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Conference on Higher Education in Sri Lanka

jointly organized by

Staff Development Centre (SDC)

University of Colombo

and

Sri Lanka Association for Improving Higher Education Effectiveness (SLAIHEE)

Conference Theme

"Outcome based higher education: achievements, challenges and potential"

Friday 26th June 2015

8.30 am to 4.30 pm

University of Colombo

SDC – SLAIHEE Conference 2015

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11th SDC - SLAIHEE Conference
on
'Outcome Based Higher Education: Achievements, Challenges and Potential'

Friday 26th June 2015, 8.30am to 4.30pm
Prof M B Ariyapala Memorial Auditorium, Department of Sinhala, University of Colombo
(the documents / materials of this conference are available at www.slaihee.org)

WELCOME TO THE CONFERENCE

The first SDC – SLAIHEE Joint Annual Conference was held in 2005 with the theme "Teaching to put students first". Since then, this conference has become an eagerly awaited event in the annual calendar, probably because it is the only forum that brings together academics from all Departments of all Universities and Degree-awarding Institutes, in both the state and private sector of Sri Lanka. The conference is the only forum to showcase original research in the field of Higher Education that encompasses all disciplines and spans generic interests. Abstracts for presentation in past conferences have included such varied topics as student ethics, problem-based learning, learning styles, peer evaluation, weblogs, learning management systems, feedback, English language and attitudes. It, therefore, crosses boundaries between disciplines and specialities, finding common ground in issues of facilitating learning in higher education.

While SLAIHEE conducts activities throughout the year with the aim of improving higher education effectiveness, the highlight is undoubtedly the annual conference. This year, too, the conference will be of great interest to academics as a number of interesting papers featuring a variety of innovations such as computer based formative assessment, peer-assisted and cooperative learning, interactive video lecturing, student-centered learning and script concordance testing will be presented. Abstracts have been submitted by academics from universities throughout Sri Lanka and have been peer reviewed by two reviewers prior to acceptance.

This eleventh SDC – SLAIHEE conference 2015 is, like previous conferences, being organized jointly by the SDC of the University of Colombo and SLAIHEE. The SDC was established in 1997 and pioneered training university staff in Sri Lanka. Inspired by the insights gained at SDC, a group of academics formed SLAIHEE as an independent national organization committed to facilitate improvement of life skills, performance capabilities and attitudes of university students and staff.

The theme of this year's conference is "*Outcome based higher education: achievements, challenges and potential"* (for previous conference themes and proceedings, please visit www.slaihee.org).

The Keynote Speaker at the conference will be Dr Gominda Ponnamperuma, Senior Lecturer in Medical Education, Faculty of Medicine, University of Colombo and Former Consultant (Human Resource Development), Higher Education for the Twenty-first Century (HETC) Project, Ministry of Higher Education, Sri Lanka. His keynote speech on "Outcome-based education: a formula toward holistic education" will be of great value to junior and middle level academics, as the Ministry of Higher Education has adopted outcome-based education as its strategy to modernize university curricula to produce graduates with the correct blend of knowledge, skills and attitudes required for the new millennium.

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

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

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.

From SDC and SLAIHEE – a big thank you for your participation, to the presenters and to Dr Gominda Ponnamperums for his Keynote speech, Prof Lalitha Mendis and all the special invitees. The reviewers are thanked for their speedy and efficient reviews. The Head of Department and staff of the Department of Sinhala are thanked for their ready support in allowing us to benefit from their facilities.

The Conference Organising Committee;

Ms Shrinika Weerakoon - University of Colombo
Dr Enoka Corea – University of Colombo
Dr Iroja Caldera - University of Colombo
Dr T Sivakumar – University of Moratuwa
Dr Rapti de Silva – University of Moratuwa
Mr Harith Kandaudahewa - University of Colombo
Dr Prasanna Ratnaweera – Open University of Sri Lanka
Dr. Pradeepa Wijetunge – University of Colombo

Cover page design - Biman Darshana Hettiarachchi, University of Moratuwa

Programme

8.30 am – Registration

Session 1

09.00 – 09.05am - **Welcome** by Dr Enoka Corea
President SLAIHEE

9.05 – 09.50am - **Keynote Address** by Dr Gominda Ponnamperuma
MEDARC, Faculty of Medicine, Colombo
(Formerly Consultant HETC)

09.50 – 10.00am - **Address** by Guest of Honour
Prof Lalitha Mendis

10.00 – 10.10am - **Vote of Thanks** by Dr D.A.C. Suranga Silva
Director, SDC, University of Colombo

10.15 – 10.35am - **Tea**

Session 2

11.00am - Presentation & discussion of peer-reviewed papers
– **Parallel Sessions** I A & I B

12.45pm - for non-members: ***Lunch***

12.45pm - for members: **Annual General Meeting** of SLAIHEE
(at MBAriyapala Auditorium) followed by lunch

Session 3

2.00pm - Presentation & discussion of peer-reviewed papers
– **Parallel Sessions** II A & II B

4.30pm - **Feedback form, Conference Closure & Tea**

Staff Development Centre, University of Colombo, Colombo 3.
Tel/Fax: 011 2594899 Tel: 011 5337207
Web : www.slaihee.org E-Mail: slaihee@gmail.com

SDC – SLAIHEE Conference, June 26th 2015 – Session Timetable

Venue	Hall A	Hall B
Session #	Session 2	
Chairpersons	*Dr Prasanna Ratnaweera* *Dr Nalin de Silva*	*Dr Pradeepa Wijetunge* *Ms Sanjeewani Somaratne*
Time	Abstract #, Title and Author(s)	Abstract #, Title and Author(s)
11.00 – 11.25am	**I A 1** **Peer Assisted Learning; Experience from a Medical School in Sri Lanka** N L de Silva, B Parththipan, C Rodrigo, G Constantine, D Fernando, S Rajapakse	**I B 1** **Study Habits of Open Distance Learners: A Study with Undergraduates of the Open University of Sri Lanka** R Mangaleswarasharma, K Vamathevan
11.25 – 11.50am	**I A 2** **Facilitating Active Learning in a Large Introductory Statistics Class with Non-Motivated Biology Students Using Cooperative and Project Based Learning** T U S Peiris, B P A Jayaweera, M R V N Subasinghe	**I B 2** **Errors Committed by English as a Second Language (ESL) Learners when Using Nouns in Written Essays** S Jeyaseelan
11.50 – 12.15pm	**I A 3** **Online Formative Assessments in Clinical Microbiology Using Learning Management Systems** V Perera, N de Silva	**I B 3** **Developing Vocational Education Undergraduates' English Pronunciation Skills** D Ranasuriya, S Fernando
12.15 – 12.40pm	**I A 4** **Microsoft Excel Based Self-Assessment Tool for Administration of Formative Assessment** K U S Somarathna	**I B 4** **Corpus Analysis of First Year Bachelor of Business Administration Lectures:Exploring English for Academic Purposes (EAP) Outcomes for Remedial Students** Z D Hussain
12.45 – 2.00pm	**SLAIHEE AGM** and **LUNCH**	

Venue	Hall A	Hall B
Session #	Session 3	
Chairpersons	*Mr Dhanesh Liyanage /Prof Nelun de Silva*	*Dr T Sivakumar /Mr Ajith Jayaweera*
Time	Title and Author(s)	Title and Author(s)
2.00 – 2.25pm	**II A 5** **The Usefulness of Early Formative Assessment in Determining Academic Performance in First Year Physiology** A D A Fernando, S Wasalathanthri, P M Atapattu	**II B 5** **'IPVLec': Interactive and Planned Video Lecturing to Facilitate Active Learning** G Beligatamulla
2.25 – 2.50pm	**II A 6** **Regionalization and Catering to Sociocultural Diversity in Higher Education: Teaching Beyond Disciplinary Bounds** S C Padmakumara	**II B 6** **Effectiveness of Blended On-line Learning on Three Key Learner Cohorts in the Soil Mechanics and Introduction to Rock Mechanics Course** H G P A Ratnaweera, N P M Rajaguru
2.50 – 3.15pm	**II A 7** **Facilitating Student Centred Learning in Environmental Science and Aspects of Environmental Law Using an Outcome Based Approach** H I U Caldera	**II B 7** **Implementation and Evaluation of a Student Centered Learning Method for Pharmacology Lectures in Different Allied Health Disciplines** K de Abrew, A de Abrew, R Priyadarshana
3.15 – 3.40pm	**II A 8** **An Online Course in Blended Environment for Student-Centred Learning to Improve the Quality of Education among Final Year Undergraduates** S H D Senanayake, K P Hewagamage, E Hettiarachchi	**II B 8** **Assessment of Clinical Reasoning in Forensic Medicine Using a Script Concordance Test: A Pilot Study** S Gunawardena, A de Abrew
3.40 – 4.05pm		**II B 9** **Application of Student Centered Learning as an Active Learning Approach in Design Education** S Rathnamalala, K Wasala

My conference schedule;

Time	Hall (A or B)	Title	Author(s)
11.00 - 11.25 am			
11.25 – 11.50 am			
11.50 – 12.15 pm			
12.15 – 12.40 pm			
12.45 – 2.00 pm	**Lunch** & time-management plans		
	While having lunch, I will 'do':		
	Over any spare time, I will 'do':		
2.00 – 2.25pm			
2.25 –2.50 pm			
2.50 – 3.15 pm			
3.15 – 3.40 pm			
3.40 – 4.05 pm			
4.05 – 4.30 pm	Feedback form Tea Conference ends		

Peer Assisted Learning; Experience from a Medical School in Sri Lanka

Nipun Lakshitha de Silva[1], B. Parththipan[1], Chaturaka Rodrigo[1], Godwin Constantine[1], Deepika Fernando[2], Senaka Rajapakse[1]
1- Department of Clinical Medicine, Faculty of Medicine, University of Colombo
2- Department of Parasitology, Faculty of Medicine, University of Colombo
Corresponding Author:senaka.ucfm@gmail.com

1. Introduction

Peer Assisted Learning (PAL) refers to an act or process of gaining knowledge, understanding, or skills from other students who are at either different or equivalent academic or experiential levels, through instruction or experience. PAL is a widely recognized method of learning used by medical undergraduates in learning activities in both clinical and class room settings (Glynn, MacFarlane, Kelly, Cantillon& Murphy, 2006). It can potentially achieve equivalent learning outcomes compared to conventional teaching (Yu, Wilson, Singh, Lemanu, Hawken& Hill, 2011). There is also evidence to show that participating student teachers also benefit academically and professionally(Yu et al., 2011). The General Medical Council, UK recommends that all medical students should be trained as teachers (GMC, 2003), since one of the responsibilities of medical professionals is teaching and training.

In Sri Lanka, however, opportunities for medical students to become formal peer teachers are negligible; in fact it is probably discouraged. Nonetheless, there is a significant amount of PAL taking place informally among medical students, and there are publications emerging from Sri Lanka which show that PAL is effective even in its current limited form (Kommalage &Thabrew, 2011). Nonetheless, these informal unplanned PAL activities are fraught with problems. Information given by the peer tutor could be incorrect, resulting in conflicts with the formal teaching programme. Deviations from the objectives of the main curriculum could occur, since peer learning is more likely to focus on strategic and superficial learning.

Published evidence pertaining to current practices of medical undergraduates in utilizing PAL in Sri Lanka is limited. Thus there is a need to further understand the utilization and acceptance of PAL in the Sri Lankan context, with the goal of implementing a formal teaching structure for PAL, which would benefit students while minimizing the negative effects of peer teaching mentioned above. Identifying reasons that motivate medical students to seek PAL would also identify deficiencies in the formal curriculum which could be corrected by reflective practice.

The objectives of this study were to a) assess the current practices of PAL among second year and final year medical students; b) identify reasons as to why medical students seek PAL; c) identify perceived weaknesses in current PAL activities; and d) identify student characteristics positively associated with seeking PAL.

2. Methodology

A cross sectional descriptive study was conducted in Faculty of Medicine, University of Colombo in September 2013, with the participation of second and final year medical students. Ethical approval for this study was obtained from Ethics Review Committee,

Faculty of Medicine, University of Colombo. Data was collected by a validated self-administered questionnaire. This questionnaire was designed by the investigators following an extensive literature search and was pre-tested on 10 students from a batch outside the study population. The questionnaire covered socio-demographic details, information on current practice pertaining to utilization of PAL, reasons for seeking PAL, and perceived weaknesses of PAL from the students' standpoints. In questions where frequency of utilization was assessed, a Likert scale ranging from 0 to 5 was used. All students were invited to participate and those consenting were given the questionnaire.

Data was entered and analyzed using Statistical Package of Social Sciences (SPSS) version 19. Descriptive statistics were outlined with frequencies, proportions, percentages and summarized using mean with standard deviation. Significance of dichotomous variables were analysed using Chi-square test (and Fishers exact test where appropriate) and that of continuous variables with independent t-test.

3. Results

Out of 352 invited, a total of 284 students (80.7%) participated, i.e., 162 second year students (females; 56.8%) and 122 final year students (females; 43.4%). Frequency of utilistion of PAL and time spent for PAL is given in Table 1. Just four (2.5%) of second year students and seven (5.7%) final year students had never participated in PAL activities.

Characteristic	Second year	Final Year	t- test
Mean frequency of utilization (scale 0-5)	3.24	3.07	0.93
Mean frequency of attending just before exams(scale 0-5)	3.15	3.3	-0.806
Mean frequency of attending throughout the term(scale 0-5)	2.44	2.22	1.246
Average time spent per week for PAL during term (hours)	15.07	7.12	3.554*
Average time spent per week during last two weeks before exam (hours)	11.98	7.84	2.084*

***p<0.05**

Table 1: Comparison of PAL utilization pattern among second year and final year of medical students

Of the 162 second year medical students who responded to the questionnaire, 101 (80.16%) indicated that they participate mostly in PAL activities conducted by co-peers (i.e., batch mates) rather than those conducted by seniors. In contrast, only 29 out of 68 (42.65%) final year students selected a batch mate as their first choice for a peer teacher ($p<0.001$). Second years most commonly participated in mass lectures (50%), while final years most commonly participated in group discussions base on past question papers (30.3%) ($p<0.001$).

The medical curriculum in the Faculty of Medicine, Colombo has 14 subjects taught in activities compacted into five streams. Participants were asked to indicate the streams and subjects for which they prefer to use the PAL method. Final year students stated that the

Behavioural Sciences Stream (32.8%) and Clinical Sciences Stream (26.2%) were the streams for which students most frequently use PAL. The second year students had only experienced the Introductory Basic Sciences Stream (IBSS) with just limited exposure to other streams. Of the three main subjects in IBSS, students utilized PAL most often for Anatomy (53.7%), followed by Physiology (37%); just 5.6% used PAL for Biochemistry.

When the amount of preparation for PAL activities and post studying following the activities was compared between the two groups, it was found that second year students engage in more preparation whereas numbers engaging in post studying did not show any statistically significant difference between the groups. Methods commonly used by each group for preparation and post studying also varied significantly. Of the factors that motivated students to seek PAL, the most common for second year students was exam preparation (85.7%). In the final year group, two commonly mentioned reasons were; to identify the important areas of the subject (87.9%) and exam preparation (87.1%). Interestingly, promoting exam oriented learning was identified as a weakness in PAL by 42.6% of the students.

Further analysis was performed by combining both student groups to identify other factors that might have affected the frequency of utilization of PAL. Mean frequency of utilization was significantly more in females ($p=0.003$). Interestingly, the medium of instruction during school education (native languages vs. English) was not associated with frequency of engaging in PAL ($p=0.766$).

Understandably, students who doubted the veracity of information taught at PAL used it less than others ($p=0.013$). A similar pattern was noted in groups who considered that PAL activities promote exam oriented learning compared to others ($p =0.007$).

4. **Discussion and Conclusion**

This study revealed several interesting facts related to utilization of PAL by medical students in Sri Lanka, which has not been shown in previous literature. Further, PAL activities described in this study differs from the PAL that has been described in most of the foreign literature as Sri Lanka does not have a well organized PAL platform for medical students.

According to the results of this study, final year students spend less time for PAL compared to the second years which could be due to their busy clinical schedule. Interestingly, it was noted that second years get more help from batch mates than final year students. This can be attributed to busy schedules in the final year but whether another cause is at play should be further explored. When progressing to the final year, medical students tend to seek more group based PAL activities, which could be considered a positive trend.

The level of prior preparedness was less for final year students probably because time is not allowed for such activities in the existing curriculum. One advantage of incorporating PAL in to the formal curriculum is that it will require setting aside a designated time period for preparatory work. It also noted that the internet was inadequately utilized for preparatory work or post-studies. A previous study in the same institution showed that students have adequate access to the internet, thus this under-utilization is unlikely to be due to lack of internet facilities. It would be interesting to explore whether the peer teachers' knowledge is limited to the knowledge in standard textbooks.

While appreciating the plus-points of PAL, students also pointed out some negative aspects which limit its usefulness. A plan to formally incorporate PAL into the curriculum with supervision of academic teachers might give this process more credibility and validity.

A study conducted in another medical faculty in Sri Lanka has looked at some similar aspects using a qualitative approach (Kommalage &Thabrew, 2011). In this study, the cited importance of PAL activities was to fill gaps in students' understanding and to explain unclear areas of the curriculum better. These goals match with the findings of this study, and the quantitative methodology used in our study has made it possible to look at a wider picture on the subject. However such an approach lacks the depth offered in a qualitative study and some of the observations we have made would be better explained by subsequent qualitative studies.

This study was of a cross sectional design. If the same cohort of students were followed up during their stay in medical school, the change in PAL activities could have been appreciated with better validity. Poor respondent rates were noticed especially in the final year group which was thought to be due to their busy schedules.

Despite lack of support from formal academic bodies,PAL is frequently used by medical students who are in the early as well as latter parts of their medical curriculum. Identifying its positive aspects and weaknesses should prompt development of organized PAL activities that can be incorporated into the formal medical curriculum. Further studies with both qualitative and quantitative design are necessary to assess PAL further.

References

Glynn, L. G., MacFarlane, A., Kelly, M., Cantillon, P.& Murphy, A. W. (2006). Helping each other to learn--a process evaluation of peer assisted learning. *BMC Med Educ, 6*, 18. doi: 10.1186/1472-6920-6-18

GMC (Ed.). (2003). *Tomorrow's doctors*. London, UK: General Medical Council.

Kommalage, M.& Thabrew, H. (2011). Student-led peer-assisted learning: the Kuppi experience at the medical school of the University of Ruhuna in Sri Lanka. *Educ Health (Abingdon), 24*(2), 516.

