63%
5	gave a good factual coverage of the subject			14%	23%	63%
6	enabled me to use appropriate problem-solving skills		2%	22%	14%	62%
7	encouraged me to express my views on the subject matter		2%	17%	19%	62%
8	stimulated my participation in discussion		6%	24%	17%	53%
9	stimulated my interest in the subject			17%	8%	75%
10	was a reinforcing learning activity			15%	10%	75%

Analysis of the student responses in Table 2 showed that the greater were able to recognise the benefits of this ME activitiy, such as having enabled them to use appropriate problem-solving skills and stimulated their interest in the subject. All students had perceived the ME allowed them to reflect on the subject matter.

Discussion/Conclusion

The feedback results indicate that both the PCL activity and the ME led to students viewing these student-centred TLAs positively as helpful activities. These TLAs generated student perceptions that they facilitated greater student engagement. In both activities, students

were allowed to interact with peers and instructors and to involve in a cycle of activity and feedback where they were given consistent opportunities to apply their classroom learning. Through the students' perceptions, it was evident that these activities promoted a helpful learning environment to bring about greater student engagement.

Previous studies have shown that student-centred TLAs can influence the sense of self-efficacy or sense of confidence, can increase motivation to learn, bring about greater retention of knowledge, and more positive attitudes towards the subject being taught (Bandura, 1977). It can be argued that the positive perceptions towards their abilities can increase their interest in the subject, as it actually did in the case of the PCL activity (Table 1, Q 2) and the ME activity (Table 2, Q 9). Nicol *et al* (2006) have indicated that formative assessment can promote the development of capacities and attitudes, useful in lifelong learning and both our TLAs had formative assessment components. Our results illustrate that student-centred instructional and assessment activities can lead to improved student attitudes. It improved not only the students' attitude toward the course but also the instructor morale and enthusiasm. In the case of all students recognising that the ME activitiy enhanced their reflection on subject matter, it is significant as this "involves students in doing things and thinking about the things they are doing", reflecting the Active Learning definition (Bonwell & Eison, 1991).

These changes, favourable to student learning, need to be examined further for use as possible interventions that can, in turn, facilitate graduate skill changes.

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Use of lecture break activities in a humanities faculty course to sustain student attention and interest

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Abstract

Research has revealed that the attention span of students could be extended usually up to twenty minutes (Gibbs and Habeshaw, 1989). In the Faculty of Arts at the University of Colombo, in many teaching classes, lecture duration is one hour. Most of the lecturers try to complete the teaching task of the particular subject within the hour irrespective of students' attention and participation. The purpose of this study is to introduce lecture breaks as a method of allowing students to be more concentrated and focused on the important aspect with regard to the lesson. This initiative was carried out for the second year students (N=32) who follow the course unit "Social Demography". The lecture breaks were implemented in two-folds. The first one was given after the first twenty minutes of the lecture and it was of three minutes and the students were asked to write down a question related to the previous lesson on their own. During the second lecture break which was given after fifteen minutes, the students were asked to exchange their questions in pairs and discuss answers. Outcome of the activity was assessed using student feedback and peer evaluation taken at the end of three consecutive classes. The student feedback indicated that the lecture breaks had helped them in maintaining the attention throughout the lecture. Peer evaluation done prior and post the implementation of lecture breaks also confirmed this finding. As per this study, it could be observed that the implementation of the lecture breaks made students enhance their learning experience by being able to retain their attention more in to the lesson. Carrying out this activity has also enabled the students to acquire knowledge within the lecture itself. Lecture breaks can be used as an effective method of keeping student attention throughout the lecture.

Background

Faculty of Arts, University of Colombo usually has lecture sessions of one hour exceeding up to two hours. During one hour or two hour period, lecturers mostly focus on completing the lesson rather than to focus on whether the students are concentrated or actively participating in the lesson. As much as completing the lesson planned is important for the lecturer, being attentive and being actively participated in the lesson is important for the student. As a result of not being attentive and not keeping the interest in the lesson, students may focused on unrelated information, background noises. In such a scenario

lecturers play a critical role to maintain the students' attention by utilizing different strategies.

For a student, attention is important in showing successful performances in the process of learning. Most of the times as observed by the lecturers, after a certain duration from the lecture, attention and interest for the lesson is gradually decreased. Some of the characteristics which follow this situation are not taking down the notes and chatting with the other person seated next to them.

With such observations during the lecture, the most common question a lecturer would ask himself or herself is 'what can I do to retain the students' attention and interest throughout my lecture?' So the main purpose of this paper is to identify whether the use of a small change like introducing lecture breaks in to lessons in the humanities faculty has been a success in sustaining student attention and interest.

Looking at this scenario in a scholarly aspect, existing literature indicates that the student attention span usually sustain up to twenty minutes. As Gibbs and Habeshaw (1989) explain, the attention curve is fairly universal and affected by room temperature, number of students and the way of teaching.

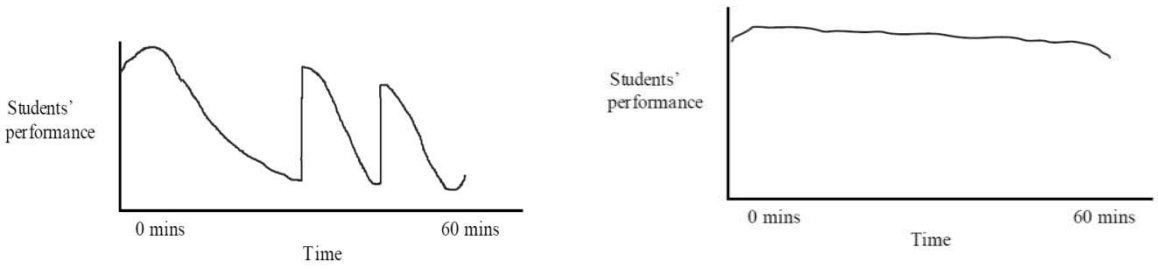

Figure 1. Changes in students' attention during the lecture
(copied from: Gibbs and Habeshaw, 1989)

Lecture breaks could be introduced in many formats in a lecture. One such method is that just before giving the break, the teacher poses one of these questions: "what is the most important point of today's lesson". There could also be questions and answer sessions such as asking to build up any two questions from the lesson, sketch a diagram to map out the lesson, to make a mistake intentionally and to identify the mistake and correct it and to draft a grid with pros and cons of the subject matter(Rowe, 1974).

Lecture breaks could also be used to reflect on what the students have learnt so far. A better way to use lecture breaks is to pause for reflection where they would be given time to look through their notes and revise what is done in the first part of their lecture. This could also be done as a Think-Pair-Share activity, where they can reflect on the course

content and the opportunity is given to formulate their thoughts before sharing (Hake, 1998).

Apart from literature on introducing different break mechanisms, Bunce and others (2010) indicate that lecture break is important not only because of increased attention but it provides a great opportunity for students for a better learning activity. They also further explain that it is easier for the students to stay focused by breaking up the lecture with activities.

Methodology

Implementation of the lecture breaks was carried out for Second Year Demography students in the General Study Stream for the course "Social Demography". This course was done by 32 students. Lecture break activity that was implemented is of two stages. The first lecture break was given after the first twenty minutes of the lecture, where the students were asked to form a question from what they have learned so far. The second lecture break was given after another fifteen minutes and asked the students to exchange their questions with the student next to them and discuss answers. Outcome of this lecture break was assessed using in-class observations, student feedback and peer feedback which were taken before the implementation and three consecutive lectures after the implementation of the activity. Student feedback were assessed using a feedback form which was given before and after the implementation and the peer feedback was assessed using the default feedback form introduced by the Staff Development Centre. In both the occasions same peer evaluated classroom in order to obtain the desired results

Results

Outcomes of the implementation is discussed in two folds i.e. assessment made by the lecturer, student and the peer before the implementation and after the implementation. Considered the assessment of the feedback before the implementation, the observations made by the lecturer can be identified as the change in the body language. The students were constantly using the mobile phone and were checking the time, chatting with the student next to them and were constantly yawning. The following table indicates the feedback given by the students and the peer before the implementation of the lecture.

According to the student and peer feedback given, majority of the students agreed on what has been universally accepted, i.e., that the attention span could only be retained up to 20 minutes. It can also be seen that the student feedback also passive in citing their opinion. Looking into the peer feedback, it also indicates a negative insight on the lecture delivered with regard to the students' learning aspect of peer reviewing.

Table 1. Student and peer feedback given before the implementation of the Lecture Break activity

	Student feedback				
	Strongly Agree	**Agree**	**Agree nor Disagree**	**Disagree**	**Strongly Disagree**
My maximum attention span is 20-30 minutes	10%	16%	46%	24%	04%
I enjoy the lesson throughout the lecture	06%	18%	42%	28%	06%
I prefer to have the lesson without any break given	02%	13%	29%	36%	20%
	Peer feedback				
	Strongly Agree	**Agree**	**Agree nor Disagree**	**Disagree**	**Strongly Disagree**
Students were attentive throughout the lecture				✖	
Student participation was active during the entire period				✖	

In the account of the observation made by after the introduction of the lecture breaks, at the very beginning they were confused on the implementation, but after about three lectures, changes were observed in their body language. As it could be observed, there was a lesser use of mobile phones and checking on time, there were more nodding and participation in the lecture, which meant they had increased their active listening in the lecture. The student and peer feedback after the implementation is presented in Table 2.

Table 2. Student and peer feedback given after the implementation of the Lecture Break activity

	Student feedback				
	Strongly Agree	**Agree**	**Agree nor Disagree**	**Disagree**	**Strongly Disagree**
Introduction of lecture break is interesting	27%	56%	12%	05%	00%
Lecture breaks have helped to concentrate on the lesson more	35%	48%	15%	02%	00%
I prefer to have the lesson without any break given	00%	06%	33%	49%	12%
I recommend this activity in other lectures	62%	25%	10%	03%	00%
	Peer feedback				
	Strongly Agree	**Agree**	**Agree nor Disagree**	**Disagree**	**Strongly Disagree**
Introduced activity on lecture break was effective		✖			
Students were more active than the previous session		✖			
I recommend this activity in other lectures	✖				

As per the Table 2 given above, student feedback suggests that the implementation of lecture breaks has been effective as 48% of the students agree that they have been able to concentrate more on the lecture and also majority of them has recommend it to be implemented in other course units as well. When considered the peer feedback, it can be identified that it has taken a positive stance compared to the peer feedback taken before the implementation of the activity.

Conclusion

This study shows that a simple Lecture Break activity implemented could have an impact on the learning experience of the students. The application of lecture breaks has enabled the students to focus on the lesson as they were actively participating rather than being passive learners. Implementation at the beginning could be challenging as they are used to the traditional way of conducting lectures. But given the time, they adapt themselves to the new method and they understood the importance of its implementation. In order to improve and develop this method, it is necessary to be utilized by the other lecturers, also student and peer the feedback is necessary to be assessed.