Yu, T.-C., Wilson, N. C., Singh, P. P., Lemanu, D. P., Hawken, S. J.& Hill, A. G. (2011). Medical students-as-teachers: a systematic review of peer-assisted teaching during medical school. *Advances in Medical Education and Practice, 2*, 157.

Facilitating Active Learning in a Large Introductory Statistics Class with Non-Motivated Biology Students Using Cooperative and Project Based Learning

T U S Peiris[a], B P A Jayaweera[b] and M R V N Subasinghe[a]
[a]Bio-statistics and Agronomy Unit, [b]Department of Livestock and Avian Sciences
Wayamba University of Sri Lanka
Corresponding Author: turslasp@yahoo.com

1. Introduction

It is evident from the research literature that large classes at undergraduate level create problems for staff and students alike. Many contribute to less effective teaching and learning (Mulryan-Kyne, 2010; Lipinge, n.d; Foley & Masingila, 2013) and lectures take 80% to 95% of the class time (Benjamin, 1991). Apart from these teacher centered learning strategies predominant in large classes, students' attitudes towards the subject learned have also been recognized as an important affective factor (Fennema & Sherman, 1976). Most students from biology streams generally show a negative attitude towards certain logical and analytical subjects like Mathematics and Statistics due to fear and anxiety towards these subjects. As a result, university teachers who teach Statistics and Mathematics in biology streams are confronted by the challenge of teaching effectively in large groups which are conspicuously non-motivated. The current pedagogy of learning in large-class teaching in Sri Lankan universities is the teacher centered paradigm where students receive information passively. Though university teachers are well aware of the trends of student centered learning (SCL) and outcome based education (OBE) approaches, the rate of implementation, especially for large classes is notably low. Further, university teachers are often criticized for failing to promote the development of transferable skills in their students. Therefore the aims of this study were to (1) change perceptions of non-motivated biology students on subjects like Statistics using SCL and OBE paradigms and (2) evaluate the effectiveness of a blend of cooperative learning (CL) and project based learning (PBL) approaches in achieving deep and active learning environment in non-motivated large classes.

2. Methodology

The study was carried out using 125 first year students following two Food Science degree programs in the Wayamba University of Sri Lanka. The course considered for the study was Concepts and Practice of Statistics, a fundamental compulsory two-credit course offered in the second semester. The most preferred learning styles of students and the quality of student learning were considered in designing teaching and learning activities for this study using a VARK (**V**isual, **A**ural, **R**ead/Write and **K**inaesthetic) questionnaire and stages of SOLO Taxonomy (**S**tructure of the **O**bserved **L**earning **O**utcomes). CL and PBL approaches were introduced instead of the conventional teacher centered lecturing method. Team based learning (TBL) was implemented as the CL method because learning together promotes the greatest effect among the other CL methods (Jhonson, Jhonson & Stanne, 2000). As PBL is now being implemented throughout higher education by embedding real-life problems into students' learning processes (Hung, Jonassen and Liu, 2008**)**, PBL was considered as the second approach for this study. To implement CL, students were divided into twenty working teams consisting of 6–7 students each. To implement PBL, two group projects were designed.

The first project was "Situation Analysis of Students' Anthropometric Information". A questionnaire was developed to collect anthropometric information of all students in the batch

in order that students will be able to create hypotheses for each statistical concept and verify all statistical theories discussed during the course. For all classroom exercises students used this set of real data for problem solving. Group reflective learning logs (RLLs) were used as another useful learning strategy under this project. Students were taught Kolb's learning cycle to facilitate writing RLLs. At the end of the course, they were asked to a write two-page individual summary of what they have learnt.

The second project titled "Learning Statistics Is Fun" was the creation of an exhibit to cover all important core concepts learned during the course to study statistics for fun. Students were asked to create an exhibit in a creative form such as puzzles, games, quizzes, or worksheets. The project was evaluated by a panel of three external members with face to face discussion.

Two assessment rubrics were developed to assess the two projects. Evaluations were based on observations, peer feedback, personal communications, and students' performance as well as student feedback taken at the beginning (5^{th} week), in the middle (10^{th} week), and at the end (15^{th} week) of the course. The first two feedbacks were open ended and the third feedback was taken through a questionnaire.

3. Results

Students' perception on CL experience showed that they have accepted the approach positively, as 71% and 88% of students in the first two feedbacks mentioned that learning in a team helped them to understand lessons more effectively. Students have also stated that feelings of stress or anxiety were minimal and they developed curiosity for knowing more about statistics. Students' perception taken through a structured questionnaire at the end of the course also confirmed that they have grasped the approach positively (see Table 1). A majority of the class (88%) believed that the new approach facilitated their learning more

CL and PBL I practiced throughout this course facilitated	Ranks				
	1	2	3	4	5
my learning than listening to normal lectures	4	7	24	50	16
long term retention of the subject matter	0	9	33	49	11
my critical thinking skills	0	10	33	50	9
opportunity to improve soft skills	0	9	22	60	10
CL and PBL are effective teaching methods	4	16	30	44	7

Table 1: Students' perceptions on improving deep learning, critical thinking and transferable skills in the new learning environment

(1=strongly disagree, 2= disagree, 3= neither agree nor disagree 4=agree 5=strongly agree)
*Cell values are percentages of students in each category

than the conventional practice. Among them, 73% had confidently grasped the approach. Similarly, 91% of students believed that the new approach facilitated their deep learning skills with 73% believing it more confidently. In general, 90% of students agreed that the new approach facilitated their critical thinking skills with 64% strongly agreeing. In addition, 91 % of students believed in principle that the new approach was a great opportunity for them to improve soft skills with 76% confidently feeling that they have achieved transferable skills. Finally, 80% of students indicated that the new approach was an effective teaching

method that enhanced their learning with 63% confidently feeling that the new approach is an overall effective method for learning.

While appreciating the above mentioned facts of the new methodology, students mentioned some aspects that they would like to be improved. Having more time for group activities was the major request and they also requested more examples during class time. In addition they suggested having instant formative evaluations like quizzes during the lecture and also incorporating independent learning for some sections. Students also expressed their willingness to regroup in order to strengthen knowledge sharing. However, grouping of students needs to be done by the instructor on a random basis to avoid having students with weaker skills working with students of the same type continuously.

Students presented a variety of items as exhibits including quiz boxes, puzzles, digital short notes, magazines, booklets, leaflets, glossaries, calendars and posters for "Learning Statistics Is Fun". Results indicated that except for two groups almost all groups achieved more than 60 marks for their group project (Figure 1(a)). Results for the "Situation analysis of students' anthropological information database," the majority of students achieved more than five for their projects (Figure 1(b)). Therefore, preliminary findings based on the two project evaluation scores indicated that students have grasped the new approach well.

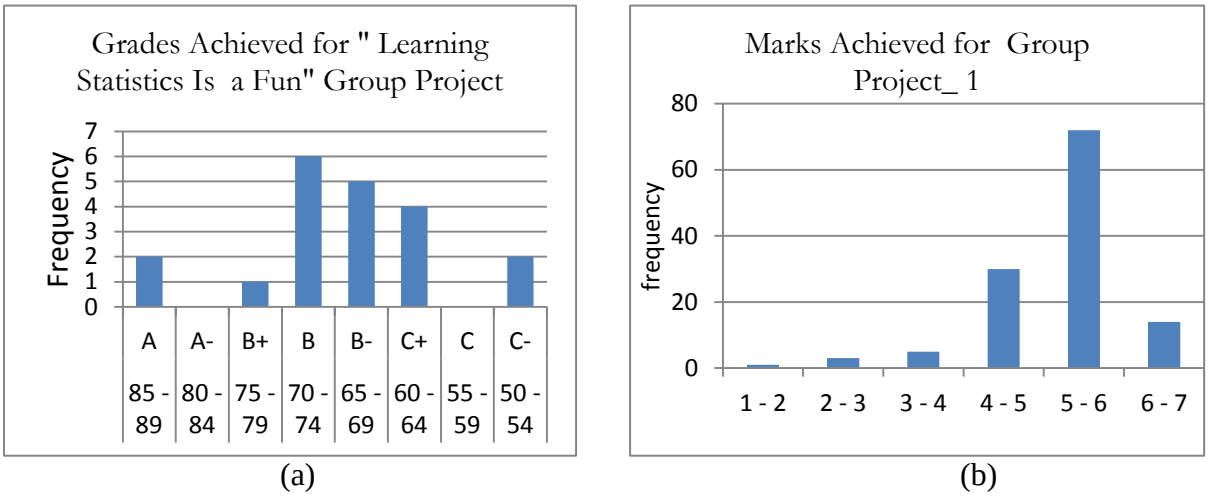


Figure 1: (a) Grades achieved for "Learning Statistics Is a Fun" group project and (b) Marks achieved for group project 1

4. Discussion and Conclusion

Students' perception on CL experience confirms Mabrouk's (2007) finding that working on a high-performance team minimizes the occurrence of unpleasant situations and maximizes learning and satisfaction. Though a large and a rapidly growing body of research confirms the effectiveness of CL in higher education (Jhonson *et al.*, 2000 and Smith *et al.*, 2005), most of them have been focused on small classes. Interestingly, this study shows the potential of cooperative learning in changing students' perception on difficult subjects like Statistics in large classes. Students' perceptions of stress and anxiety towards the subject with the CL approach reflects that relative to students taught traditionally—i.e., with instructor-centered lectures, individual assignments, and competitive grading—cooperatively taught students tend to exhibit lower levels of anxiety and stress and greater intrinsic motivation to learn, as indicated by Felder and Brent (n.d.). According to student feedback, students also believed

that CL facilitated not only the acquisition of knowledge but also several other desirable attributes, such as communication skills, teamwork, problem solving, independent responsibility for learning, sharing information, and respect for others. Therefore, this study shows a combination of CL and PBL has potential to motivate students in large classes and also to facilitate deep learning and critical thinking skills of students in large classes.

In order to succeed with these approaches in a large class, planning well ahead of time is required and the instructor should be smart enough to experiment, take risks and make adjustments as needed. The results suggest that the teacher can achieve outcomes successfully by coupling CL and PBL with novel technologies such as learning management systems (LMS). Finally, from the authors' point of view, it is important to give students a variety of experiences in the class in order to keep things interesting and to make learning statistics fun.

References

Benjamin, L. T., Jr. (1991), "Personalization of Active Learning in the Large Introductory Psychology Class," *Teaching of Psychology*, 18(2), 68-74.

Fennema, E. and Sherman, J. A. (1976). Fennema Sherman Mathamatics attitude scales: Instruments designs to measure attitudes towards the learning of mathematics by males and females. *Journal for research in mathematics education.* 7(5), 324 – 326.

Felder, R. M., and Brent, R. (n.d.). *Cooperative Learning.* Retrieved on September 20, 2014 from http://www4.ncsu.edu/unity/lockers/users/f/felder/ public/Papers/CLChapter.pdf.

Foley, A. R. and Masingila, J. O. (2013). Building capacity: challenges and opportunities in large class pedagogy (LCP) in Sub-Saharan Africa Building capacity: challenges and opportunities in large class pedagogy (LCP) in Sub-Saharan Africa. *Higher Education,* 66, 265 -281.

Hung, W., Jonassen, D. H., & Liu, R. (2008). Problem-based learning. *Handbook of research on educational communications and technology*, *3*, 485-506.

Johnson, D. W., Johnson, R. T. and Stanne, M. E. (2000). *Cooperative Learning Methods: A meta-analysis.* University of Minnesota, Minneapolis: Cooperative Learning Centre. Retrieved on October 08, 2014 from http://www.corporation. org/pages/cl-methods.html.

Lipinge, S.M. (n.d). Challenges of Large Class Teaching at the University: Implications for Continuous Staff Development Activities. Retrieved from website: http://www.people.math.sfu.ca/~vjungic/Lipinge.pdf

Mabrouk, P.A. (Eds.). (2007). Active Learning: Models from the Analytical Sciences, ACS Symposium Series 970, Chapter 4, pp. 34–53. Washington, DC: American Chemical Society.

Mulryan-Kyne, C. (2010). Teaching large classes at college and university level: challenges and opportunities. *Teaching in Higher Education*, 15(2), 175-185.

Smith, K. A., Sheppard, S. D., Johnson, D. W., and Johnson, R. T. (2005). Pedagogies of engagement: Classroom-based practices. *J. Engr. Education*, *94*, 87-101.

Online Formative Assessments in Clinical Microbiology Using Learning Management Systems

Vindya Perera & Nelun de Silva
Department of Microbiology, Faculty of Medicine,
South Asian Institute of Medicine and Technology (SAITM)
Corresponding Author: v.perera80@yahoo.com

1. Introduction

Formative assessments occur during the learning process to determine a learner's level of performance (knowledge and skills) with respect to established criteria. The information thus obtained is used to make changes in the learning process to improve teaching learning activities. They can also be used for self-assessment by students. These assessments are important to improve the quality of the education (Kibble, 2007). Formative assessments that provide timely, relevant and supportive feedback contribute to improved learning outcomes (Gipps, 2005).

There are different techniques for implementing formative assessments. Some courses use in class formative assessment while others use information technologies. One possible way is to use a Learning Management System for implementing activities that support formative assessment (Kiryakova, 2010). For example, in computer-based tests feedback is immediate. From the teacher's perspective, benefits include reduction in question marking time and the ability to conduct more assessments since they are conducted without using lecture halls or times.

Formative assessments are an integral part of the course curricula at SAITM. However, in the microbiology curriculum, purely formative tests were not being conducted as done earlier when batches were smaller in size and teachers conducted control tests in a formal manner. Instead, due to increasing student numbers, a few questions were posed to students at the beginning of a lecture. However, many students do not come on time for lectures and miss out on such formative assessments. Thereafter, control tests were discontinued but formal continuous assessments were continued. The department then took a decision to introduce online formative assessments (OFA). Such assessments would be easy for students to do at their own pace and time. For the teachers too, the system was easy to handle as there was no paper work involved.

The purpose of this study was to evaluate the effectiveness of online formative assessments for students learning clinical microbiology in their fifth semester in medical school. The study also looked at the usefulness of this system through student feedback and evaluated the effectiveness of this system on students' performance at the final examination in Microbiology.

2. Methodology

The Department introduced this new model of formative assessments to the 7th Batch, in the last 6 weeks of their semester 5 clinical microbiology course. There are 10 lectures scheduled during this time frame and every week two lectures are conducted followed by small group discussions on the topics done during the lectures. After the two lectures, a formative assessment quiz consisting of 5 -10 true false MCQ's on the related topics was uploaded on EDU 2.0, one quiz per week. The students were given the password for the quiz and were encouraged to assess their

knowledge on the topics they have learnt during that week by taking the quiz. Each quiz was online for 1 week during which time students were allowed to access the quiz only once. Thereafter the database was closed and accumulated data downloaded.

During the small group discussions (SGD) that followed lectures and formative assessments, students were given the opportunity to ask questions, give comments and get feedback from the teachers. To evaluate the usefulness of conducting formative assessments through LMS system using EDU.2, the teachers conducted a reflective practice in which they discussed feasibility, ease of administration, and time constraints. To evaluate the usefulness of the system, students completed a questionnaire on using LMS for formative assessments, experience they gained and the importance of the quizzes in preparing for summative examinations. To evaluate the effectiveness of this system on students' performance, data from online assessments was used to compare the performances of those who took part in these formative assessments with those who did not, at the final examination held end of January 2015.

Ethical clearance was obtained from the Ethical Review Committee of the Faculty of Medicine, SAITM. Permission was obtained from the Dean, Faculty of Medicine, to conduct the formative assessments on line. Since formative assessments are an integral part of teaching and learning, permission from students was not required to implement this system. The only change was that the activity was conducted on line and student participation was voluntary. Students were encouraged to use the system showing them the benefits of formative assessments on learning. They were not coerced into participating, nor were non participants identified. Anonymity was maintained when collecting feedback, analyzing performance and disseminating results.

3. Results

A total of 5 OFA sessions were conducted during the 6 weeks. Twenty seven of 53 students (51%) in the class enrolled for the OFA.

The conclusions arrived at by the teachers after the reflective session indicated that OFA were easier to administer and was less time consuming than paper based assessments. This was a positive move for a department which had few academic staff. However, concern was expressed about the low student numbers who took the OFA. Possible explanations identified were: short time period and one time access per session; no access to computers; low internet facilities; reluctance of students to do self-learning and self-assessment.

Benefits of OFA identified by students were: convenience; ability to review lecture content; good for examination revision; helped to retain content; can be done at own pace; and immediate feedback. Difficulties encountered were that explanations to the MCQs were not given and the time frame of one week given per session was inadequate. Another difficulty was due to technical errors in internet access, where they lost their single attempt after login. Suggestions given by students to improve OFA were to include other types of assessments Objective Structured Practical Examination (OSPE) and EMI, to give more than one attempt, more time and to give explanations for the correct answers.

The students were divided into two groups depending on whether they enrolled for OFA (a) or not (b). The performance of the two groups in the different components of the final examination was compared.

In the multiple choice question (MCQ) component, a clear difference exists between the groups. The number of students in group (a) scoring between 70 and 90 was much higher than in group (b). Similarly the majority of students who scored less than 50 were from group (b) (Fig. 1).

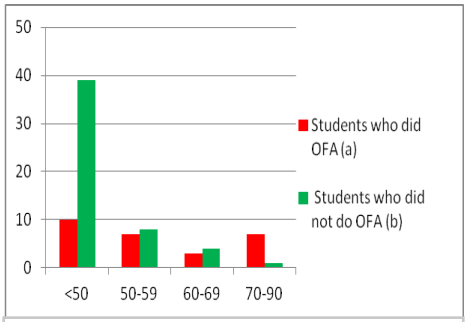


Fig.1: Comparison of MCQ marks

Similar differences are seen when comparing marks obtained in structured essay questions (SEQ) 1, 2 and 4 and in the Objective Structured Practical Examination (OSPE) (Figs. 2, 3, 4 & 5).

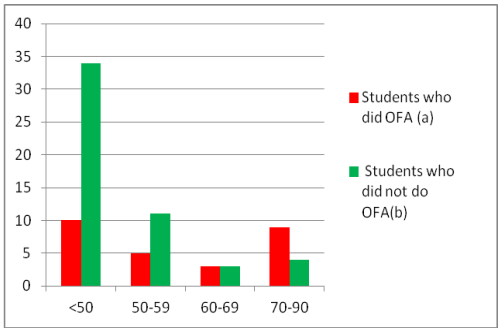


Fig.2: Comparison of SEQ 1 marks

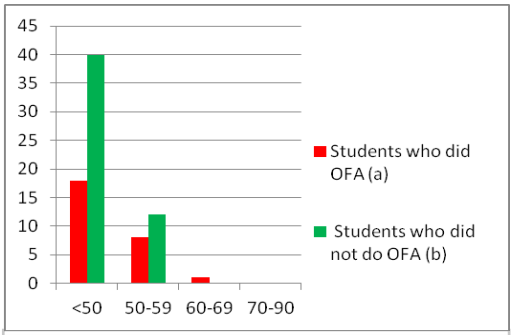


Fig.3: Comparison of SEQ 2 marks

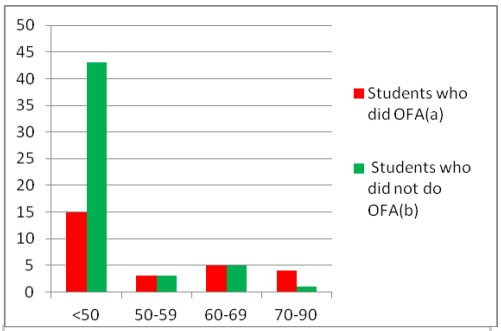


Fig.4: Comparison of SEQ 4 marks

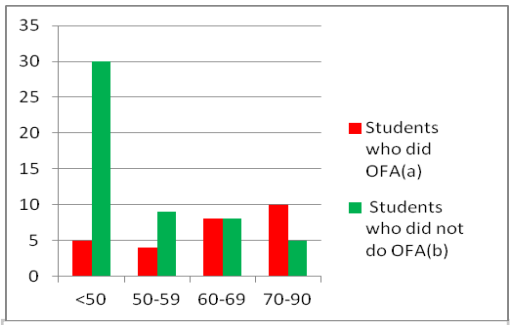


Fig.5: Comparison of OSPE marks

However such a difference was not seen between the groups when comparing marks obtained for SEQ 3 (Fig. 6).

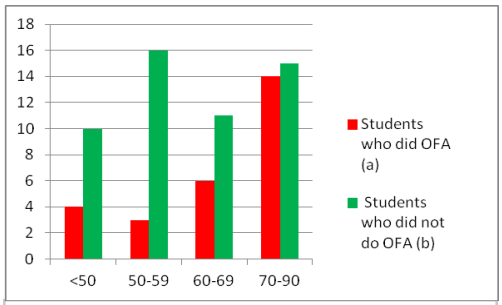


Fig.6: Comparison of SEQ 3 marks

Student t- tests were used to compare the performances of the two groups. They showed that the performances of the two groups in the final examination were significantly different. The performance of students in group (**a)** was better than that of those in group **(b)** on all six components of the examination. Except on SEQ 3, a p value of less than 0.05 was calculated for all components (Table 1). For SEQ3, even though the mean score was higher in group (**a)** than group **(b)**, there was no significant difference between the 2 groups at p = 0.05 level.

Exam component	Mean (**a)**	Mean (**b)**	p value
MCQ	55	43	0.00154
SEQ 1	59	42	0.0006
SEQ 2	43	33	0.00378
SEQ 3	67	61	0.0909
SEQ 4	43	33	0.0056
OSPE	62	47	0.00081

Table 1: p values; groups (**a)** & (**b)**
Mean (**a)** = mean for group who did the OFA
Mean (**b)** = mean for group who did not do OFA

4. Discussion and Conclusion

OFA were useful in a department with few resource persons, because they were easier to administer and less time consuming and therefore less demanding than paper based ones. The fact that students indicated that OFA helped them to revise lectures and retain content was encouraging. Further, the performance of students who enrolled for OFA were significantly better than those who did not. However, completing OFA may not be the sole factor to improved performance at the final examination. Other factors such as commitment to learning would have influenced their enthusiasm to do the OFA and thus contribute to their overall performance.

Due to noncompliance for OFA by many students of the batch, the department needs to rethink its strategies in uploading OFA to encourage wider participation. Taking into account the feedback given by the students, the OFA need to be more user friendly by increasing the time limit, number of attempts given per session, uploading different types of assessments and giving explanations in the feedback.

References

Jonathan Kibble. {2007). *Advances in Physiology Education*. Vol. 31(3), 253-260.

Kiryakova, G. (2010). Using information technologies to carry out formative assessment. *Trakia Journal of Sciences,* 8 (3), 11-20.

Gipps CV. (2005).What is the role for ICT-based assessment in universities? *Stud High Educ.* 30,171-180.

Microsoft Excel Based Self-Assessment Tool for Administration of Formative Assessment

Somarathna K.U.S.
Department of Textile & Clothing Technology
University of Moratuwa
Corresponding Author: udaras@uom.lk

1. Introduction

Assessment could be considered as the single most important determinant of student learning. (Spiller, 2009). The primary reasons for assessment could be identified as formative feedback and summative grading. Formative assessment is where the results are used for feedback while the learning process is being carried out and hence, is important for both the teacher and the student in order for them to know how learning is proceeding and thereby improve the learning of individual students and the teaching itself. When students receive prompt feedback on their competencies and drawbacks, self development plans could be prepared and follow up action would be initiated accordingly (Gibbs & Habeshaw, 1989). Therefore formative feedback is considered inseparable from the learning process. On the other hand, summative assessment is where the results are used for grading students at the end of a course or to accredit at the end of a programme. (Biggs & Tang, 2007).

However, certain challenges are confronted by teachers in providing formative feedback individually during the allotted time for the lecture, particularly due to class size. Engaging in one-on-one dialogue after an assessment task for proper identification and analysis of an individual's specific problems and then providing individualized feedback is considered to be an effective method of providing formative feedback, though it is often considered as impractical due to time limitations. Further all important topics need to be assessed and formative feedback provided. However unless such customized feedback is provided by allocating sufficient time per individual, the effectiveness of the formative assessment task is questionable (Hunt & Pellegrino, 2002).

This problem of time could be overcome to a certain extent by delegating the administration of assessment tasks to computer technology and assigning responsibility of self assessment to students with only the instructional and feedback tasks undertaken by the teacher on the request of students on specific problems (Hunt & Pellegrino, 2002). The administration of the assessment could be done in an informal way outside the classroom and time could be allocated for feedback during the lecture.

Therefore the development of a Microsoft Excel based Self-Assessment Tool would save time while assisting the teacher in providing feedback based on the information generated through the tool and a student's specific requests.

2. Methodology

The primary objective of developing a self-assessment tool was to develop a mechanism where students could assess themselves effectively in all important subject areas without consuming time available for teaching/learning activities when performance would be immediately evaluated and feedback provided. After the self-assessment, a student may request expert and customized advice on specific problematic areas from the teacher.

The first step was the identification of the subject module and specific subject content for which assessment tasks should be set. In order to ensure constructive alignment of teaching, learning and assessment tasks, the Intended Learning Outcomes (ILO) were considered in identifying the subject content to be assessed. Then, a hierarchy of knowledge was developed considering the coverage, significance and depth of subject matter where sub modules were identified in the order of importance.

Setting assessment tasks for the identified sub modules was the next step where multiple choice questions (MCQ) were set objectively to cover a wide range of knowledge in alignment with the Bloom's Taxonomy. ILOs have been set to address different levels of knowledge as identified in the Bloom's taxonomy such as remembering, understanding, applying, analyzing, evaluating and creating (Biggs & Tang, 2007). MCQs were set in alignment with such ILOs. Straight forward questions were developed targeting lower order learning outcomes while analytical and mini-case study style questions were set to address higher order learning outcomes. Basic questions were prepared focusing on declarative knowledge (Biggs & Tang, 2007) where the understanding of specific theories and concepts were tested. In contrast, analytical questions and case studies were prepared focusing on functional knowledge (Biggs & Tang, 2007) to test the ability of applying declarative knowledge. Several forms of MCQs were also used such as single correct answer, multiple response, incomplete statement, best answer, and matching questions (Biggs & Tang, 2007).

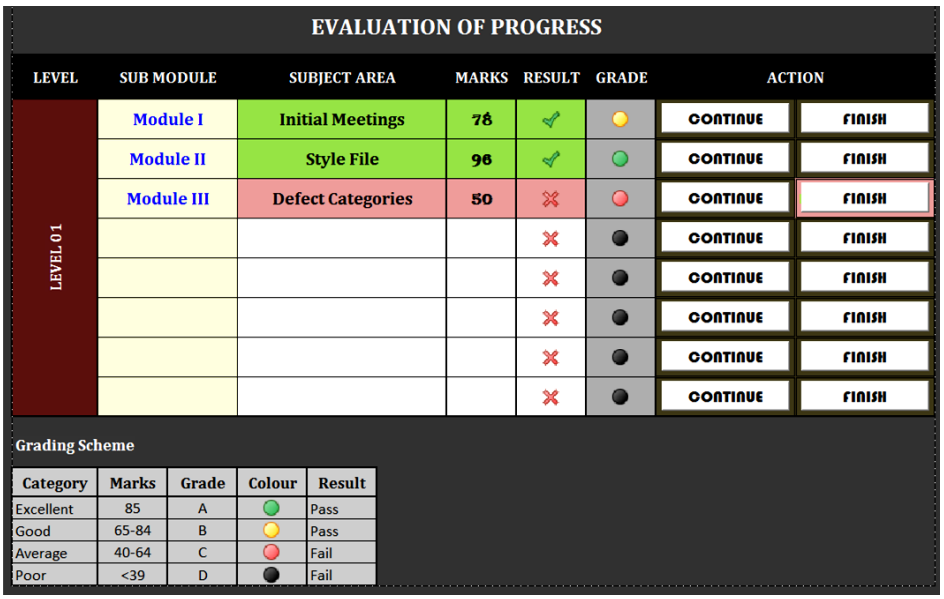
Further, in developing questions, most of the important subject sections were covered so that more attention would be paid by students to such sections when preparing for summative assessment, because it has been identified that most students are heavily influenced by assessment and tend to pay more attention to areas where they are tested. Therefore formative assessment tasks have to be oriented deliberately to achieve specific learning outcomes expected by the teacher (Gibbs & Habeshaw, 1989).

If students score higher than average, they are allowed by the system to proceed further through the hierarchy to advanced sub modules. The performance criteria were developed as per the criteria used in the summative assessment tasks. A feedback mechanism was then developed. Once the candidates carry out the assessment tasks, the responses would be evaluated automatically based on the set performance criteria and the failed assessment tasks would be notified as the feedback. A student should achieve at least an average score to be eligible to review the particular module. Further a summary of performance in each sub module will be generated as a result sheet.

Finally the structure of the tool was developed integrating individual components such as control panel, assessment tasks, current progress, performance criteria and result sheet. Then necessary controls were incorporated using programming codes, and other options available in Microsoft Excel such as hyperlinks, conditional formatting, and formulae.

3. Results

The Microsoft Excel based Self-Assessment Tool consists of a welcome screen where the personal details and program details need to be entered, a progress screen which would indicate the current progress, sub module wise assessment tasks, a result sheet and a control panel to review performance, receive feedback and reset and continue. The user-friendly interfaces provide specific instructions and guidelines and ensure smooth functionality of the self assessment tool.



EVALUATION OF PROGRESS

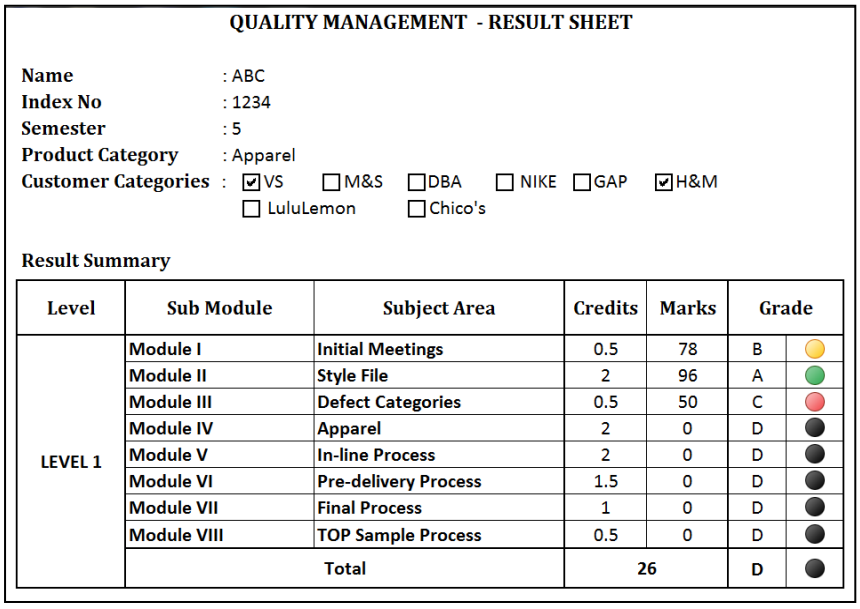
LEVEL	SUB MODULE	SUBJECT AREA	MARKS	RESULT	GRADE	ACTION	
LEVEL 01	Module I	Initial Meetings	78	✓		CONTINUE	FINISH
	Module II	Style File	96	✓		CONTINUE	FINISH
	Module III	Defect Categories	50	✗		CONTINUE	FINISH
				✗		CONTINUE	FINISH
				✗		CONTINUE	FINISH
				✗		CONTINUE	FINISH
				✗		CONTINUE	FINISH
				✗		CONTINUE	FINISH

Grading Scheme

Category	Marks	Grade	Colour	Result
Excellent	85	A		Pass
Good	65-84	B		Pass
Average	40-64	C		Fail
Poor	<39	D		Fail

Figure 1 shows current progress where completed modules are highlighted in green and failed modules in red. The system will not allow the student to continue beyond the failed module until s/he attempts it again and passes.

Figure 1 – Current progress of the assessment



QUALITY MANAGEMENT - RESULT SHEET

Name : ABC
Index No : 1234
Semester : 5
Product Category : Apparel
Customer Categories : ☑ VS ☐ M&S ☐ DBA ☐ NIKE ☐ GAP ☑ H&M ☐ LuluLemon ☐ Chico's

Result Summary

Level	Sub Module	Subject Area	Credits	Marks	Grade	
LEVEL 1	Module I	Initial Meetings	0.5	78	B	
	Module II	Style File	2	96	A	
	Module III	Defect Categories	0.5	50	C	
	Module IV	Apparel	2	0	D	
	Module V	In-line Process	2	0	D	
	Module VI	Pre-delivery Process	1.5	0	D	
	Module VII	Final Process	1	0	D	
	Module VIII	TOP Sample Process	0.5	0	D	
	Total		26		D	

Figure 2 shows the result sheet where each sub module is given a credit rating based on the significance and the final total and grade indicated. The student can then identify specific areas where s/he has performed well and areas that need more effort and may require consultation with the teacher.

Figure 2 – Assessment Result Sheet

4. Discussion and Conclusion

The key objective of developing a self assessment tool was to assign the administration of formative assessment to computer technology and thereby save time allotted for lecturing. However specific characteristics of assessment such as learner centered, teacher directed and provision of feedback have to be ensured through the developed mechanism (Angelo & Cross, 1993). As discussed under methodology, coverage of subject matter, hierarchy of sub modules, content of assessment tasks and the performance evaluation criteria were developed systematically by the teacher in alignment with the ILOs. The students would carry out the

assessment tasks by themselves. Finally the tool would evaluate the performance and feedback would be provided.

Another challenge in self assessment is the motivation of adult learners (MindTools Corporate, 2014). The responsibility of self-assessment was given to the student so that the usual 'competition in assessment' mindset is absent at the time of assessment and the student could exercise a genuine attempt to understand his/her level of knowledge. Further, the concept of the tool is similar to a video game where the player progress from low levels to higher levels based on performance. So the students would be motivated intrinsically to progress through the hierarchy of knowledge because it has been identified that student attention could be retained by making the tasks interesting and challenging (Gibbs & Habeshaw, 1989). The MCQ nature of assessment tasks also provides a short, sharp and impactful assessment experience preferred by adult learners (MindTools Corporate, 2014).

Finally, the structure and controls of the tools are important to prevent the manipulation of the system. For instance, students would not be allowed to progress unless a particular sub module was satisfactorily completed. Also, the students who show weak performance would be allowed to review a particular module and receive feedback. Once a particular module was reviewed, the incorrect questions would be notified but answers provided would not be visible. Instead, the teacher would decide on the necessary architecture of the tool based on the requirements.

In conclusion, the Microsoft Excel based Self-Assessment Tool provides a mechanism to administer formative assessment in a relatively inexpensive, flexible, time saving and effective manner where the users would be intrinsically motivated to assess themselves independently and expert consultation could be requested by the student based on specific, individual requirements. The tool could be further developed to incorporate learning materials and several pools of questions for each sub module.

References

Angelo, T. A., & Cross, K. P. (1993). *Handbook for college teachers.* San Francisco: Jossey Bass Inc.

Biggs, J., & Tang, C. (2007). *Teaching for Quality Learning at University.* Berkshire: McGraw-Hill.

Gibbs, G., & Habeshaw, T. (1989). *Preparing to teach.* Technical and Educational Services Limited.

Hunt, E., & Pellegrino, J. W. (2002, April 16). Issues, Examples, and Challenges in Formative Assessment. *New Directions for Teaching and Learning* , pp. 73-85.

MindTools Corporate. (2014). *How do you Motivate Self-Directed Learning?* Retrieved March 01, 2015, from MindTools Corporate: www.mindtools.com/corporate

Spiller, D. (2009, February). *The University of Waikato.* Retrieved November 2, 2013, from Principles of Assessment: http://www.waikato.ac.nz/tdu/pdf/booklets/16_AssessmentPrinciples.pdf

Study Habits of Open Distance Learners: A Study with Undergraduates of the Open University of Sri Lanka

R. Mangaleswarasharma, Dept of Secondary and Tertiary Education, Faculty of Education,
K. Vamathevan, Dept of Mechanical Engineering, Faculty of Engineering Technology,
Jaffna Regional Centre
The Open University of Sri Lanka
Corresponding Author: rmang@ou.ac.lk

1. Introduction

The Open University of Sri Lanka (OUSL) operates based on the concept of Open Distance Learning (ODL). Distance Learning is a form of education where student and instructor are not in the same place and instructions occur through formats such as printed modules, online instruction and multimedia packaged formats (Somuah, Dankyi & Dankyi, 2014). This is a mode of study where the students are not physically present in a traditional setting such as a classroom and are separated by space and time from their tutor and the institution, but keep in close touch with specially formulated study materials. The OUSL offers many degree programmes using the ODL system through its Regional and Study centres spread all over the country. It enables a wide population of people scattered over the country to pursue higher education of their choice and provides educational opportunities for working adults, paving the road to success, irrespective of age, vocation, gender, race, ethnicity and religion.