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Student perceptions on the use of group assignments in initiating Information Technology skills in social science undergraduates

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Abstract

Information and communication technology (ICT) is vital for today's graduate as it pervades all personal and professional activities. In higher education, ICT teaching is given a significant attention especially in Science and Technology based faculties though it lacks in Arts and Social Science based faculties, where students may lack even the basics of such skills, but may also feel backward to undertake skills development due to unfamiliarity, lack of confidence and opportunities. The urgent need to break down these barriers among Social Science students led me to examine whether group assignments can be used to initiate student confidence to enhance first-year Arts students' basic ICT-related skill development. The 3P model by Biggs (2002) was used as the conceptual framework for this study. The study was done with 35 first year students following tutorial classes in 'Introduction to Data Analysis' course unit. Students were divided into seven member groups and activities were given which involved basic ICT components such as calculations (using excel), followed by group presentation (using power point) and a one-page report (using Microsoft Word). After five tutorials, a questionnaire was used to evaluate student perceptions. Evaluations showed that 91% of students stated that they developed ability and confidence to do subject-based activities using computers. With the use of Excel, 83% students expressed confidence to do calculations at more advanced levels than previously. Majority (97.14%) of students stated that they gained a lot of skills about page formatting and report writing techniques. Majority (95%) stated that their group presentation skills had improved by practicing power point presentations. The results suggest that teaching students lacking familiarity and confidence, group mode assignments can be used from the first year itself to enhance confidence and to initiate development of unfamiliar but important skills, such as basic ICT related skills, as shown in this case to initiate Arts students' learning.

Background

People who live in this twenty first century have been mostly working with the activities related to Information and Communication Technology (ICT). Therefore, people who live in this global village cannot survive without a sufficient knowledge with regard to ICT, which has become an integral part of every individual's life (The right information, 2017).

ICT is vital for today's graduate as it pervades all personal and professional activities. In higher education, ICT teaching is given significant attention especially in Science and Technology based faculties though lacks in Arts and Social Science based faculties, where students may not only lack even the basics of such skills, but may also feel backward to undertake skills development due to unfamiliarity, lack of confidence and opportunities.

With the rapid changes in the current job market, especially these Arts and Social Science based faculties graduates need an adequate knowledge on ICT to find jobs and to survive in the competitive job market (Harvey, 2001). As there is an urgent need to break down these barriers among Arts and Social Science students, the main research objective is to examine whether group assignments can be used to initiate student confidence and to enhance first-year Arts students' basic ICT-related skill development.

The 3P model (Presage, Process and Product) by Biggs (2002) was used as the conceptual background for this study. When this modification is seen with a combination of this model 'Presage' means the student factors of how much they know about the basics of ICT. When looking as in a teaching prospect, the past experiences can be used to make objectives in improving students' ICT skills.

When it comes to 'Process' lecturer can add some learning activities related to ICT through the tutorials and give a deep and appropriate knowledge regard to ICT. As the final step, 'Product' is that lecturer can indirectly improve students' basic ICT skills quantitatively and qualitatively through group assignments while teaching the main objectives of the course unit.

Methodology

The study was done with 35 first year students following tutorial classes in 'Introduction to Data Analysis' course unit offered by Department of Demography in 2017. Five tutorials have been used for the new implementation. Students were divided into seven member groups and they had a chance to choose their own group members.

In the first tutorial, students were well-versed and instructed them about the way of doing the change regarding the improving of basic ICT skills through group assignments method while motivating the students. Before giving the group assignments, students were taught how to work on Excel, power point and word software's step by step while teaching the components of course unit.

Within these five tutorials, students were given activities through basic ICT components such as basic statistical calculations (mean, mode, median and stranded deviation) by using Excel, followed by group presentation (10 slides per group) by using power point software and a one-page report writing by using Microsoft Word.

After five tutorials, a questionnaire was used to evaluate student perceptions. The questionnaire was included questions regarding the new teaching approach and how students felt that. As a co evaluation method, continues group assignments have been taken as their mid semester examination. Through the examination of the group presentations and one page reports, first year students have been evaluated on how they have gained their basic ICT skills.

Results

This study focuses on the student perceptions on the use of group assignments in initiating ICT skills. However before engaging on a discussion regarding student perceptions, how students acquired the basic ICT skills was discussed.

At the end of five tutorials, majority of students were able to complete their course related activities very well by using computers. In the first tutorial class onwards majority of students agreed to the proposed change in a positive sign.

Students were very slow in practicing Excel related calculations in the first two tutorials, but in latter tutorials they had well practiced on given time to do the activities and students were more prepared on searching data for calculations and they were able to do compute demographic measures using excel within the given time slot.

When it comes to the report writing sessions, first they had shown that they disagree with proposed activity using Microsoft Word, however after encouraging them on advantages that they could gain from knowing about the Software, they agreed to do that activity with the use of Microsoft Word. With regard to one page report, students mentioned that they were able to gain a lot of skills about page formatting and report writing.

Finally students had done their small group presentations on what they have analyzed through Microsoft Excel and Word. It was very successful and most of students made their presentations in a very attractive manner. As an indirect outcome of this change most of the students mentioned that their working capacity as a team and group moral had developed under this new implementation.

Table 1 shows the student perceptions on the learning activity.It showed that 91% of students agreed that they were able to develop their ability and confidence to do subject-based activities using computers. More than 80% of students stated that they were motivated to use computers for their academic activities than in the past. With the use of Excel, 83% of students expressed confidence to do calculations at more advanced levels than previously. Especially 11.42% of students mentioned that they gained their Excel related knowledge from this course for the first time in their university student life.