As adult learners in distance education programmes, OUSL students are often challenged by problems such as sudden increase in their responsibilities, influence of job and families in their studies, lack of motivation, physical, emotional, psychological and social issues, and increased demands placed upon them. The OUSL has clearly spelt out the number of hours students need to spend on each session of their course module. For instance one credit course would require 45-50 hours of study. Under normal circumstances, a student may register up to 36 credits of courses in an academic year. Thus a student is expected to set aside a minimum of five hours a day for study. However, most students will find it difficult to devote the time required for self-study because of pressure from their work places, interference from family members, financial constraints as well as other social issues that demand their time.

Morgan (1991) notes that students who lack confidence in their learning abilities tend to concentrate on memorizing facts to complete assignments and write examinations. They end up with weak grades as a result of poor understanding of course materials. Somuah *et al.* (2014) reiterate this and state that ineffective study habits of distance learners lead to poor performance in examinations, poor understanding of concepts and high rate of student drop out. Ogbodo (2010) found that the main reason for students' poor performance in tests was lack of proper study habits. Many researchers have identified the relationship between study habits and the academic performance. Distance education students may exhibit a wide range of study habits which may be positive or negative. It is positive when it helps to promote effective learning and negative when it inhibits learning. Therefore their study habits should be explored in order to guide them in choosing appropriate study habits.

As the Regional Centre in Northern Sri Lanka, the Jaffna Regional Centre (JRC) of the OUSL extends its services to students in the northern region. However empirical evidence shows that the undergraduates at JRC face difficulties in completing their courses

successfully and often become inactive in their study programmes, as illustrated in Figure 1. According to Ismail (1997), variables related to study behaviour of OUSL students influence this drop out. As academic coordinators, the researchers needed to address the drop out problem by analyzing the study habits of their students. Therefore the present study tries to explore the study habits of undergraduate students following their degree at JRC of OUSL.

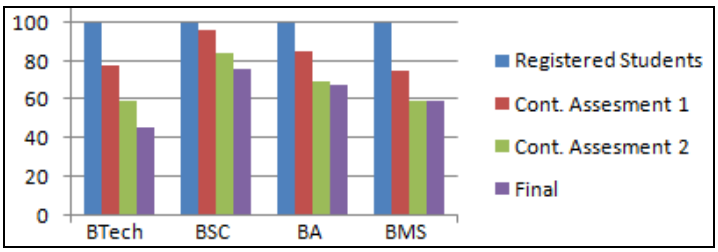


Figure 1: Undergraduate student involvement in academic activities
at JRC in 2013/2014 (From Centre statistics)

The general objective of this study is to explore the study habits of undergraduate students following their degree programme at the Jaffna Regional Centre of the Open University of SriLanka through Open Distance Learning. The specific objectives of the study are

- To assess different study habits of open distance learners
- To identify the time management practices adopted by the open distance learners for self-study
- To draw suggestions to improve the study habits of open distance learners.

2. Methodology

A descriptive survey research design which allows the researcher to describe, analyze and determine the study habits of undergraduate students was adopted. The study population was students pursuing degree programmes at the OUSL. Purposive sampling was used for 150 respondents from the students following four degree programmes, namely B.A. (Social Sciences), B.Sc, B.Tech and B.M.S at JRC. The main data collection instrument was a questionnaire which was built up by reviewing related literature on study habits. In this self-developed questionnaire questions were set under 3 thematic areas. Out of the 150 questionnaires distributed 96 were successfully retrieved. Data analysis was done by using quantitative techniques of frequencies and percentages. In the second phase of the study, a semi structured interview was conducted to explore ways to improve the study habits of distance learners. Four lecturers in the Open University of Sri Lanka coordinating the particular programmes were invited for the interview. Their responses were recorded and analyzed qualitatively.

3. Results

A survey was used to explore the study habits of open distance learners. Data on students' back ground information, study habits and time management were examined. These aspects were measured on a discrete five point scale. According to Table 1, 70% of the students are employed, approximately 23% are married and 25% are over thirty years of age. Further, most undergraduate students have family, social and job responsibilities.

Table 2 reveals the study methods reported by students. Reading the chapter was the most used method (35%) followed by bulleting and text annotations (30%). The least used method

	Main categories	Sub Groups	Number	Percentage
1	Sex	Male	35	36
		Female	61	64
2	Age	20-30 Years	72	75
		31-40 years	17	18
		41-50 years	7	7
3	Degree programme	B.A.(Social Sciences)	37	39
		B.Sc (Natural Sciences)	29	30
		B.M.S	16	17
		B.Tech	14	15
4	Marital status	Single	72	75
		Married	22	23
		Divorced	1	1
		Widow/Widower	1	1
5	Employment	Employed	67	70
		Unemployed	29	30

Table 1: Background information of students

was the quiz let with 28% reporting they never used it. Drawing pictures/diagrams and using text questions and concept maps are also not often used by students. Further, only 18% of students always study in groups. These results indicate that most students rarely or only sometimes use multiple effective study methods appropriate for open distance learning.

	Study method	**Always**		**Generally**		**Some times**		**Rarely**		**Never**	
		N	%	N	%	N	%	N	%	N	%
1	Read the chapter	35	35	39	41	14	15	8	8	0	-
2	Make an outline of the lesson	17	18	32	33	35	36	7	7	5	5
3	Bulleted notes	29	30	23	24	21	22	16	17	7	7
4	Draw pictures/Diagrams	8	8	28	29	30	31	18	19	12	13
5	Make charts / Graphic organizers	11	11	14	15	43	45	17	18	11	11
6	Self-quiz	26	27	27	28	25	26	12	13	6	6
7	Text annotations	29	30	38	40	17	18	7	7	5	5
8	Sticky notes	10	10	8	8	28	29	24	25	26	27
9	Text questions	6	6	28	29	25	26	21	22	16	17
10	Quiz let	4	4	16	17	21	22	28	29	27	28
11	Study in groups	17	18	21	22	26	27	16	16	16	17
12	Make concept maps	4	4	11	11	25	26	33	34	23	24
13	Don’t study	3	3	6	6	10	10	17	18	60	63

Table 2. Study habits reported by the JRC undergraduates

With respect to time management, only 30% of students were able to allocate at least four hours a day for studies (see Table 3). Thus the majority of distance learners had difficulties in finding the recommended time for self-study. Further, just 20% always prepared a master schedule for studying. Less than 8% of those who did so even rarely, report always carefully following it. 41% of the students reported spending more than 10 hours daily on their jobs with 25% spending more than 4 hours a day on their family responsibilities. Thus most probably face problems in time management due to family and job responsibilities. However, 57% of students reported that they were able to get their assignments done on time. Thus the majority managed their time in order to stick to the deadlines.

	My time management practices	Always		Generally		Sometimes		Rarely		Never	
		N	%	N	%	N	%	N	%	N	%
1	I prepare master schedule for each semester	19	20	40	42	21	22	9	9	8	8
2	I update it monthly or weekly	14	15	31	32	35	36	9	9	7	7
3	I carefully stick to it	8	8	36	38	25	26	17	18	10	10
4	I allocate time for exercise and social relationships	18	19	29	30	22	23	23	24	4	4
5	I get at least six hours of sleep each night	48	50	30	31	15	16	2	2	1	1
6	I study at least four hours every day	29	30	30	31	21	22	11	11	5	5
7	I get my assignments done on time	55	57	27	28	9	9	4	4	1	1
8	I use the time effectively when I study	34	35	41	43	15	16	4	4	2	2
9	I spend more than ten hours for my job every day	39	41	29	30	12	13	2	2	14	15
10	I spend more than four hours for my family responsibilities every day	24	25	30	31	25	26	12	13	5	5

Table 3: Practices adopted by the students for time management

4. Discussion and Conclusion

Study habits and time management play crucial roles in the success of a learner in the open distance learning system. While use of various study methods were reported, most JRC students use ineffective study habits such as reading chapters and text annotations. Only a few use effective study methods such as concept maps and quiz let. Students' time management practices were also poor. Therefore the distance learners at JRC should pay attention to improve their study habits and time management practices.

Based on the findings of the study the following recommendations are made:

1. The open distance learners should be provided with guidance and support on the formation of effective study habits
2. The entry undergraduate students to the Open University should be instructed regarding time management and study methods appropriate to ODL.
3. Undergraduates should pay more attention to organizing their study activities.
4. Students should form appropriate study groups and utilize effective study habits.

References

Effiong, N. L., Aakege, N. Y. & Anthony, E. O. (2012). Post graduate students' study habits in two Nigerian tertiary institutions. *Herald J. Educ.Gen. Stud.* 1(3), pp. 54 – 61.

Ismail, A. G. H. (1997). *A Critical Study on Factors Influencing the Student Drop out from Educational Programmes Offered by the OUSL*. Ph.D Thesis, University of Colombo.

Morgan, M. (1991). *Research into Student Learning Distance Education*, Victoria, South Australia.

Ogbodo, R. O. (2010). Effective Study Habits in Educational Sector: Counseling Implications. *Edo Journal of Counseling*, 3, pp. 229-239.

Somuah, B. A., Dankyi, L. A. & Dankyi, J. K. (2014). An Investigation into the Study Habits of Distance Learners: Implication for Guidance& Counseling services, *Mediterronean Journal of Social Sciences*, 5(6), pp. 273-282.

Errors Committed by English as a Second Language (ESL) Learners when Using Nouns in Written Essays

Subajana Jeyaseelan
Vavuniya Campus of the University of Jaffna
Corresponding Author: subi_08@hotmail.com

1. Introduction

Grammar is regarded as the most fundamental element of language learning for second language learners. In Sri Lanka, gaining knowledge in grammar is an essential part of learning English as it is in the curriculum. Different studies have proposed that in written form especially, English as a Second Language (ESL) learners committed common grammatical errors that showed their incompetency in some grammar aspects. This paper highlights the common errors in using nouns in writing by ESL learners in their first year at Vavuniya campus.

Given the tertiary education in Sri Lanka, there is a need for students to have good English grammar knowledge since they have to pass written examinations in English to fulfill their degree programs. However, learners in the first years of the Vavuniya campus especially, despite having learnt English language since their primary, secondary education, tend to commit common grammatical errors when writing.

The objective of this study was to investigate the various errors in the use of nouns committed by students at Vavuniya campus in their writing.

Language learning is not a new process; it is like other learning processes which involve making errors. No learning happens without making errors. In the case of language learning, errors have become fossilized firmly in the minds of the learners (Corder, 1974).

Richards and Schmidt (2002 cited by Mungungu, 2010, p. 28) define language error analysis as "the study and analysis of the errors made by second language learners". Error analysis compares "learner English" with accepted English and judges how learners are "ignorant" (James, 1998 cited by Mungungu, 2010, p. 28) about the grammatical and semantic rules of the target language. Another view of error analysis is given by Brown (1980, cited by Hasyim, 2002, p. 43) when he defines language error analysis as the process of observing, analyzing, and classifying the deviations of the rules of the second language in order to reveal the systems operated by a learner. Also included in the finding are the possible causes of errors. The possible causes are based on those classified by Richard (1973) who divided them into four crucial factors: (1) Over-generalization (2) Incomplete application of rules (3)False concept hypothesized (4) Ignorance of rules restriction.

2. Methodology

The students from the Faculty of Business Studies, Vavuniya Campus, University of Jaffna were selected as the sample for this study. The sample number was thirty. The convenient sampling method was used. Since the researcher took regular lectures with this specific batch. the researcher had uninterrupted access to the respondents, data collection, and observation as well as their performance in writing on a regular basis.

Since the research was on students' common grammatical errors in writing, the data were collected in written form by writing free style essays on a given topic. This paper focuses only on students' errors in using nouns. The essays were collected after 30 minutes. The collected data were analyzed qualitatively based on the Corder's (1974) error analysis steps of identification of errors, categorization of errors, description of errors and explanation or interpretation of errors. The aim of the free writing assignment was to observe their errors naturally while focusing on the content of the essay, i.e. their application of grammar.

3. Results and Discussion

The errors committed by the students are given in Tables 1 and 2.

Errors of addition refer to any unnecessary or incorrect elements found in a word. It is one of the common errors found in the writings of most ESL learners.

1. ***it is free area to learn **everythings** regarding of subjects, sports & **every things**
2. *University mean collection of **knowledges** of…..
3. *They respected the eldest they obeyed to their **advises and guidances**

Table 1: Respondents' Erroneous Forms of Addition (* indicates the erroneous forms)

In example 1 above, the learner writes 'everythings' instead of 'everything' which is an indefinite pronoun referring an unspecified or unknown person or thing. 'Thing', 'body', or 'one' can be added to some indefinite pronouns to form a compound. 'Every' gives the singular meaning. In example 2, the abstract noun 'knowledge' has no plural form. But the student writes as 'collection of knowledges'.

Similarly, in example 3, there are no plural entities 'advises' and 'guidances'; the third person singular verbs, 'advises**'** and 'guides' exist in English grammar but not the pluralized uncountable nouns, 'advises' and 'guidances'. The noun 'advice' has the plural form. The respondent, further might have experienced the confusion of using the letter 'c' for the noun and the letter 's' for the verb such as *advice* and *advise***.** However, this type of errors takes place because of overgeneralization. Most intra-lingual errors are associated with overgeneralization of expressions by incorrectly applying the same underlying strategy from previous knowledge to understand new experience (Littlewood, 1984).

Errors of omission refer to the lack of a required element. Such errors were also numerous.

In Table 2, example 1, the intention of the learner is to pluralize the entity, 'university', but when he writes, he fails to use the correct plural morpheme indicator, -'ies' with the noun which is modified by a plural adjective, 'several'. Instead, the learner uses the indefinite article, 'a', that is in conflict with the adjective modifier but in agreement with the singular noun. This shows that the ignorance of the number agreement with the article and the modifier and reveals its plural idea semantically, not as a grammatical morpheme. The word 'several' needs a plural noun.

In the examples 2 and 3, the same types of errors are seen, for instance, 'the several factor' and 'so many thing'. The determiner 'many' is also an indicator of the plural form, but the learner ignores that and incorrectly writes 'many thing' but subsequently uses the correct auxiliary 'be' verb, 'are' in agreement. 'All the university system' also falls into the same category in which

the universal determiner is in the plural sense but the noun, 'system' is singular creating disagreement between the modifier and the noun. Further, the learner writes 'all person' in sentence 6; the universal determiner 'all' is in disagreement with the attributed noun, 'person'.

1. *The country has a **savaral university**
2. *But **nowaday** university education is destroyed by the **savaral factor**…to **all the university system**
3. ***so many thing are** happening
4. *the government try to impose **some rule and regulation** about the raging of **the new university student.**
5. ***Some of university student** do the political in the university
6. ***all the university system** in the country are facing so many difficulties; ..**all** knowledgeable **perso**n of a country
7. *Not only this problem but also **other political problem** there are.
8. *Otherwise the government has to face **lot of problem** because university in main place of developing country
9. *Therefore, the education activities also destroy and Not only that but also **discipline of student are** destroyed
10. *According to z-score level they enter **one of the university** among 13 universities
11. ***Senior students are try to give **some kind of punishment** for their freshers.
12. ***There is** declining **a** discipline
13. ***All the universities** in Sri Lanka **has** so many problems
14. *They learn the **many discipline** from the school

Table 2: Respondents' Erroneous Forms of Omission

The learner writes 'nowaday', nearly four times in his/her piece of writing to indicate the idea that the action takes place 'in the present' but he/she fails to add –'s', the plural marker. These types of errors which seem to be registered permanently in his/her mind is called fossilization.

He/she mentions 'some' as an adjectival modifier which should have plural nouns, 'some rules and regulations' (e.g. 4). The learner has the correct thought in his/her mental schema but the ignorance of rules leads him/her to poor presentation. Further, 'some' functions as a pronoun as well as an adjective. One can observe it in the following examples: some are happy to help (pronoun); some people are happy (adjective). The reason for omitting the plural -s is perhaps because the learner does not realize that determiners such as 'some' and 'many' require plural nouns. These errors occur due to the lack of training or incomprehensibility of the rule. The leaner has displayed confusion in the use of different plural forms.

Example 5 shows that the definite article and the plural –'s' – are missing in the phrase, 'some of university student'. When 'some of' is used, the question raises 'of which', a particularization so after 'some of', 'the' should usually follow. Further, in example 5, the subject of the sentence is singular but the verb used is plural; 'university students' is a collective noun in grammar. It is more appropriate to write 'university students' since the learner mentions an opinion on 'students' in general. Further, sociologically speaking, what is going on in universities is mob psychology. Individual students rarely misbehave in isolation; they commit a violation in groups appropriate to their age. The phrase, 'all the university' reveals the disagreement of the universal

collective number with the singular entity 'university' but the expression, 'all the university system' not only reveals the number disagreement but also that the learner is confused with the abstract word, 'system', and the concrete word, 'university'. The learners needs clear understanding about the abstract entities which should be distinguished from concrete entities at the tertiary level of education in which the learners will study more abstract and theoretical ideas than concrete ones.

4. Conclusion and Recommendations

The results show that the students make both errors of addition and of omission which are the two main categories among the types of grammatical errors. However, errors of omission were likely to be more common than the error of addition. As an ESL learner, the student struggles to apply the correct grammar rules at the beginning of the learning. As a result s/her applies various strategies to develop his/her inter-language. Omission is a frequently made error by the ESL learners. Omission of errors suggests that learners are in some way simplifying the learning task by ignoring grammatical features. Some learners feel that certain structures are difficult to produce and avoid them altogether; as a result errors of omission occur.

Findings of this study provide insights in revising the syllabus to be implemented in an activity based grammar class. The study recommends learners should constantly practice free style writing to improve in their grammatical abilities. Also, teachers should give opportunities for peer-correction and peer-evaluation in the classroom activities. To study the learners' difficulties, error analysis is an efficient tool to identify the nature of specific errors and to improve teaching and learning of grammar and appropriate application techniques.

References

Brown, A. L. (1980). Metacognitive Development and Reading. . *Harvard University Press*: Cambridge

Corder, S. P (1974). Introducing Applied Linguistics, Penguin.

James, C. (1998). Errors In Language Learning and Use: Exploring Error Analysis. Longman, London-New York.

Littlewood, W. (1984). Foreign and Second Learning, USA: Cambridge University Press.

Mungungu, S. S. (2010).Error analysis: Investigating the writing of ESL Namibian learners. (unpublished master's thesis). University of South Africa, Pretoria.

Richards, J. C. & Schmidt, R. (2002). Dictionary of Language Teaching & Applied Linguistics. Pearson Education Limited. London: Longman.

Developing Vocational Education Undergraduates' English Pronunciation Skills

Dilini Ranasuriya[1] and Shehan Fernando[2]
[1]Department of Languages, University of Vocational Technology
[2]Department of Mechanical Engineering, Kotelawala Defence University
Corresponding Author: shehan117@gmail.com

1. Introduction

Where oral skills in English are concerned, pronunciation plays a major role. Pronunciation includes the ability to use correct stress in a word, rhythm and intonation. As English is a second language in Sri Lanka, it is not an easy task to achieve perfection in pronouncing English words (Michelann P. 2011). The majority of users of English as a second language face difficulties in speaking English. The difficulties faced by learners of English are dependant on the degree to which their native language differs from English (Hasselbring, T.S., & Bausch, M.E. 2005), (Edyburn, D. 2007). A native speaker of Sinhala, as an example, may face numerous difficulties compared to a native speaker of German. One of the reasons for this is the fact that German is more closely related to English than Sinhala.

The University of Vocational Technology awards degrees in the fields of Engineering, Information and Communication Technology and Food Science Technology. As the medium of instruction is English, students are encouraged to acquire both written and spoken English in order for them to excel in both written and oral presentations. It was observed that the majority of undergraduates at the University of Vocational Technology (UNIVOTEC) face difficulties in English pronunciation. These difficulties affect their oral communication competence resulting in poor grades at the end of semester examinations.

This study and the introduced software used in it are attempts to improve English pronunciation in order to support undergraduates at UNIVOTEC in their degree programmes. The introduced software is a text to speech (TTS) synthesizer (Nageshwara R. et.al, 2005); (Sasirekha D., Chandra E. 2012) which is a computer based system that can automatically read a text aloud or read an article loaded as a text file.

2. Methodology

This experiment was carried out on a sample of twenty undergraduates, which is the normal class room size. Short texts, of around a hundred words relating to the respective degrees followed by the undergraduates, were set as an activity by the teacher. These texts ranged from simple to difficult and each text was graded from level 1 to level 10. The levels were categorized as follows:

Level 1 to 4: Simple texts which consisted of simple diction and syntax.

Level 5 to 7: Moderate texts which consisted of moderate diction and syntax

Level 8 to 10: Difficult texts which consisted of difficult diction and syntax

First and foremost a simple text which consisted of passages related to their subject matter with simple diction and syntax was distributed among the class. Simple diction and syntax consists of day to day usage such as: “Good Morning. I am not coming for the lecture today”. Difficult diction and syntax would be texts that gradual introduced engineering terms etc. The total word count was about 100 words per text. The students were asked to read the passage to the teacher, one at a time, and were assessed. The teacher then highlighted the mispronounced words.

Next the text was typed on the software developed by the authors. The student was then able to go through the pronunciation of each and every word in the text with the use of the software. After an allocated time to practice pronunciation using the software, the student was asked to read the same text to the teacher. The teacher then re-assessed the pronunciation of the student. If the student did not reach the required level of performance, he/she was asked to repeat the same level. Students who gave a satisfactory performance moved to the next level. The same procedure was carried out till the student reached level 10.

During the entire procedure the teacher was able to evaluate the number of mispronounced words before and after the introduction of the TTS software. Initially each student was asked to read out the paragraph given and the teacher marked the words that were not pronounced properly. Next the software was introduced to the students. The graphical user interface (GUI) of the software is shown in Figure 1.

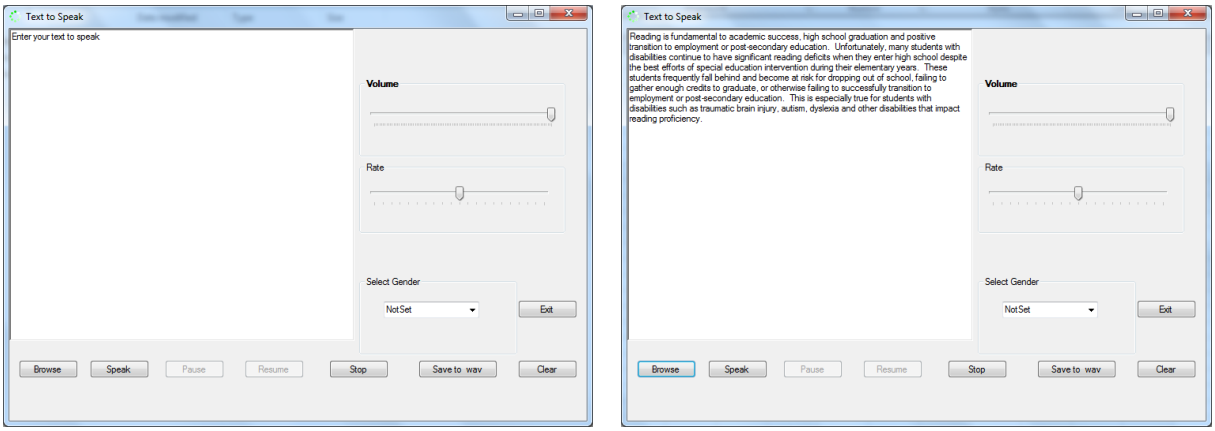


Figure 1: GUI of the Text to Speech Synthesizer

After practicing for a predefined time, each student was asked to read out the same paragraph where the teacher had marked the words that were not pronounced properly and the count of mispronounced words was taken again.

3. Results and Discussion

There was an immense improvement in the pronunciation of words in all categories of texts. The students’ improvement is shown in Figures 2 to 4.

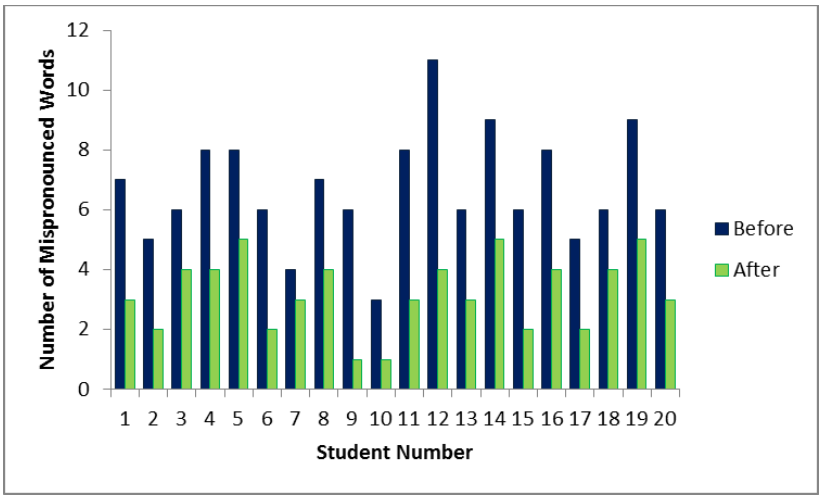


Figure 2: Improvement of students in simple text category

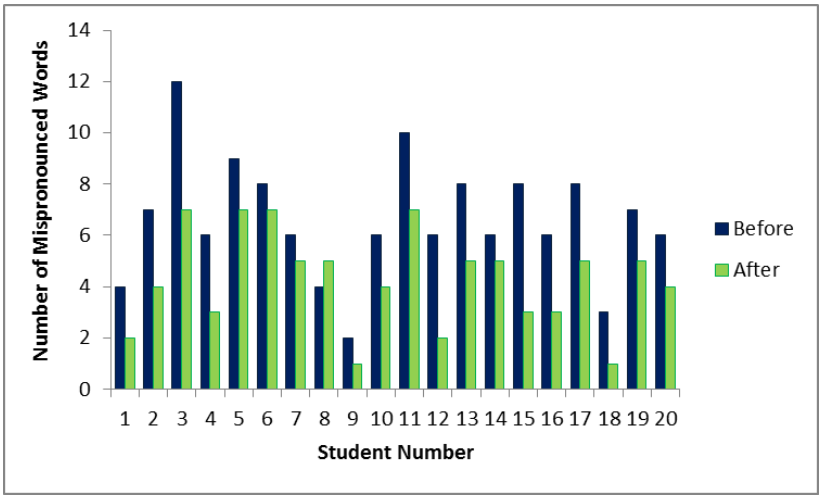


Figure 3: Improvement of students in moderate text category

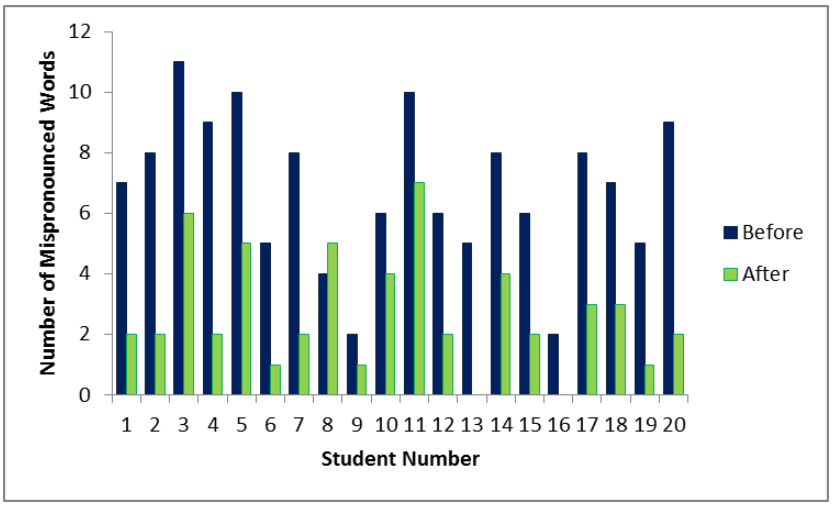


Figure 4: Improvement of students in hard text category

The results show that a significant improvement in correct pronunciation occurred after introduction of the software. A statistical hypothesis test, using student's t–test at a 95% confidence level, proves that the introduced software had a significant impact on student pronunciation.

4. Conclusion

The aim of this research was to minimize the difficulties that students face in terms of pronunciation of English words. The method shown above brought about a significant positive change among the students**.** It not only improved students' pronunciation but also created enthusiasm among them. At the end of the semester students were able to correctly pronounce English words, which helped them to perform well in oral presentations in their respective subject areas. This method is both an interesting and an effective way to enhance pronunciation in students learning English as a second language.

References

Edyburn, D. (2007). Technology-enhanced reading performance: Defining a research agenda. Reading Research Quarterly, 42, (pp. 146–152).

Hasselbring, T., & Bausch, M. (2006). Assistive technology for reading: Text reader programs, word-prediction software, and other aids empower youth with learning disabilities. Education Leadership, 63(4), (pp. 72–75).

Michelann, P. (2011). The Voice of Text-to-Speech Technology. Research monograph 35.

Nageshwara, R., Nagarajan, T., & Murthy, H. (2005). Text-to-Speech Synthesis using syllable-like units.

Sasirekha, D., & Chandra, E. (2012). Text To Speech: A Simple Tutorial. International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-2, Issue-1.

Corpus Analysis of First Year Bachelor of Business Administration Lectures: Exploring English for Academic Purposes (EAP) Outcomes for Remedial Students

Hussain Z. D.
English Language Teaching Unit
Faculty of Arts, University of Colombo
Corresponding Author: zareenadh@gmail.com

1. Introduction

Undergraduate courses conducted exclusively in the English medium pose language related challenges to students of limited English proficiency (LEP) or remedial students (Rosenthal, 1993). This situation, also present in the Sri Lankan tertiary context, has been observed to be most severe in the first year, the period involving a linguistic transition from the medium of school education to English medium higher education (Evans and Morrison, 2011b, Rouf, 2012). In this situation the LEP students' limited English proficiency could become an obstacle to achieving academic success.

EAP or English for Academic Purposes is a genre of English language teaching developed to help students to cope with the demands of English medium higher education (Dudley-Evans and St John, 1998). The potential of this genre to assist students who struggle with English Medium Instruction has been identified and is an area under exploration by English language practitioners worldwide. This paper is part of an ongoing study which explores the process of developing an EAP program targeting remedial students in their first year of university education. This study has selected as its research subjects the remedial students in the first year of an English medium Bachelor of Business Administration degree of a local university in Sri Lanka and its course content.

It was identified that the ability to listen and gather information from lectures was one of the main skills required during the first year of this particular degree, a skill which calls for adequate comprehension of lecture content on the students' part (Hussain, 2014). However, these lectures contain a number of language features such as words, word groups and language patterns that are unknown or less familiar to the remedial students. When these 'difficult' language features occur frequently or repeatedly in a lecture they would very likely contribute to poor comprehension. Thus it can be deduced that identifying these language features or patterns and familiarising students with them through a specialised EAP course would help in preparing remedial students for better lecture comprehension.

In order to identify these key linguistic patterns, EAP practitioners have been examining and drawing insights from the field of Corpus Linguistics. Corpus Linguistics has been connected to language teaching and has been focussed on empirical evidence leading to better quality input and providing both language learners, teachers and researchers an improved understanding of 'how language works in specific contexts' (Campoy, Belles-Fortuno & Gea-Valor, 2010, p.3). The sources of language in context can include lectures, textbooks, handouts, assignment tasks and examination questions. Today, with the development of software based corpus linguistic studies, there is wide explorations on how software can be exploited to address LEP issues.

EAP possesses much of the same characteristics of the sphere of English teaching called English for Specific Purposes some of which are; being related in content to a particular

discipline and activity and centered on language of those activities (Dudley-Evans and St John, 1998, p.3). Thus the corpus linguistic practice of selecting a corpus (a collection of texts) and analysing it for linguistic features seems to be in line with the objectives of EAP and have potential to serve as a tool to achieving them.

As application of corpus analysis to English language teaching, especially for academic purposes is still a novel idea in the Sri Lankan university context, this paper chooses to focus on corpus analysis of the first year course content and its implications for English language teaching for remedial students. This study looks at a few computer based analysis processes that would assist in identifying language features in the English medium lectures that may be challenging for the first year remedial students. The computer based language analysis tools are used to analyse the lectures to build up a repertoire of language features that can inform remedial teaching actions and decisions based on the findings of this analysis. This paper aims to draw conclusions on authentic lecture based EAP activities for the remedial students enrolled in this degree program as well as the course content for such a remedial program.

The research question of this paper is:

> What are the linguistic features prevalent in the academic subject lectures of the first year Bachelor of Business Administration degree program?

The objective of this paper is:

> To analyse the subject lectures to identify linguistic features prevalent in the remedial students' academic program.

2. Methodology

This paper selected two sample lectures from two first year subjects namely Microeconomics and Basic Statistics. These sample lectures were delivered in the first semester of the first year and is reflective of the type of academic language remedial students are expected to process and comprehend relatively early in their academic studies. The reason for selecting these two lectures is that during initial observations of these lectures they were found to have the most continuous flow of English language delivery with fewer pauses and sparing use translations.

In order to achieve uniformity, lecture content from the first 30 minutes of the lecture was transcribed for text analysis. Next the transcriptions were saved in .txt format in order for it to be analysed using corpus analysis software.

The three softwares used in this analysis are UAM Corpus tool, UAM Corpus tool 3 and AntConc. On analysing the lecture transcriptions, the UAM Corpus tool conducted sentence segmentation which is the breaking down of the lecture text into large linguistic units such as phrases and sentences or clauses based on punctuation marks. The UAM Corpus tool 3 produced tag diagrams, in which each of the large linguistic units identified in the sentence segmentation were analysed for grammatical patterns within each unit. The AntConc software was found to be useful in creating vocabulary lists with information on how frequently the words occur in the lecture. AntConc was also useful in identifying word collocations and contextual patterns. Here, when a particular word was selected, the software was able to produce a list of words and contexts in which the word occurred. Although all the above mentioned analyses can be performed by one software, there was a need to test and use a variety of software depending on the facilities allowed under licensed and demonstration versions as well as compatibility with the user's computer.

3. Results

By using the above mentioned text analysis tools it was possible to identify the following language features as shown in Table 1. This table provides examples for these features.

Language feature	Microeconomics	Basic Statistics
1. Frequent words	7th most frequent word is ***'demand'***	45th most frequent word-***'probability'***
2. Words in context	Week before last we were looking at price elastic ***demand*** and we got here, am I right? …whereas in a typical downward sloping ***demand*** curve such as this …	So we discussed about the ***probability*** distributions. So in the ***probability*** distributions actually we defined random variable/
3. Phrases, sentences and clauses	**Phrases**- *Demand* curve/ *demand* for** **Sentence-** That means the *demand* is not responsive at all to price. **	**Phrases**- '*probability* of selecting…/ *probability* distribution / *probability* of success/ *probability* of getting ** **Sentence-** ' *Probability* of selecting the 1st black ball is 5 by 10'** **Sentence (with two clauses)** 'if you are repeating the experiment 100 times (clause 1) in each time the *probability* of success should remain the same.' (clause 2) **
4. Phrasal, Sentence level and clausal grammar patterns	**the word 'demand' followed by nouns,** *Demand* curve/ /*demand* for** **Question forms** what do you mean by elastic *demand*? **	**the word 'probability' followed by different prepositions** *probability* of success…/*probability* of getting…/ *probability* that x is…** **Question forms** then what is the *probability* of success.? ** **Conditional clauses** if you are absent we consider it as a failure.

Table 1: Language features in lecture (** Although most of the examples shown are related to one selected word, this is not a necessity for all the language teaching activities)

These patterns lend themselves to designing of language teaching activities shown in Table 2.

Objective	Type of teaching learning activity
1. identify content vocabulary in a lecture	Students listen to the lecture and complete a transcript of the lecture with the omitted content words
2. identify syntactic (grammar or structure) words in a lecture	Students listen to the lecture and complete a transcript of the lecture with the omitted syntactic words Students read and complete lecture transcript where grammar words are removed with the most appropriate grammar words
3. identify meaning of content words with meaning	Reading comprehension exercises and dictionary based vocabulary exercises to learn the meaning of content words found in the lectures
4. identify the function of syntactic words in a lecture	Grammar lesson on syntactic words based on the words that occur in the lecture
5. complete listening cloze passage with word groups or phrases *Cloze*: a type of language exercise that requires the student to read a text and supply words which have been systematically deleted from	Students complete lecture transcript where words groups are removed. This can be done while listening to the lecture recording or while reading. e.g- (the highlighted sections can be omitted from the student texts, for the students to complete)

a text. This exercise can be modified into exercises that teach groups of words and listening exercises.	…as a random variable will assume different values we'll try to calculate the probabilities how the random variables will assume these different values. So then by using the probability distributions, the probability distribution functions, we try to calculate different probabilities, what is the probability that x will assumes a particular value, what is the probability that x is greater than something, what is the probability that x is less than something and like that. - Excerpt from the *Basic Statistics* lecture
6. complete listening cloze passage that focusses on collocation and context	The same type of activity as in 5 above can be used but here the focus will have to be on words that occur with a particular word

Table 2: Language teaching activities

4. Discussion and Conclusion

The above analysis identified phrasal, clausal and sentence level segments, individual words and words in context or collocations from the lecture text. When aligning language assistance program with the academic content the above mentioned corpus analysis tools will be of assistance to the English language practitioner in developing course content and designing the teaching learning activities. Applying language analysis techniques will make the task of EAP curriculum and lesson design a more manageable one and provide remedial students with assistance to cope with the language challenges of the very subject lectures they struggle with.