Table 1. Student perceptions on the new implementation (n = 35)

Statements	Agree (%)	Disagree (%)	Total (%)
I developed my ability and confidence to do subject-based activities using computers.	91.0	9.00	100.00
I have motivated to use computers for my academic activities than past.	82.85	17.15	100.00
I had confidence to do calculations through Excel at more advanced levels than previously.	83.00	17.00	100.00
I gained a lot of skills about page formatting and report writing techniques through this course unit.	97.14	2.86	100.00
Our (My) presentation (group) skills had improved by practicing power point presentations.	95.00	5.00	100.00

The majority (97.14%) of students stated that they gained a satisfactory level of skills about page formatting and report writing techniques through this group activity. Majority (95%)

stated that their group presentation skills had improved by practicing power point presentations. On a positive here, 94.28% of students requested to continue this new implementation in all other course units for the mid semester examination as a co evaluation method, all the seven groups have taken more than 60% of marks for their group assignments.

Finally it can be assumed with the above results, group assignment method can be used to enhance students' confidence to develop their skills in advancing basic ICT skills. And furthermore it helps to reduce their attitudes of being backward to undertake skills development due to unfamiliarity, lack of buoyancy on themselves and competitive opportunities.

Discussion and Conclusion: ICT related skills are vital for day today life in this new global society. However, ICT teaching in higher education is given significant attention in Science and Technology based faculties though it lacks in Arts and Social Science based faculties. Unfamiliarity, lack of confidence and have reduced the various opportunities among Arts and social sciences graduates. Therefore, the urgent need to break down these barriers among Social Science students was addressed through this research and it is examined that whether group assignments can be used to initiate student confidence to enhance their basic ICT-related skills.

With the conceptual background of 3P model, this new change was implemented for first year students for those who followed 'Introduction to Data Analysis' course unit. With regard to new change, the results confirmed that the group assignment method could be used to enhance students' basic ICT skills. In addition, the results further suggest that when teaching students where there is lack of confidence and familiarity with certain skills, group mode assignments can be used from the very beginning (e.g. first year onwards) to enhance confidence and change perception towards positive development of important skills, such as basic ICT related skills, as shown in this case study.

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Changing student perceptions on their initial skill and self- image enhancement through course- based research engagement

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Abstract

Research skills are viewed as a key group of generic graduate attributes and can include communication, problem solving, and analytical skills. Student-engaged course-based research provides opportunities for students to learn while enhancing their higher order thinking, learning skills and self-image. One of the common criticisms about the university education in Social Sciences is that in-class teaching and learning activities facilitate students to obtain theoretical knowledge but fail to develop employability skills, including self-image, due to the lack of opportunity for students to engage in practical applications. Therefore, the aim of this study was to examine whether student- engaged research can change perceptions students hold on their self-image, in relation to perceived skill enhancement. Bloom's Taxonomy was applied for designing and facilitating the course-based research activity. The study population consisted of 36 third year students who followed course unit 'Human Resources Development and Labour Market planning' and student were guided to undertake a research in an urban community as a part of learning activities of the course. Six teams were formed and guided to select a research problem related to human resource development in a community. Subsequently they were guided to collect, process, analyze data, present and prepare a research report. Outcomes were assessed using student feedback questionnaires and final reports submitted by student teams. More than 80 per cent of students self-rated to strongly agree that student-engaged research have facilitated skill acquisition. More than 75 per cent of students felt that the research activity helped to develop their skills such as team work skills, communication skills, presentation skills and analytical skills. Findings suggest that student-engaged research can be used to facilitate the perception among students that initial development of research skills among university students can take place, thereby improving their self-image, results however cannot be generalized due to the shortness of the study involving only a single iteration.

Purpose/ background

The objective of this paper was to examine the question of whether student- engaged course-based research can change perceptions students hold on their self-image, in relation to perceived skill enhancement. Research skills are viewed as key group of generic graduate attributes and can include communication, problem solving and analytical skills. One of the common criticisms about the university education in Social Sciences is that in-class teaching and learning activities facilitate students to obtain theoretical knowledge but fail to develop employability skills, including self-image, due to lack of opportunity for students to engage in practical applications.

Student- engaged research provides opportunities for students to learn while enhancing their higher order thinking, learning skills and self-confidence. These skills can be created through the problem-based and self-directed learning. Rogers (1969) emphasized that "…when a student chooses (their) own direction, helps to discover(their) own problems, decides (their) own courses of action, lives with the consequences of each of these choices, then significant learning is maximized" (Rogers, 1969 cited in Macdonald, 2005, p.1). However, it is observed that in many faculties of Social Sciences, lectures, conventional modes of teaching and classroom learning are still leading. Research further reveal that in the current job market, few opportunities are available for graduates in humanities and social sciences due to lack of skills (Ariyawansa, 2008). Creating an environment for students to engage in course-based research provides important ways to improve their "natural potential for learning" (Rogers, 1969, p.114), and to develop their self-image as well as prepare students for accepting potential challenges. Such preparation is particularly important because, probably due to the changing nature of expected outcomes of the higher education in Sri Lanka, and significant educational reforms are taking place to enhance soft skills and employability specially among Social Sciences graduates trough teaching and learning.

Several research evident that when students develop their initial skills, facilitating for team-based or group learning provides an important opportunity to work together and learn as teams while enhancing their self-image (Zhou & David, 2015; Biggs and Tang, 2011; Gibbs, 1988). Burrow & Mclver (2012) also found that group assessments and collaborative learning based on teams are important to encourage students in achieving higher levels of educational outcome defined within Bloom's Taxonomy (Burrow & Mclver, 2012). Therefore, this learning activity is designed considering the level of learning presented in Bloom's Taxonomy (Bloom, 1956 cited in Anderson and Krathwohl., et al, 2001). The course-based research activity was designed to encourage student engagement and improve higher-order cognitive skills such as apply, analyze, evaluate and create from their initial skills to self-confidence development.

Methodology

The course-based research activity was implemented for Third Year Students in the Special Degree Programme for the course unit "Human resources development and labour market planning". The study population consisted of 36 third year students who followed the course unit and they had not been engaged in course-based research previously. Therefore, students were made aware about expected learning outcomes, learning activities and the method of assessment in advance. Student were guided to design a research problem related to human resource development in an urban community as part of their learning activities of the course. Six teams were formed and guided to select a research problem. First, the student teams were guided to develop research topic, research questions, methodology and a questionnaire for data collection and then they were asked to upload them into LMS. The study site was selected as Panchikawatta, Colombo-10 and students were taken to the field activity and they have gathered data that are useful for addressing their respective research problems. Subsequently students were provided sufficient knowledge on ICT based data analysis package- SPSS during the course to enable them to process, analyze and present data that

they have collected. Finally, students were asked to submit research report and present research findings and to share what they have learnt from the community with other teams. Outcome of the use of this course-based research was assessed using student feedback which were taken after the implementation of the activity and quality of final reports were submitted by six student teems.

Results

Based on student feedback which was taken after completing the activity, student have shown positive influence on skills development in areas such as theoretical learning and its practical applications, identification of research problem, data analysis using SPSS, and report writing and sharing research findings. More than 80 per cent of students self-rated to strongly agree that student-engaged research have facilitated skill acquisition. More than 75 per cent of students felt that the research activity helped to develop their skills such as teamwork skills, communication skills, presentation skills and analytical skills. Results of the student feedback regarding student perception on their skills enhancement through course based research are shown in Table 1. Implementation of course-based research has been effective as majority of the students agree that they have been able to develop skills and their perceptions on self – image enhancement, it is suggested to implement similar course-based research activity for other course units as well. From the final report submitted by students also revealed that all most all groups have achieved satisfactory level skills in problem solving, data collection, data analysis using SPSS and presenting results using graphs, tables etc.

Table 1. Student perceptions on their skills enhancement through course-based research (from student feedback forms)

Key areas of skill enhancement	Descriptive Statistics			Student feedback (self-rated) [as %s]				
As a result of this activity;	Number	Mean	SD	Strongly disagree (1)	Disagree (2)	Somewhat agree (3)	Agree (4)	Strongly agree (5)
I am able to acquire research skills and present myself with confidence	36	4.81	0.467	0.0	0.0	2.8	13.9	83.3
My communication skills and working in teams have improved	36	4.75	0.439	0.0	0.0	0.0	25.0	75.0
My ICT-based analytical skills have improved	36	4.78	0.485	0.0	0.0	2.8	16.7	80.5
I feel confident in identifying a research problem	36	4.64	0.593	0.0	0.0	5.6	25.0	69.4
I feel confident in analyzing data	36	4.78	0.540	0.0	0.0	5.6	11.1	83.3
I feel confident in writing a research report	36	4.33	0.926	0.0	5.6	13.9	22.2	58.3

Discussion and Conclusion

Findings suggest that student-engaged course-based research can be used to facilitate the perception among students that initial development of research skills among university students can take place, thereby improving their self-image. The results further suggest that the processes involved in course based research had facilitated enhancement of student self-image through positive thinking and therefore having developed positive attitudes among students as a way of thinking and learning can make student open to a world of physical changes, understanding community diversities, change their behaviour and competencies by learning new skills. Results however cannot be generalized due to the small sample size (n=36) and to be extended with further study. Nevertheless, it is recommended to introduce course-based research as a method of skill acquisition and self-image enhancement for the undergraduates of Social Sciences Faculties.

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The use of clinical case scenarios to improve critical thinking in medical students

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Abstract

Critical thinking can be defined as purposeful thinking where individuals systematically and habitually question existing situations thoughtfully and apply criteria having intellectual standards upon such thoughts. While critical thinking skill development is needed in all modern-day graduates, for medical students it promotes creativity and 'out of the box' thinking which are essential for accurate diagnosis and treatment of patients, specially where non-textbook patient situations come up. The difficulties in developing critical thinking have led to trying out of many strategies. In this study I explored whether real life clinical case scenarios could facilitate critical thinking skill development of medical students. Third year medical students undergoing family medicine rotations were selected. One group (n=50) received conventional didactic lectures with a standard assessment method and the other group (n=50) was given clinical case scenarios assigned to major content themes. A pair of students received a case each and was asked to diagnose, manage, and write relevant prescriptions and referral letters. After 30 minutes they were asked to present their findings to class. They were peer evaluated and each pair was allocated marks for accurate diagnosis, management plan, and prescription and referral letter writing skills. This activity was followed by a class discussion to clear doubts, which was mediated by me under the supervision of a senior colleague. At the end of the session, the performance of both groups was compared. Evaluation by the senior colleague found that the case-scenario group came up with novel methods of managing patients, indicative of creativity initiation, and that all students actively participated in the class discussion part. This case-scenario group also scored higher marks on peer evaluation. The case-scenario method was more time consuming but was more effective in enhancing critical thinking among medical students and changing their perceptions on patient care.

Key words: Critical thinking, medical education, clinical case scenarios

Background

Critical thinking can be defined as purposeful thinking where individuals systematically and habitually question existing situations thoughtfully and apply criteria having intellectual standards upon such thoughts. It is an integral part of part of education, notably in higher education (Fletcher *et al.,* 2018; Jahn and Kenner, 2018). While critical thinking skill development is needed in all modern-day graduates, for medical students it promotes creativity and 'out of the box' thinking which are essential for accurate diagnosis and treatment of patients, specially where non-textbook patient situations come up. Students are increasingly faced with a plethora of data and information online, challenging their ability to identify accurate information upon which they should base their analysis (Espey, 2018). The way a student approaches a learning situation is not inherent, but an acquired

trait or strategy dependent on the learning context or situational demands (Entwistle, 2005).