References

Campoy-Cubillo, M. C., Belles-Fortuno, B., Gea-Valor, M. L., (2010). Introduction to Corpus Linguistica and ELT. In Campoy-Cubillo, M. C., Belles-Fortuno, B., Gea-Valor, M. L., (Eds.), *Corpus-Based Approaches to English Language Teaching*. (pp. 3-17). London. Continuum International Publishing.

Dudley-Evans, T., & St John, M. J. (1998). *Developments in English for Specific Purposes: A Multi-Disciplinary Approach.* Cambridge: Cambridge University Press.

Evans, S., & Morrison, B., (2011). Meeting the challenges of English-medium higher education: The first year experience in Hong Kong. *English for Specific Purposes.* 30, 198-208. doi:10.1016/j.esp.2011.01.001

Hussain, Z. D. (2014) Expected Language Performance in the First Year of the English Medium Bachelor of Business Administration Degree: A Qualitative Analysis of Content Lecturers' Views. *Proceedings of the Annual Research Symposium 2014, University of Colombo,* 33. Retrieved from http://www.cmb.ac.lk/wp-content/uploads/Proceedings-Annual-Research-Symposium-2014-University-of-Colombo.pdf

Rosenthal, J. W., (1993). Theory and Practice: Science for Undergraduates of Limited English Proficiency. *Journal of Science Education and Technology*, 2(2), 435-443. Retrieved from http://www.jstor.org/stable/40186196 .doi: 192.248.16.90

Rouf, M. A., (2012), Linguistic Transition at Tertiary Level: A Case Study. *New Media and Mass Communication*, 3, 10-15. Retrieved from www.iiste.org/Journals/index.php/NMMC/article/download/1768/1721

The Usefulness of Early Formative Assessment in Determining Academic Performance in First Year Physiology

A. D. A. Fernando, S. Wasalathantrhi, P. M.Atapattu
Department of Physiology, Faculty of Medicine, University of Colombo
Corresponding Author: dinithianush@gmail.com

1. Introduction

Formative assessment (FA) is assuming a significant role in higher education,with the paradigm shift in assessment culture highlighting its importance in teaching and learning (Rushton, 2005). They have many uses; such as providing feedback to students, guiding student learning and curriculum evaluation (Friedman, Dent & Harden,2009). Feedback is the central component of FAthat is useful for interveningwith the intent to improve(Rushton, 2005). Feedback during FA provides the students a basis for correcting their mistakes, offer guidance for learning, serves as a reference point for end of course or module summative evaluation, reduces student anxiety by clarifying goal, and diminishes reliance on self while lessening the insecurity about performance in summative assessments (SA) (Krackov SK, Dent & Harden,2009).

The Faculty of Medicine University of Colombo (FMUC) introduces FA early in the curriculum. Two FAs are conducted in physiology during each of the 3 terms of the Basic Sciences Stream (BScS). The summative assessments in physiology comprise a continuous assessment (CA) at the end of each term (CA1, CA2 and CA3) followed by a final BScSmain examination. During the FA, students are requested to answer a combination of structured essay questions (SEQ) and multiple choice questions (MCQ). The questions and time allocated to answer are as in the SA. Afterwards the tutors display and discuss the expected structured, objective marking schemes. Students are requested to self mark their answers and ask for any clarifications.

Though FAs have been conducted over the past 15 years, their benefits for the students in FMUC have not been formally evaluated. Though students state in their curriculum feedback that FAs are helpful, it has been noted that student attendance at FAs is suboptimal. It is also unclear if students are able to comprehend the structured marking scheme discussed by the tutor and if they are able to self assess their answers with reasonable accuracy. Furthermore, there is there is a dearth of empirical studies on the impact of FA on academic achievement in medical undergraduates in published literature, emphasizing the need for this study.

This study examined the relationship between self marking and tutor marking of a structured essay question and analysed any associations between marks obtained at a FA with academic performance in first year physiology SA.

2. Methodology

This study was conducted in the first term. A week before the study, students were briefed about the format of the FA. They were also informed regarding the purpose of study, and all students in the batch were invited to participate. Only those who opted to participate were requested to hand over the answer scripts after self-marking.The objective marking schemewas validated by 2 experts. Students were ensured that their marks will be recorded only for the purpose of this study. Ethics approval was obtained from the Ethics Review Committee, FMUC.

A question paper consisting of a SEQwith space for the structured answers was given. Students were requested to answer by themselves within 30 minutes. At the end of the FA, the structured objective marking scheme was projected on the screen. The tutor discussed the marking scheme and emphasized on the important aspects of the answer. The students were then asked to mark their answer according to the marking scheme given and 15 minutes were allocated for self marking and enter the marks on the answer script. The answer scripts were collected from the students who consented to participate. The senior academic staff member who designed the question marked all answers using the same marking scheme discussed with the students. The answer scripts were returned to students under confidential cover with the tutor mark and constructive feedback.

This particular method was used as it mimicked the real situation closely, except for the tutor marking. By identifying associations of marks of formative assessments with the academic performance at summative assessments, the possibility of using the marks of formative assessments as an early feedback for the academic staff was explored. This may enable the early identification of students who required support.

3. Results

The FA question paper was distributed to all 204 first year students. 163 students handed over theanswer scripts at the end of the FA, consenting to participate in the study. 117 students (57%) of the batch) were included in the final analysis as46 students had not either stated the self mark or completed the summative assessments.The mean +/- standard deviation of the self marks and tutor marks were 24.53 +/- 20.66 and 34.53 +/- 22.35 respectively. The mean tutor mark was significantly higher than the mean student mark ($p<0.0001$) when compared using the paired sample t-test, but there was a significant positive correlation between tutor marks and student self-marks ($r=0.801$, $p<0.01$).

Association of marks of the FA with academic performance in physiology in the first year

Physiology marks at summative assessments [CA 1 and BScSmainexamination] were correlated with the student self-marks and tutor marks using Pearson's correlation coefficient. Both CA1 and theBScSmainexamination assessed the content area tested in this FA.

The student self marks had significant positive correlation ($p<0.01$) with the marks of CA1 ($r=0.443$), BScs main examination total ($r=0.393$), and individual written examination components of the BScs main examination [MCQ($r=0.35$) andSEQ ($r=0.318$].

The tutor marks showed similar correlations with the academic performance, showing a significant positive correlation ($p<0.01$) with the marks of CA1 ($r=0.402$), BScs main examination total ($r=0.399$), and individual written examination components of the BScs main examination [MCQ ($r=0.35$) and SEQ($r=0.322$].

Academic performance in study participants and non-participants

In the BScSmainexamination 124/163 (76%) of study participants passed physiology obtaining >50% of the total marks, whereas only 20/41 (48%) of non-participantspassed. Among the study participants, the numbers who obtained >50% for MCQ and SEQ components of the BScSmain examination physiology paper were 125/163 (76%) and 57/163 (35%) respectively. Among non-participants, the numbers who obtained >50% for MCQ and SEQ components of the BScSmainexamination physiology paper were 23/41 (56%) and 8/41 (19%) respectively. In physiology CA1, 148/163 (90%) study participants obtained >50% of the total marks, whereas only 28/ 41 (68%) non-participants obtained >50% of the total marks.

There was a significant increase in the number ofstudy participantsobtaining >50% of the allocated marks at the physiology summative assessments, compared to non-participants; BScSmain examination (chi square 11.754, p=0.0006), CA1 (chi square 14.011, p=0.0001) and MCQ component of the physiology main examination components (chi square 6.973, p=0.008). However no significant difference was observed between the two groups of students in the SEQ component (chi square 3.605, p=0.057).

4. Discussion and Conclusions

This study evaluates three key areas related to formative assessments in physiology.

1. Self-assessment accuracy of medical students

The study revealed that the self-assessment accuracy of medical students is high, even very early in the undergraduate period, with the students' marks having a highly significant correlation with the tutor marks, though students tended to underrate themselves with both tutor and students using the same structured marking scheme.Four previous studies on medical students evaluating the self assessment ability have also revealed that students tend to underrate themselves (Boud&Falchikov, 1995). A study on 3rd year medical students by Langendyk (2006) which had a methodology very similar to the present study found that high achieving students tended to underrate themselves whereas low achieving students tended to overrate themselves.

2. The association of the performance at an early FA with academic performance in first year summative assessments

Performance at an early FA in physiology had a strong correlation with academic performance throughout first year (CA1, BScS main examination and all written examination components of the BScS main examination.This could be attributed to many factors: the FA was conducted very early in the undergraduate course-within the first 6 weeks, and high marks at FAmay be obtained by students with better facilities for learning such as text books, IT support and family support, greater English proficiency or students with greater knowledge at onset. The same factors that affected the higher performance at the initial undergraduate period may remain more or less to the same extent throughout the first year and even till later. However, the fact that poor performers could be identified early has a bearing on the ability to implement early measures to promote learning in such students. Other studies also have revealed that success in FAwas associated with better results in the summative assessmentsamong first year medical students for both open and closed book FA (Krasne, Wimmers, Relan& Drake, 2006) and in pre-graduate health science students (Carrillo-de-la-Peña, et al., 2009). Clinical FAs have however did not show a correlation with the overall grades among undergraduates in oral surgery (Anziani et al., 2008).

3. Impact of participating in FA on summative assessments

Students who participated in the FA had a significant increase in obtaining marks >50% in summative assessments. The higher achievement was noted in CA1, BScs main examination and the MCQ component of the BScs main examination. This could be because students who were either unprepared or did not feel confident regarding their performance at the FA may not have ether participated in the assessment or may not have handed over the answer scripts to be included in the study. The students who opted to participate in the study may be those who wish to receive tutor feedback and check their self assessment ability and attempt to improve their outcome. Thus insufficient knowledge and poor attitude could have contributed to the poor outcome in students who did not participate in the study.

It could be recommended that medical students at university entrance should be encouraged to participate in the FAs explaining their potential impact on learning and summative assessments. Poor performers should be identified early in the undergraduate period using FAs. The high self-assessment accuracy of medical students would be beneficial in devising remedial learning activities for especially poor performers, in the form of tutorials, mock examinations or FA etc where structured objective answers could be provided by the tutors allowing students to self assess their performance, saving tutor time while promoting student learning. Further studies should be conducted on the best types of FAs to enhance deep learning in medical students.

References

Anziani, H., Durham, J., & Moore, U. (2008). The relationship between formative and summative assessment of undergraduates in oral surgery.*EuropeanJournal of Dental Education*, 12, 233-238.

Boud, D., &Falchikov, N. (1995). What does research tell us about self assessment? In: D Boud (Ed.), *Enhancing Learning Through Self-Assessment* (pp 155–166). London: Kogan Page.

Carrillo-de-la-Peña, M., T., Baillès, E., Caseras, X., Martínez, A., Ortet, G., & Pérez, J.(2009). Formative assessment and academic achievement in pre-graduate students of health sciences.*Advances in Health Science Education Theory and Practice*, 14, 61-67.

Friedman Ben-David, M. (2009).Principles of assessment.In J. A. Dent, &R. M. Harden (Eds.),*A practical guide for medical teachers* (pp 303-310). London: Churchill Livingston Elsevier.

Hill, D., A., Guinea, A., I., &Mccarthy, W., H. (1994). Formative assessment: a student perspective. *Medical Education*, 28, 394-399.

Krackov, S. K. (2009). Giving feedback. In J. A. Dent, & R. M. Harden (Eds.),*A practical guide for medical teachers* (pp 357-370). London: Churchill Livingston Elsevier.

Krasne, S., Wimmers, P., F., Relan, A,& Drake, T., A.(2006). Differential effects of two types of formative assessment in predicting performance of first-year medical students.*Advances in Health Science Education Theory and Practice*, 11, 155-171.

Langendyk, V.(2006). Not knowing that they do not know: self-assessment accuracy of third-year medical students. *Medical Education*, 40,173-179.

Rushton, A. (2005). Formative assessment: a key to deep learning?*Medical Teacher*, 27, 509-513.

Regionalization and Catering to Sociocultural Diversity in Higher Education: Teaching Beyond Disciplinary Bounds

S. C. Padmakumara
Department of International Relations
University of Colombo
Corresponding Author: padmakumarasc@gmail.com

1. Introduction

With the advent of globalization, the spatial reference of the world has become less significant and the field of education is no exception. Specifically, the field of higher education has become more sensitive to numerous incentives resulting from rapid changes in the international system. These incentives are influenced by multiple factors relating to both material and nonmaterial claims associated with the aforesaid context. We can observe, in general, that the higher education sector has adequately adapted itself to the material claims resulting from various regional and global developments. However nonmaterial claims, such as normative practices and cultural sensibilities, are mostly overlooked in these higher education endeavors. Broadly speaking, higher education has been relatively successful in adapting itself to technological and scientific advancements (including information technology) and market and professional requirements. Thus Progler (Progler 2014) argues that curriculum reform in most higher education institutions in recent years has shown a tendency to result in more employment oriented instruction.

Sumaryono and Ortiz (Sumaryono and Ortiz 2004) argue that recognizing and validating cultural identities in the class room leads to a positive student-teacher connection. Similarly Michele and McMillon (Michele and McMillon 2009) emphasize that a teacher in contemporary society requires cultural literacy in addition to knowledge of subject content. Hence it is worthwhile to conduct a systematic inquiry to examine whether the field of higher education has paid similar attention to nonmaterial requirements as to material accomplishments. Perhaps these nonmaterial requirements are affiliated to some ideational factors such as multiple identities or diversity of sociocultural dimensions which cannot be directly addressed by a kind of discipline bounded pedagogical approach.

In this context, conventional nomenclatures and pedagogical canons prevailing in higher education practices are not able to exclude issues arising from such ideational factors in a class room environment. Therefore it is pertinent for the teacher to be conscious and aware of these issues, which are often sidelined by predetermined disciplinary requirements. Moreover it appears that diversity in the levels of understanding, subject knowledge and competency in the medium of instruction of students in the class room is of a greater concern in traditional pedagogy, which generally pays much attention to material gains. Indeed it is impossible to deny that addressing such diversity is essential in a class room. However, at the same time, it is questionable whether we can achieve teaching outcomes effectively by marginalizing or ignoring ideational factors like socio cultural and linguistic diversities which are psychologically attached to our students.

Student learning and perception building cannot be separated from their cultural and linguistic attachments through which their mentalities are constructed. This should be a greater concern when the class room setting is composed of students who are affiliated to different sociocultural and linguistic clusters. As noted by Slocum and Langenhove (Slocum and Langenhove 2003), it is important to see how social functions are served and social tasks are accomplished through the use of symbols in their communications. Therefore this study intends to explore the importance of catering to the sociocultural diversity of students in the classroom, in addition to mainstream teaching strategies, in order to make teaching more effective and mutually satisfying. At the same time, the study looks at how the role of the teacher as an actor, the speech acts of the teacher and different storylines between teacher and students are important to address sociocultural diversity in the class room. Similarly this case study of the South Asian University which is comprised of a multicultural student population from eight different counties in the South Asian region reveals students' perceptions regarding the teacher's consciousness of the above matters.

2. Methodology

This study adopted both qualitative and quantitative methods. Data collection was done through a questionnaire which was distributed among 30 postgraduate students belonging to the Faculty of Social Sciences at the South Asian University established by the SAARC organization. Students included all eight South Asian countries. Primarily the questionnaire was based on questions relating to equal representation of the eight SAARC countries in teaching examples, speech acts of the teacher, sudden deviation from common medium of instruction of the teacher and the amount of opportunity given to students to interact with the teacher in the classroom. Concurrently, the positioning theory was incorporated into the study to highlight the significance of the psychological and linguistic elements or teaching by looking at the triad of actor, acts and different storylines that emerged in the context of the class room.

3. Results

Out of 30 students that represented Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka, 22 students responded that the teacher should be conscious to use examples that equally represent the eight countries in the SAARC region without confining teaching examples to any particular country or countries. Significantly 23 students responded that teacher's speech acts should address the cultural diversity in the classroom. In addition to that, 24 students have reported that sudden deviation from the common medium of instruction should be avoided by the teacher during his or her teaching. Finally twenty eight students have agreed that all students should be allocated or granted equal opportunities for interacting with the teacher in the classroom irrespective of the nationality of the students.

4. Conclusion and Discussion

It is apparent that teaching in higher education should not be confined to a tightly fixed model totally adhering to traditional pedagogy which is highly skewed towards discipline based accomplishments. While achieving such discipline bounded objectives through various methodologies and teaching strategies that pay attention to student diversity in terms of knowledge, understanding and language competency, it is pertinent to pay attention equally to student diversity in terms of socio cultural and linguistic clusters. Since these clusters have the

potential to jeopardize important outcomes of teaching in higher education, there is a vital need to address them using a systematic approach. Most importantly, teacher's consciousness of such diversity in the classroom is crucial. While maintaining such consciousness, the teacher has to incorporate pragmatic initiatives focusing on socio cultural diversity into his or her mainstream teaching strategies in order to address the issue. This approach may move slightly beyond the discipline bounded teaching protocols.

This case study of the South Asian University reveals that students who are constructed differently by a diversity of socio cultural and linguistic architectures deriving from eight different countries are conscious about addressing socio cultural diversity in the class room alongside mainstream teaching. Further, they expect the teacher to be conscious about such diversity and adopt pragmatic measures into her or his teaching. Primarily students are concerned about equal representation of countries in teaching examples, speech acts of the teacher and concerned about deviation from the common medium of instruction and the quantity of opportunity given to students to interact with the teacher in the class room. Therefore this regionalized case study has informed us that student's perceptions on catering to socio cultural diversity should be a paramount to our teaching along with mainstream teaching. Thus the insights coming from this regional case study are equally applicable to higher education practices in any multicultural country comprising various socio cultural identities.