The difficulties in developing critical thinking have led to trying out of many strategies. Various demographic factors may possibly influence the learning approaches of medical students, hence it is crucial in helping educators to intervene and create a more favorable learning environment to enhance student learning and better prepare them for the future (Chonkar *et al.,* 2018). In this study I explored whether real life clinical case scenarios could facilitate critical thinking skill development of medical students.

Methodology

Third year medical students undergoing family medicine rotations were selected. One group (n=50) received conventional didactic lectures with a standard assessment method in the form of an end of semester examination and the other group (n=50) was given clinical case scenarios assigned to major content themes (Representation 1).

Case 1

Manel is a 70-year-old woman who had a left total knee replacement two days ago. The patient was walking down the hall and developed chest pain, which she describes as "a strange sensation" in her chest. Which has lasted more than 20 minutes. She reports it "felt like somebody sitting on my chest." She complains of feeling weak, dizzy.

On examination BP – 160/100, PR- Sinus rhythm 90 beats/min
Bilateral carotid bruits

You order an ECG and a troponin test, which comes positive for STEMI (ST-elevation myocardial infarction).

1. How would you manage this patient?
2. Write a referral letter for this patient

Representation 1. Example of a case scenario

A pair of students received a case each and was asked to diagnose, manage, and write relevant prescriptions and referral letters. After 30 minutes they were asked to present their findings to class. They were peer evaluated and each pair was allocated marks out of

15 for accurate diagnosis, management plan, and prescription and referral letter writing skills by employing a peer evaluation rubric (Representation 2) which included the following sub categories preparation and clinical skills, management style and communication skills and administration. This activity was followed by a class discussion to clear doubts, which was mediated by me under the supervision of a senior colleague. At the end of these Learning-Teaching Activities, the performance of both groups was compared. The comparison used peer evaluated marks and analysis by the senior staff member of whether new or novel methods to manage patients were identified and described by the students.

Facilitator: **Case #:** **Date:** *These are possible concepts that may fall under these categories. Please use them globally, not as a checklist.*	**Student 1**	**Student 2**	**Student 3**	**Student 4**	**Student 5**	**Student 6**	**Student 7**	**Student 8**	**Student 9**
Preparation & Clinical Skills • Prepared and reviewed *multiple* resources • Appeared able to answer questions without hesitation • Defined terms and clarified concepts • Arrived at an appropriate diagnosis									
Management style & Communication Skills • Encouraged other partner to contribute • Shared ideas with others • Was assertive, confident • Was clear and concise • Methodical, clear and to the point • Identified limitations and took necessary actions									
Administration • Dressed appropriately • Was professional and enthusiastic • Was punctual									
Total Score (15 points possible):									

Please use the space below to write any comments (positive or negative) about individual students:

Representation 2. Assessment rubric
Modified and adapted from:
https://www.google.ca/search?q=MRCGP+evaluation+rubric&source=lnms&sa=X&ved=0ahUKEwj45fKestLaAhVGkJQKHWywAiEQ_AUICSgA&biw=1126&bih=643&dpr=1

Results

Evaluation by the senior colleague found that the case-scenario group came up with novel methods of managing patients, indicative of creativity initiation, and that all students actively participated in the class discussion part. This case-scenario group also scored higher marks on peer evaluation with more than 90% scoring above 10 marks on overall assessment. The group that received only didactic lectures had a 66% pass rate at their end of semester examination.

Discussion and Conclusion

While oral assessments can be applied to almost any kind of learning outcome, it is particularly useful in assessing critical thinking ability of students, the assessment also allows judgments about students' interpersonal competence. By giving case scenarios that simulate real life situations we can assess the students ability to think on their feet and to apply knowledge in a systematic and meaningful manner to arrive at an accurate diagnosis. This method also lends itself to interaction, ranging from gentle probing by the examiner seeking further information (Joughin, 2010; Asghar and Pilkington, 2018). When comparing the two methods the case-scenario method was more time consuming but was more effective in enhancing critical thinking among medical students and changing their perceptions on patient care.

Having said this a teaching method purely based on case scenarios has its own limitations in terms of validity, reliability and fairness hence a combined mode of teaching with both lectures and case scenarios is the best method for family medicine teaching in undergraduate curriculum.

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Use of scaffolded syndicate group activities to enhance scientific communication skill-practices of students

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Abstract

Progress in science involves continuous revising and updating using new findings generated by the scientific community. Dissemination of scientific findings is important to make new knowledge available for the peer community to drive scientific developments efficiently, avoiding repetition of work. Though science curricula provide students with opportunities to undertake laboratory experiments and research, lack of awareness and skills for effective scientific communication limits exciting outcomes that are generated from reaching the scientific community. Using a plant tissue culture course (2016/17), I wanted to observe whether small syndicate-group presentation activities that students undertake, with appropriate scaffolding, can successfully enhance their skill-practices and perceptions related to scientific communication. I divided the class to 5 groups (each of 4-6 members). In my student development scaffold, the initial task required students to propose a stepwise approach to obtain a cell culture based secondary metabolite production and to present the construct using a poster. Group performances were assessed based on a rubric. This initial activity was based solely on identification of basic theoretical facts. As the next activity of the development scaffold, a more advanced task was undertaken by the same groups, moving them towards application of theory. Here, they analysed a research paper and made a seminar presentation. Here too, I assessed group performances using a rubric. All groups scored on or above 70% for the first activity. Surprisingly, the students performed much better in the follow-up activity, even with the task being advanced. All students scored on or above 80%, showing 10% increment of their marks. This evidenced that appropriately scaffolded small group presentation activities can be effectively used to improve scientific communication skill-practice of science students to strengthen their dissemination skills. A next step would be to examine whether this helped to also improve individual presentation skills.