Finally we argue that, students will be benefited with the introduction of consciousness of and catering to sociocultural diversity in the class room. Similarly the class room environment will be more comfortable and welcoming for students by providing psychological satisfaction. Concurrently, students will be more confident with a sense of 'inclusiveness' in the system. On the other hand, the teacher also benefit due to the satisfaction of adopting a mutually inclusive teaching method that leads to harmony in a comparative belief system. Indeed this will make goals and ends of teaching in higher education more meaningful and mutually satisfying. Eventually this will sustain a valuable normative agenda among communities that can address many of the ideational anomalies coming from current regional and global developments.

References

Michele , G., Macmillon ,T. (2009). Pen Pals Without Borders: A Cultural Exchange of Teaching and Learning. *Education and Urban Society* , 42(1) , 119–135.

Progler, J. (2014). Internationalization and Cultural Diversity in Higher:Teaching for Mutual Understanding. *Ritsumeikan International Affairs*, 12 , 61-82.

Slocum, N., Langenhove, L.V. (2003). The Meaning of Regional Integration: Introducting Positioning Theory in Regional Integration Studies. *UNU-CRIS e-Working Papers*, 1-49.

Sumaryono , K. , Ortiz , F.W . (2004). Preserving the Cultural Identity of the English Language Learner. *Voices from the Middle* , 11(4) , 16-19.

Facilitating Student Centred Learning in Environmental Science and Aspects of Environmental Law Using an Outcome Based Approach

H.I.U.Caldera
Department of Plant Sciences, Faculty of Science
University of Colombo
Corresponding Author: iroja@pts.cmb.ac.lk

1. Introduction

Lectures are one of the most common forms of teaching in tertiary education. However, it is portrayed as a teacher-centred method that is unable to cope with the wide diversity of student ability (Walklin, 1990) and unsuitable for stimulating higher order thinking skills such as analysis and synthesis (Cox, 1994). Accordingly, at present, a method where the student is placed at the centre of the learning process and thereby able to take responsibility for his/her learning is encouraged. In the Student Centred Learning (SCL) approach the lecturer provides the opportunities for students to learn independently and from one another while guiding them to achieve necessary knowledge and skills. This tends to increase student motivation to learn, encouraging deeper understanding and greater retention of knowledge while generating a more positive attitude towards the subject (Collins and O'Brien, cited by Froyd and Simpson, 2010). A wide range of SCL methods are available and some commonly used in higher education include; student presentations, assignments, problem based learning, small group discussions and case studies.

A modification in the teaching style was made in two sections of an existing course offered for Level III students of the Department of Plant Sciences following the Plant Sciences and Plant Biotechnology Special degrees (12 students). The course, 'Aspects of Environmental Science' includes two important sections on environmental degradation and environmental law. The section on environmental degradation was a relatively familiar topic for the students and the lecturer wanted the students to build upon their existing knowledge on this subject whilst guiding them to achieve specific skills such as communication skills and information technology (IT) skills. These and other skills were the in fact the outcomes that the lecturer hoped to address through the SCL activities. Conversely, the section on environmental law was an unfamiliar topic to the bioscience undergraduates with it being the first time many of them learnt anything related to law. The approach adopted here was to facilitate their learning whilst piquing their interest by giving them the opportunity to use 'real' legislative enactments and letting them find information on their own in small student groups. As mentioned earlier the author was keen that students would achieve certain outcomes through the SCL process and these were a predetermined group of skills that employers consistently seek from university graduates (Archer and Davison, 2008; Kaliannan and Chandran, 2012).

2. Methodology

The changes were made as part of an initial study on broader reforms of the 'Aspects of Environmental Science' course. The lecturer sought to develop certain skills in the students as a possible outcome of guided SCL activities such as:

- A group presentation on a topic in environmental pollution followed by an interactive question session. The students were given over two weeks to find information and prepare. It was expected/notified that each group shares its knowledge with the other groups as they worked on diverse topics which were not covered by traditional lectures.

- The students using/reading 'real' Legal Enactments of Sri Lanka in the introductory environmental law lectures when the lecturer explained various sections of the enactments (such as 'section, proviso and amendments'). The students were then encouraged to find sections of relevance for various environment related issues.
- Obtaining information on Multilateral Environmental Agreements (MEA's) from reliable on-line sources. The information was then discussed within groups and presented as a short written report within a designated amount of time. The lecturer was available during the entire period and questions were asked from their findings.

Guidance was provided for each activity and its relevance and expected outcomes explained.

The content in all the activities were assessed at some point. For example, at the final theory examination questions incorporating their knowledge from the presentations as well as the activity using legal enactments were included. Some of the activities such as the group presentations were allocated an individual mark (for effectiveness of speaker, voice modulation, enthusiasm etc.) as well as a group mark (for use of current facts, logical progression of presentation, suitable visual aids etc.). This was used in part for their final grading for the course. Finally, student feedback on the activities as well as their perceptions on the skills gained was obtained using a modified general student feedback form.

3. Results

The skills selected as possible outcomes were: intellectual skills (A), analytical and decision making skills (B), communication skills (C), team working skills (D), planning and organizational skills (E) and IT skills (F). The manner in which each activity may contribute to the outcomes to be achieved is given in Table 1.

SCL activity	Outcomes					
	(A)	(B)	(C)	(D)	(E)	(F)
1. Collecting information for group exercise on 'pollution'	√	√		√	√	√
2. Presenting the group exercise on 'pollution'	√		√		√	√
3. Obtaining information on selected MEA's	√	√		√		√
4. Preparing a short group report on selected MEA's	√	√	√	√	√	
5. Using/reading 'real' legal enactments in the introductory	√	√				

Table 1: SCL activities and the outcomes to be achieved

The students were given comprehensive feedback for each activity. For instance, following their presentations, feedback was given on the content as well as the delivery. This was appreciated by the students as some had commented that they obtained the most valuable feedback so far on how to conduct presentations effectively.

On a scale of 1-5 (with 5 being 'strongly agree' and 1 being 'strongly disagree') the following scores was obtained from the student feedback (Table 2).

Component	Score
I have learnt to apply principles of this field in new situations	4.2
I have been encouraged to ask questions	4.4
Student feedback was welcomed	4.6
I have been motivated to work hard	4.5
The activities given to students were well explained	4.8
Sufficient guidance was given to carry out the group activities	4.8
Following the activities constructive (lecturer) feedback was provided	4.8
The lecturer has been approachable	4.8
An environment conducive to learning was maintained by the lecturer	4.5
Lecturer –student discussions has been encouraged	4.7

Table 2: Selected feedback relevant to the study from the student feedback form

The students were also asked to select the major skill that they felt that was gained from each activity (Table 3.)

Activity	Major skill gained
1. Collecting information for group exercise on 'pollution'	Intellectual skills (A) Analytical & decision making skills (B)
2. Presenting the group exercise on 'pollution'	Communication skills (C)
3. Obtaining information on selected MEA	Intellectual skills (A)
4. Preparing a short group report on selected MEA	Planning and organizational skills (E)
5. Using 'real' legal enactments in the introductory environmental law lectures	Intellectual skills (A)

Table 3: The major skills the students gained from each activity (student perception)

The results of the student assessments showed that they had performed satisfactorily both for the individual activities as well as the relevant theory questions posed to them at the final examination. For instance, three quarters of the students obtained 70% and over for the question on this section at the theory examination.

4. Discussion and Conclusion

The present study sought to enhance student learning through SCL activities using an outcomes based approach. The results in Table 2 show that the activities encouraged students to take responsibility for their learning. The fact that they were actively involved would have encouraged them to remember subject content that they learnt (Rogers, 2002) as demonstrated by their performance at the theory examination. The results in Table 3 suggest that the activities facilitated a deep approach to learning as they worked conceptually with a genuine interest to handle a task meaningfully as described by Biggs (1999).

There was an interest on the part of the lecturer to provide most activities as group activities, since according to Roger (2002), group work requires negotiation and decision making while at the same time promoting a multitude of other skills such as interpersonal skills and leadership.

According to Spady (1988), in order to achieve Outcome Based Education (OBE) instructors need to focus on the outcomes they want to achieve. These should be defined outcomes that allow students to obtain skills and knowledge that would be useful to meet the broad opportunities and challenges students face as young graduates. In this context the present study selected skills that would enable graduates to increase their employability as the

outcomes to be achieved. The student perception on the skills gained gave an idea of the success of the activities. However, it was seen that intellectual skills was the most important outcome gained in a majority of activities as per their perception (Table 3). This signals the need for further improvement in the design of the activities to focus on the other skills identified herein. Student feedback further showed that the lecturer had maintained an environment conducive to learning whilst providing the necessary level of support to carry out the learning tasks successfully (Table 2).

The method used here where the lecturer decided upon a certain set of outcomes and designed activities to achieve them is in line with the 'design down' principle of OBE (Spady, 1994) albeit at a lower level as it was not a significant change in the curriculum.

The changes described herein are part of an initial study to bring about certain changes that would ultimately facilitate better student learning. It is envisioned that building upon the experiences gained here that these changes could be applied to the entire course. In addition, the course in question is currently due for a curriculum revision providing an excellent opportunity to incorporate SCL principles through an outcome based approach in all aspects such as curriculum development, teaching, learning and assessment.

References

Archer, W. and Davison, J. (2008) *Graduate Employability: What do Employers Think and Want?* The Council for Industry and Higher Education (CIHE), London. Retrieved from aces.shu.ac.uk/employability/resources/0802grademployability.pdf (18/03/2015)

Biggs, J. (1999). Teaching for Quality Learning at University. Open University Press, Buckingham.

Cox, B (1994). *Practical Pointers for University Teachers*, Kogan Page Ltd., London.

Froyd, J. & Simpson, N. (2010). *Student-Centered Learning Addressing Faculty Questions about Student-centered Learning*. Texas A&M University. Retrieved from http://ccliconference.org/files/2010/03/Froyd_Stu-CenteredLearning.pdf (18/03/2015)

Kaliannan, M & Chandran, S.D. (2012). *Empowering students through Outcome-Based Education (OBE)*. Research in Education, Manchester University Press, 87, 50-63.

Rogers, G. (2002). *Student Centred Learning – A Practical Guide ForTeachers.* The British Council. Bangkok.

Spady,W. G. (1988) *Organizing for Results: The Basis of Authentic Restructuring and Reform*. Educational Leadership 46:2, 4-8.

Spady,W. G. (1994). *Outcomes Based Education: Critical Issues and Answers*. American Association of School Administrators. Arlington, Virginia.

Walklin, L. (1990). *Teaching and Learning in Further and Adult Education*. Stanley Thomas (Publishers) Ltd., Cheltenham.

An Online Course in Blended Environment for Student-Centred Learning to Improve the Quality of Education among Final Year Undergraduates

S. H. D. Senanayake, K. P. Hewagamage & E. Hettiarachchi
University of Colombo School of Computing (UCSC)
Corresponding Author: senanayakeshd@gmail.com

1. Introduction

In the Sri Lankan context, university education can be considered as a type of tertiary or higher education which is still focused on teacher-centered learning rather than student-centered learning. In order to improve the quality of teaching and learning, the lecturers can use different methods of teaching to match various learning capabilities of the students. When students have a real interest for in-depth knowledge, indirectly they will become lifelong learners. In Sri Lankan universities, Outcome Based Education (OBE) is considered as the key concept used in building the knowledge of undergraduates (HETC, 2014). The Ministry of Higher Education also promotes OBE and defines it as a structure to include, merge and distribute the important skills that students need to gain at the end of a course (HETC, 2014). Student-Centered Learning (SCL), which can be identified as an instructional approach focusing on student needs rather than on the needs of the teacher (AIR, 2012), plays a major role in achieving OBE. It is valuable to explore whether online and blended learning approaches could be utilized when achieving SCL in Sri Lankan universities.

The main objective of this research is to improve the quality of education through SCL using online and blended environments. The course context was "Contemporary Topics in Information Systems," which is part of the Information Systems degree programme conducted at the University of Colombo School of Computing (UCSC). At UCSC, most courses are still being conducted in a face-to-face (f2f) classroom environment and are backed by a Virtual Learning Environment (VLE) [http://ugvle.ucsc.cmb.ac.lk]. VLE is an online collaborative teaching and learning platform that enriches e-learning by providing virtual access to course content, university news forum, assignments and other resources. However, this course was designed differently and there were no f2f interactions in teaching, and students were asked to participate in online discussions based on the selected topics posted in the VLE. When evaluating students in the course, both online ratings and their participation of activities were partially considered to decide the grades.

According to Nanney (2004), SCL replaces traditional lectures with active learning, self-learning, and group learning making students more responsible for their learning. Also, in lifelong learning, students are motivated to find solutions for problems without depending on an instructor. Furthermore, the current job market is seeking people with self-directed, lifelong learning traits. However, SCL needs to be carefully designed to minimize technical and social problems. Hewagamage, Premaratne and Peiris (2007) explain the challenges in implementing blended learning environments and have designed several blended learning solutions for classroom activities. According to Gamage and Fernando (2012), a blended learning approach is the most suitable way of teaching in universities and institutes. In their study of 23 selected universities and institutes, most learners voted for a blended e-learning approach. They used a framework for measuring the level of interactivity using a Likert scale. They found that most universities and institutes have the lowest interaction with e-learning technologies. However, they found there is potential for blended learning and that universities and institutes have to be encouraged to use it.

The literature reviewed shows that online and blended learning environments can be a sound option to achieve OBE through SCL in Sri Lankan universities. This study presents overall learner performance with learner interaction frequency using the VLE.

2. Methodology

The main objective of this course is to have students assess the level of attainment for several emerging topics such as nano-technology, mobile cloud computing, and digital forensics through interaction with peers on topics which were selected based on student interest. This approach promotes self-learning among students by making them enthusiastic to find the information needed through electronic media such as e-books, research papers, online articles and reports or offline media such as newspapers and text books. This section describes the learning interaction, assessment and evaluation used in designing the course.

The "Contemporary Topics in Information Systems" course is an online course conducted in a blended environment designed to increase students' awareness of current technologies, trends and emerging topics. It is practical oriented rather than exam oriented since, there are many continuous assessments such as article writing and poster design throughout the year. Topics, based on student suggestions, are given at the beginning of the course and the ten most suitable topics are selected. Two weeks are given for studying each topic. At the beginning of the first week, the teacher announces the topic and within that week individuals are required to post their ideas, comments, suggestions and criticisms on that topic. Each student must publish at least two postings. During the second week, peers are required to evaluate, discuss and debate on the published postings. The students can rate the posts related to a particular discussion on a scale of 1 to 10 based on their qualitative preferences. Students can only see the average rating obtained and not specific ratings by individuals. This activity is conducted for all ten selected topics.

In this course the student interaction happens through online discussion forums as outlined above. The students search content related to the weekly topic by reading and searching and then discuss findings in the online forums. Figure 1 gives an example of postings done by students and the replies that were posted for a particular topic.

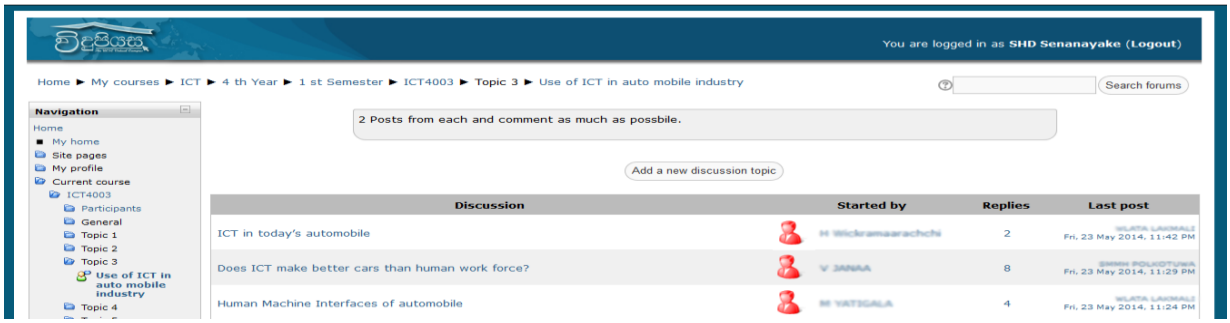


Figure 1: A discussion forum in the Virtual Learning Environment

After discussing all ten topics, each student must write a magazine article on one of the ten topics, based on discussions and individual findings. One topic may be selected by a maximum of three students. Once they have completed their articles, students who selected the same topic, discuss and design a poster referring to their articles and the forum postings. The posters are published online [https://www.facebook.com/contemporarytopics2014],

through social media to obtain feedback and ratings from the public community. Academic staff also evaluates the posters based on pre-determined criteria.

There are two stages of evaluation in this course. At the first stage, a formative assessment is carried out based on the online discussion forums of the ten topics. For this evaluation, content, presentation and validity of the posting, average rating from the class and referencing are considered. This work is worth 60% of the final grade. At the second stage, summative evaluation is carried out based on two components; the individual magazine article is an online activity worth 20% of the final grade; the group poster activity which is carried-out in blended mode also worth 20% of the final grade. The course evaluation is thus based 80% on online activities and 20% on blended activities.

3. Results

Twenty three students participated in this course. Qualitative analysis of the quality of their forum postings and replies shows that student engagement in discussion gradually improved over the year. However, quantitative engagement varied. Figure 2 shows their participation increasing at the beginning of the course (first 3 topics) and then decreased and leveled off. Based on the variation of the quantity of postings and replies made by the students, the involvement for some topics was high.