Purpose/Background

Dissemination of scientific knowledge now has been widely accepted as an important part of scientific research since the results or outcomes have to be utilized at its maximum possibility. In order to establish a considerable impact on the research audience regarding the piece of knowledge that is created, certainly there is a requirement of transmitting research information as effectively as possible (Crosswaite and Curtice, 1994). Function of graduate students in science communication can be considered as imperative as they would bear the responsibilities of future conduct of research and developments. Concurrently, these students mainly feature difficulties

with the involvement of scientific communication process due to the limited facilitation (Kuehne *et al*. 2014). Most often university curricula do not allocate direct opportunities to improve scientific communication skills in students, though they facilitate students to undertake a considerable amount of scientific experiments or research at laboratory level which often lead to generation of valued scientific information. In return, students may lose their confidence as well as skill and practice towards effective scientific communication and in long term, this could be badly reflected on the progress of science, as even cutting-edge knowledge created in scientific disciplines would get misrepresented or restricted reaching the scientific community, public and private stake holders, even the policy makers. This scenario would confine much of the benefits that could be harnessed from scientific research that are conducted world- wide almost in every second. Therefore, the need of developing skill-practices and perceptions related to scientific communication, particularly in science students has been recognized as important.

When considering a learning outcome which could be set the initiative to drive the students acquiring effective science communication skill-practice, it is certainly the student who should play an active role with the designed teaching-learning activities. An outsized proportion of students' learning time usually has been allocated where they are facilitated to work alone, such as during the lectures, self-studies in libraries or with laboratory work. Collaborative work also has been identified by educationists as one of the most efficient modes to offer students with opportunities to develop on their own with lot of personal and interpersonal benefits. Discussions and controversy which always take place during group work may lead students' thinking towards deep approaches since analysing and processing of data or information is involved significantly. Hence, collaborative work can be used as a platform to develop students, particularly on their creativity, analysis and communication skills (Gibbs and Habeshaw, 1992). Student presentations can be used as an effective mode for assessing functional knowledge rather than declarative knowledge. Benefits can be further supported by constructive peer feedback (Biggs and Tang, 2007). Scientific communication skill not only encloses the competency in presenting specific outcomes generated but also the confidence in active discussion of the positive and negative features of the work. Therefore, presentations particularly in small collaborative learning communities can be identified as a dynamic mode to strengthen the scientific communication skill and practice in students. In order to steer the students to reach the targeted learning outcome of improving the scientific communication skill and practice, appropriate activities must be designed with provision of appropriate guidance and scaffolding to learning (Biggs and Tang, 2007).

During this study, I wanted to examine the possibility of using scaffolded syndicate group presentation activities of students for enhancing their skill-practices and perceptions related to scientific communication.

Methodology

I had the opportunity to conduct two elaborated practical sessions on 'Cell suspension culture and secondary metabolite production' for the students who followed BT 3006-Plant tissue culture technology course during the semester I of the academic year (2016/17). I divided the class to 5 groups, each of 4-6 members. The necessary fundamentals were discussed with the students during the lecture sessions prior to the practical classes in order to make the students more confident during the laboratory conduct. With these initial sessions I guided the students to gain specialized skills on handling specific instruments for preparing cell suspension cultures, maintenance of aseptic techniques during culture establishment, record scientific observations, analyse the outcomes of the experiment and discuss the results obtained with respect to the information available in literature. This initial learning experience of students was basically confined to individual laboratory report writing in which they were familiarized with aspects in scientific writing. However, the benefits were yet limited due to the lack of interactive discussion of experimental outcomes and collaborative efforts.

Table 1. Grading criteria (rubrics) for assessing the poster presentation

Criteria	% points	Factors assessed
Poster organization	10	Logical smooth flow of information Emphasis on main points and explaining of points (excellent: 8-10, good: 5-7, adequate: 2-4, inadequate: 0-1)
Poster content	30	Results clearly analyzed/presented. Conclusions clearly stated or not. Key findings/observations clearly discussed with citing references. (excellent: 22-30, good: 13-21, adequate: 6-12, inadequate: 0-5)
Poster creativity	15	Design and graphics used to effectively communicate the facts (excellent: 12-15, good: 7-11, adequate:4-6, inadequate: 0-3)
Poster grammar/spelling	05	Errors ranging from no/minor to seriously affecting readability (excellent: 5, good: 4, adequate: 2-3, inadequate: 0-1)
Oral presentation – introduction	05	Establishing the focus of the presentation (excellent: 5, good: 4, adequate: 2-3, inadequate: 0-1)
Oral presentation – organization and time management	10	Facts clearly stated and explained with a logical and smooth organization Usage of the time allocation (excellent: 8-10, good: 5-7, adequate: 2-4, inadequate: 0-1)
Oral presentation – style of delivery	10	Can be clearly heard or not Appropriate eye contact, Referred to the location of the poster Languages and pauses are effective or not (excellent: 8-10, good: 5-7, adequate: 2-4, inadequate: 0-1)
Oral presentation-response to questions	15	Questions handling with confidence Clearly justification with a deep knowledge of application (excellent: 12-15, good: 7-11, adequate:4-6, inadequate: 0-3)

I used a student development scaffold on syndicate group presentation activities in order to inspect whether students' scientific communication skill and practice can be effectively enhanced by this. First, I assigned the same practical groups with the task to propose a stepwise approach to obtain a cell culture based secondary metabolite production and to present the construct using a poster. Since this was the first attempt of the students on group poster presentations on a given task, I planned it to be structured on identification of fundamentals they learnt so far. Group performances were assessed based on a rubric (Table 1).

Moving ahead with the next activity of the student development scaffold, I assigned a more advanced task to the same groups. With this, they analysed a research paper relevant to their study background which was randomly assigned to each group and students organized a seminar presentation. Analysis of research papers compel them to move towards a much higher level of learning, application of theory. I also assessed the group performances of this task based on a rubric (Table 2).

Table 2. Grading criteria (rubrics) on which the seminar presentations were assessed

Criteria	% points	Factors assessed
Power point display - organization	10	Logical smooth flow of information Presented under main and sub topics explained Followed by the audience (excellent: 8-10, good: 5-7, adequate: 2-4, inadequate: 0-1)
Power point display - content	30	Information on slides reflects understanding and effective summarization on all sections presented (excellent: 22-30, good: 13-21, adequate: 6-12, inadequate: 0-5)
Power point display - design	10	Design and graphics used to effectively communicate the facts (excellent: 8-10, good: 5-7, adequate: 2-4, inadequate: 0-1)
Power point display - mechanics	05	Errors ranging from no/minor to seriously affecting readability (excellent: 5, good: 4, adequate: 2-3, inadequate: 0-1)
Oral presentation – organization and time management	10	Facts clearly stated and explained with a logical and smooth organization Usage of the time allocation (excellent: 8-10, good: 5-7, adequate: 2-4, inadequate: 0-1)
Oral presentation – style of delivery	10	Can be clearly heard or not Appropriate eye contact, Referred to the location of the poster Languages and pauses are effective or not (excellent: 8-10, good: 5-7, adequate: 2-4, inadequate: 0-1)
Oral presentation – illustrations based on in depth analysis	10	Presenter familiar with material Reading from slides, Evidence of rehearsal (excellent: 8-10, good: 5-7, adequate: 2-4, inadequate: 0-1)
Oral presentation-response to questions	15	Questions handling with confidence Clearly justification with a deep knowledge of application (excellent: 12-15, good: 7-11, adequate: 4-6, inadequate: 0-3)

Results

The students' skills on scientific communication were evaluated based on the assessment rubrics. All groups scored on or above 70% for the first activity (All group marks ranged between 70% - 80%). Surprisingly, the students performed much better in the follow-up activity, even with the task being advanced. For the second activity,

students scored on or above 80% (All group marks ranged between 80% - 90%), showing 10% increment of their marks in general. The marks of the two activities were statistically analyzed using t-test with Statistical Analyses System (Release 9.0) for any statistical significance. Mean comparisons were carried out using Tukey's multiple comparison test. The mean marks obtained for the students' performances with the second activity were significantly different to that of the first activity ($p \leq 0.05$). Tukey's multiple comparison test differentiated the two sets of marks obtained for the first and the second activity into distinct groups as they were statistically different. Apart from the analysis of the marks, the feedback obtained from the students at the end of these tasks revealed that the perception of the students regarding the scientific communication skill had been greatly improved with the series of the group presentation activities they undertook. Concurrently, they have gained the opportunity to enhance many other interpersonal skills with the engagement in the scaffolded group tasks (Figure 1). Further my observations agreeably interpreted that this approach can impact on improving students' scientific communication skill since they showed signs of more confident and proficient individuals as they proceeded through the scaffolded activities.

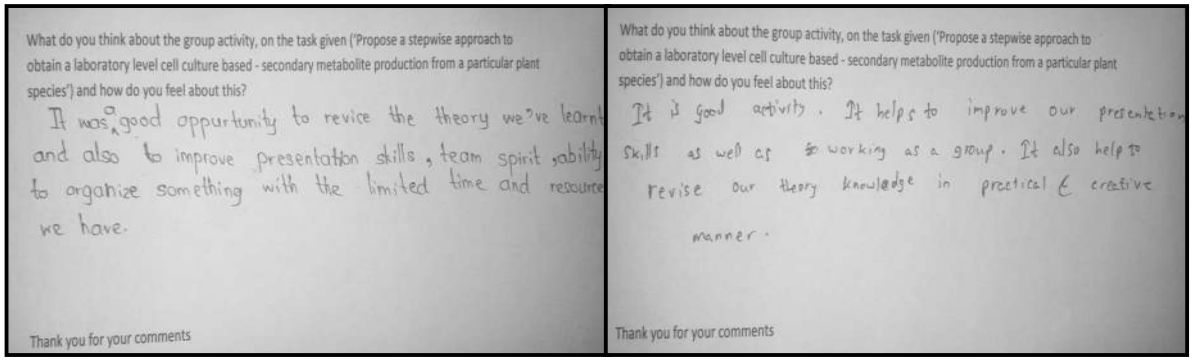

Figure 1. Some of the student feedback regarding the group presentation activities

Discussion and Conclusion:

This study evidenced that scientific communication skill-practice of science students can be effectively improved by using appropriately scaffolded small group presentation activities. Kostova and Atasoy (2008) have compared the effectiveness of different approaches for successful learning in environmental education using Student t-criterion, the values more than 1.96 being significant. The results clearly pointed out that all the methods assessed were effective than traditional lectures and out of them studying cases and role playing shown to be the most effective (t=17.3). Creative construction of models by students utilizing modes such as presentations, posters turned out to be one of the best ways, as the student is captivated by their own work and there is always room for creativity and freedom to choose material. Many other reports are available which emphasize the importance of presentations for disseminating knowledge as well as general guidelines for effective communication have been ruled out (Bavdekar *et al*. 2017).

The next step would be to examine whether this helped to also improve individual presentation skills. This may need a diverse approach combined with supplementary

methods such as viva-voce examinations for individuals. I thoroughly believe that it is important to encourage students to develop their skill and practice towards scientific knowledge dissemination which would ultimately promote the entire global community harnessing the maximum benefits out of future scientific research and developments. Therefore, it is one of the responsibilities of teachers to excavate students' skills, practices and perceptions which remain unaddressed within the current curricula and to guide the students with supportive approaches to help student development.

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