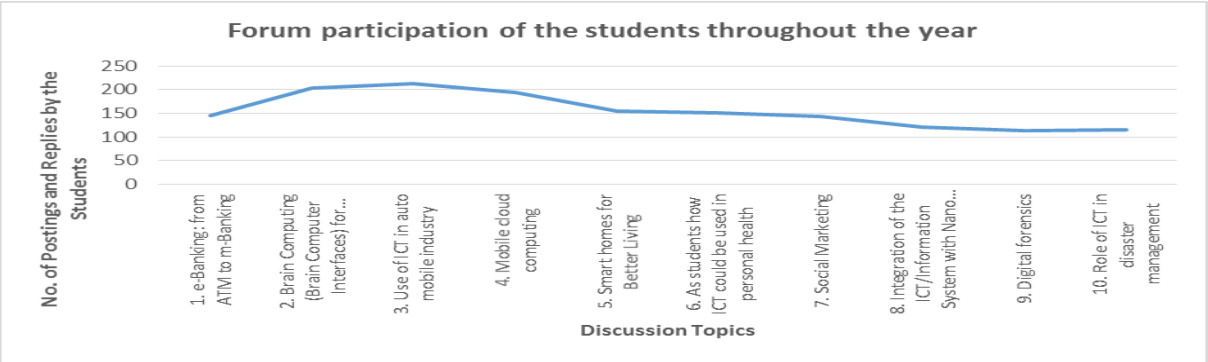


Figure 2: Students' forum participation throughout the academic year

Students' feedback on the course was collected through an online questionnaire. Results show (see Figure 3) that 87% liked the online mode of the course. 96% of the students

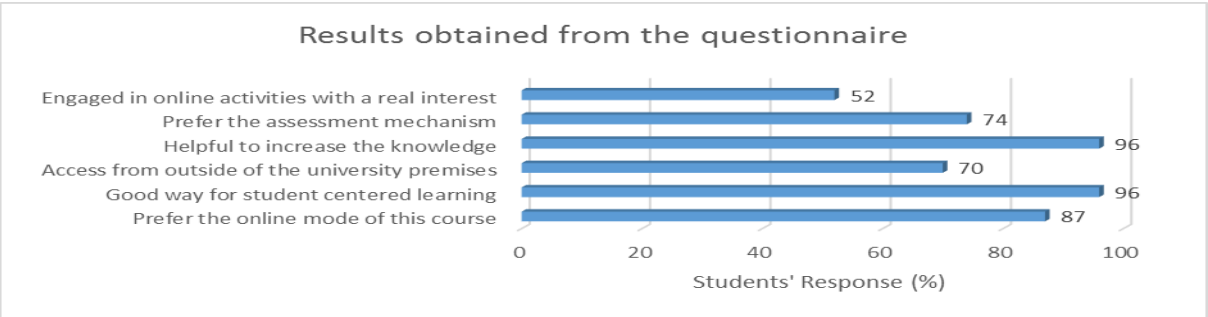


Figure 3: Students' feedback through the questionnaire

identified it as a good model of student-centered learning. Most students (70%) had participated in forum discussions either from home or their boarding place. 96% found the

course helpful in improving their knowledge. Only 74% students preferred the assessment mechanism based on preparation of the magazine article and the poster. The remaining 26% were neutral or felt this was a poor assessment method. 52% of the students had engaged in the online discussions with a real interest, but 48% had only done so in order to earn marks. At the end of the questionnaire the students were given a chance to provide comments and suggestions. The comments suggested that most students preferred to work in a virtual environment and these types of courses helped to increase their knowledge.

4. Discussion and Conclusion

As discussed, the quality of students' participation and interaction in the course and forum discussions improved, perhaps as a result of the SCL. The quantitative improvement in participation at the beginning might correspond to students becoming familiar with the virtual environment. Qualitatively, students' replies were more constructive as the course progressed, even if the number of interactions decreased. According to the feedback, the key reason for this decrease might be the high workload from other courses and during end of semester examinations, resulting in lack of time for engagement in forums. Also, based on feedback obtained through the questionnaire, students found the online and blended modes helpful for improving their knowledge, suggesting it is a good way of incorporating SCL. Finally, when analyzing students' final grades to measure effectiveness of this online course, a significant improvement in grades compared to other f2f courses was observed.

Overall, most students preferred this mode of study compared to the traditional f2f environment. Therefore this type of course can be used as an interactive course in a blended environment. The use of technology enhanced learning and assessment techniques for undergraduates is thus a good way for teaching while achieving SCL within the blended environment. It is a more effective and efficient way for undergraduates to acquire in-depth knowledge with their learning facilitated by the teacher. Using these types of e-assessments in an academic environment should be helpful when developing curricula for other undergraduate degree programs.

References

AIR (2012). Teaching Excellence in Adult Literacy - Just Write! Guide. American Institution for Research. Retrieved from: https://teal.ed.gov/documents/TEAL_JustWriteGuide.pdf

Gamage, D., & Fernando, S. (2012). Engaging Interactivity in eLearning: Review of practices and challenges in Sri Lanka. 30th National Information Technology Conference. Colombo, Sri Lanka.

HETC (2014). Implementing Outcome-Based Education (OBE) Using Student-Centered Learning (SCL), Higher Education for the Twenty first Century Project

Hewagamage, K. P., Premaratne, S., & Peiris, K. (2007). Design and Development of Blended Learning through LMS. Workshop on Blended Learning, 279-291.

Nanney, B. (2004). Student-centered learning. Retrieved November 30, 2012, from http://www2.gsu.edu/~mstswh/courses/it7000/papers/student-.htm

‘IPVLec’: Interactive and Planned Video Lecturing to Facilitate Active Learning

Gnanaharsha Beligatamulla
Department of Integrated Design, Faculty of Architecture
University of Moratuwa
Corresponding Author: DesignerGnanaharsha@gmail.com

1. Introduction

In the present day in Higher Education (HE), the word ‘lecture’ does not just signify a speech or transfer of information. ‘Lecturing’ has deviated from its origins in the teaching-learning process. The origins and the evolution of the lectures have been reported by a number of authors, and many suggest that the nature of lectures has changed, from the traditional style of a university professor literally ‘reading’ from a book to his students (Goodyear, 2003).

Many authors suggest that the role of the lecture is not just information transmission but assimilation (Fink, 2003; Biggs & Tang, 2007; Gibbs & Habeshaw, 1992). When one closely examines writings on lectures some common characteristics can be identified i.e. “[lectures] offer a mechanism for mass-education, they tend towards exposition of materials by the lecturer, they are as effective as other media in the transmission of information, they allow for a variety of styles of presentation by the lecturer, they allow for the use of a range of support media by the lecturer e.g. blackboards, overhead transparencies, and video materials [projectors, audio-visuals]” (Goodyear, 2003, pp. 2,3).

These characteristics have given birth to many forms of lectures such as ‘video-streaming’, ‘educational television’, and ‘web-based lectures’. Students learn best when learning is ‘active’ (Biggs & Tang, 2007; Gibbs & Habeshaw, 1992). There are many ways to integrate ‘active learning’ into classroom and many interesting things to do in lectures (The Professional and Higher Partnership Ltd, 2012) and audio-visuals play a significant role.

‘Videos’ can be used to facilitate active learning. Researches and literature depict different uses of ‘videos’ in the teaching-learning process. The nature of the ‘application of videos’ depends on the disciplinary contexts. Some use ‘videos’ in classrooms while others use it as extra material out of the classroom. Hence the label ‘video lectures’ differs. An argument can be built to define ‘lecture-videos’, ‘video-lectures’, ‘videoed-lectures’, and ‘video-lecturing’ as uses of videos in teaching-learning. (Bennett & Maniar, nd; Brecht & Ogilby, 2008; Halawa, Pang, Cheung, & Girod, nd; Brecht, 2012)

Previous research testifies to videos being specifically effective; 1) “to grab a student’s attention and motivate them to learn – the primary aim is not to use video to teach the material itself – but to stimulate interest”, 2) “when a highly realistic depiction of reality is important – when it is necessary to expose students to things they would not otherwise have the opportunity to see, or when it is necessary to ‘humanize’ a topic, (Bennett & Maniar, nd, p. 1) and 3) “the videoing of live face-to-face lectures for students to watch again later. At its’ most basic, a videoed lecture involves directing a video camera towards the front of the lecture theatre to capture the lecturer, their Power Point slides and their voice”. (Bennett & Maniar, nd, p. 2; Gibbs & Habeshaw, 1992, p. 47)

Further, Bennett and Maniar (nd) emphasize some potential negative impact of videoing lectures i.e. providing video recordings of lectures has an adverse effect on attendance, lecturer can convey their enthusiasm for the subject grabbing the students’ attention and these

qualities are often somehow lost when transferred to a video watched on the small screen, 'Videoing lectures' promotes the idea that the lecture is the only important source of knowledge about the subject area so videoed lectures may hinder the development of students as independent learners. As literature suggests, the videos should not be given to students, videos should be watched in the classroom live (especially on a larger screen), and videos should facilitate active learning to reduce the negative impacts.

The purpose of this research was to identify techniques to facilitate 'active learning', escalate memory retention and convey the 'must know' things according to 'learning onion' using audio-visuals.

This study was conducted to identify; a) How effectively and interactively can lectures be planned with videos to support active learning? and b) How a planned video lecture can maintain the 'time on tasks'?

In the book 'Preparing to Teach', Gibbs and Habeshaw (1992) proposed to make a 'lecture video' as a quick-tip for lecturing, as follows;

> "Ask your video support services to record your lecture. … Prepare handouts where students need to see diagrams or other visual detail. In class, show the video … ask questions or discuss points as they wish. … You can also use the recording later to evaluate your own performance." (p. 47)

Starting from the above quote and associated literature, 'Interactive and Planned Video Lecturing' (IPVLec) is a system of facilitating active learning that was developed in a 'Learning Agreement' implemented at the 'Certificate in Teaching in Higher Education' (CTHE)[1] course. Most supportive videos downloaded from the internet are done in foreign countries and it is sometimes hard to recognize the words due to narrators' accent or some parts are not matching with my lecture flow. But here in my 'IPVLec' students hear their lecturer's voice which is familiar to them. Lecture flow is predetermined and everything is relevant and arranged properly.

This study on interactive and planned video lectures was carried out as an 'action research'. The hypothesis was that students will be motivated by watching an in-house video and will actively engage with the lecture thus improving their memory retention. In addition the lecturer is able to manage time better.

2. Methodology

The sample[2] population consisted of Level 1 – Semester 1 students (n=45) of the Department of Integrated Design, Faculty of Architecture, University of Moratuwa. Under the module 'History of Art and Design' (DC1001), which is a Level1, Semester1, two credit module, a topic[3] was selected to conduct an IPVLec. Lecture materials were gathered and a video – having 8 minutes intervals between 15 minutes lecture materials (see Figure 1) – was made (refer attention curves (Biggs & Tang, 2007)).

[1] 'Learning Agreements' are designed to practice the theories of teaching-learning-assessments while following the 'Certificate in Teaching in Higher Education' (CTHE) at Staff Development Center, University of Colombo

[2] Though the IPVLecs were practiced in several turns with the students in Honours Degree of Bachelor of Design course, specifically to study of the effectiveness of the IPVLec system a sample of students were selected. (Department website - http://www.design.mrt.ac.lk)

[3] 'Modernism in Art and Design' was the selected topic and it plays a significant role in the said module.

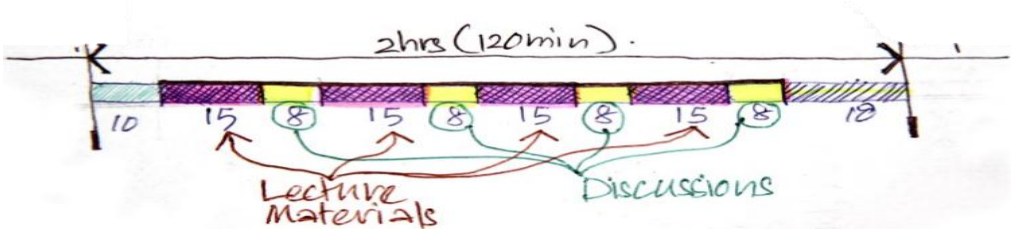


Figure 1: sketch of lecture plan; 10min to enter the lecture, 15min Lecture materials and 8min discussion

To assess the IPV lecturing system following methods were used. Observing students' responses, lecture notes[4], and students' written feedbacks were used to evaluate the IPVLec system from students' perspective. Peer reviews helped to capture lecturers' pedagogic views on video lecturing. To appraise the effectiveness of the teaching-learning process with IPVLec, results of the end semester examination were used.

3. Results and Discussion

The IPVLec was conducted as planned. The start of the lecture and the end exactly tallied with the time slot. Time on tasks was as planned (Figure 1).

To observe the students' response during the lecture, the classroom was filmed[5] and inspected later to record students' physical active participation. Not one person fell asleep or showed lethargy. 100% of them were taking notes and engaged in discussions. Lecture notes from randomly selected 10 students were inspected and 100% of the 'must know' items had been noted down.

Student written feedback on the IPV lecture was positive with approximately 90% complimenting the discussion times in the middle. More than 30% requested to incorporate subtitles so that they could understand the terms and names clearly. 100% said they liked to engage with an in-house video.

Peer reviewers of the lecture advised improving the clarity of the sound on the audio tracks and encouraged me to continue with this method. Pedagogically they were agreed with the IPVLec system.

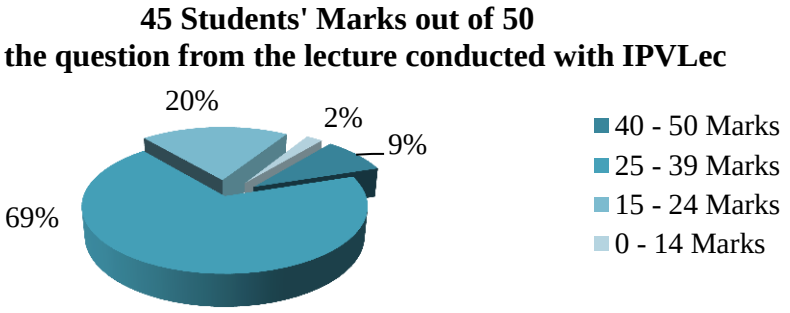


Figure 2: Results summery of the end Semester examination

A compulsory question from the lecture materials facilitated through the lecture conducted with IPVLec, was included in the end of semester examination. 100% of students answered the question and only a single student was unable to get 15 marks out of 50 (Figure 2). That student was absent on the particular day. Therefore, there should be a way to address those who are absent for IPVLecs. According to the marks, 98% students have assimilated the 'must know items' from the lecture.

[4] Uncompleted handouts were given them to fill and develop as their lecture notes

[5] Students were informed prior to the lecture that the lecture was going to be recorded

4. Conclusion and Recommendation

IPVLec system can be used as a technique to facilitate 'active learning' and recall and convey the 'must know' things according to 'learning onion'. Further IPVLecs helps to plan and maintain 'time on tasks'. Students will be motivated by watching an in-house video and will actively engage with the lecture thus improving their memory retention. This research encourages the practice of IPVLec after appropriately considering the context (subject domain, technological matters, etc.).

References

Bennett, E., & Maniar, N. (nd). Are videoed lectures an effective teaching tool? Portsmouth, UK.

Biggs, J., & Tang, C. (2007). *Teaching for Quality Learning at University (3rd ed.).* Berkshire , England: Society for Research into Higher Education and Open University Press.

Brecht, H. (2012). Learning from Online Video Lectures. (K. Petrova, Ed.) *Journal of Information Technology Education: Innovations in Practice, 11*, 228-250. Retrieved 8 8, 2014, from http://www.jite.org/documents/Vol11/JITEv11IIPp227-250Brecht1091.pdf

Brecht, H., & Ogilby, S. (2008). Enabling a Comprehensive Teaching Strategy: Video Lectures. (J. Whatley, Ed.) *Journal of Information Technology Education: Innovations in Practice, 7*, 71-87. Retrieved 06 02, 2014

Fink, D. (2003). *Creating Significant Learning Experiences: An Integrated Approach to Designing College Courses.* San Francisco: Jossey-Bass.

Gibbs, G., & Habeshaw, T. (1992). *Preparing to teach: An introduction to effective teaching in higher education.* Bristol, UK: Technical and Educational Services.

Goodyear, P. (2003, August). Interactive Lecturing on the Net: Improving Teaching Knowledge. Lanchester, UK. Retrieved 08 08, 2014, from http://www.leeds.ac.uk/educol/documents/190015.pdf

Halawa, S., Pang, D., Cheung, N.-M., & Girod, B. (nd). ClassX - An Open Source Interactive Lecture Streaming System. Stanford, CA, USA.

The Professional and Higher Partnership Ltd. (2012). 53 interesting things to do in your lectures. (A. Haynes, & K. Haynes, Eds.) UK.

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Effectiveness of Blended On-line Learning on Three Key Learner Cohorts in the Soil Mechanics and Introduction to Rock Mechanics Course

H.G.P.A. Ratnaweera and N.P.M. Rajaguru
Department of Civil Engineering
The Open University of Sri Lanka
Corresponding Author: pratnaweera@yahoo.com

1. Introduction

Soil Mechanics and Introduction to Rock Mechanics (Course Code: CEX4230) is a Level 4 course in the Bachelor of Technology (Civil) Programme of Open University of Sri Lanka (OUSL). It attracts three key learner cohorts; learners who have completed the foundation programme; those who passed Mathematics Stream subjects at GCE Advanced Level, and diploma holders of National Diploma in Technology (NDT), Higher National Diploma in Engineering (HNDE), and National Diploma in Engineering Sciences (NDES) programmes. The first two learner cohorts are familiar with Open Distance Learning (ODL) model used at OUSL, while diploma holders are new entrants to the programme. ODL expects learners to create knowledge by relating subject matter discussed in printed course material to their prior experiences. In this regard, teacher's role is to encourage continuous learning through timely feedback and feedforward. Besides this role teachers prepare learning materials and perform evaluations. Continuous assessment (CA) consists of two Continuous Assessment Tests (CATs), three Tutor Marked Assignments (TMAs) and the laboratory activity (LAB). Questions in TMAs are structured to make learners explore the subject while CATs assess the ability to interpret knowledge in accordance with stipulated learning outcomes of the course. The laboratory activity is a group interaction which supports the above mentioned objectives. TMAs and CATs measure learner engagement in continuous learning. The CA criteria is expressed as 0.3□[Average CAT mark]+0.3□[Average TMA mark]+0.4□[Lab mark] □ 40%; and [Lab mark] □ 40%. The laboratory activity facilitates interactive learning among group members. Final Grade comprises of 50% of CA mark and 50% of Final Examination Mark.

Table 1 lists statistics pertaining to enrollment and performance of the three key learner cohorts, during Academic Year 2013-14.

Cohort Type	No. enrolled	Active learners	No. eligible	No. sat the Final Exam	No. passed the Final Exam
Foundation completed	31	25	25	23	10
A/L Math-stream	43	33	31	30	16
National diploma holders	167	*16+10+38 = 64	*16+8+35 = 59	*11+7+33 = 51	*4+0+10 = 14
Total	**241**	**122**	**115**	**104**	**40**
[as a percentage]		[100%]	[94.3%]	[85.2%]	[32.8%]

*NDT+HNDE+NDES diploma holders

Table 1: Enrollment and performance of the three key cohorts during Acad. Yr. 2013-14

Data show that 49.4% of learners dropped out from the course, not having completed the laboratory activity. These numbers are significant among diploma holders compared to other two cohorts. 94.3% of active learners gained eligibility to sit the final examination.

Figure 1 shows success rates at CA. Data show that cohorts 1 and 2 have outperformed diploma holders both in percent numbers and grades. Figure 2 shows success rates of the three cohorts at the Final Examination. Data shows that only 38.5% of learners successfully completed the final examination. This shows that success at CA does not ensure success at more comprehensive Final Examination.

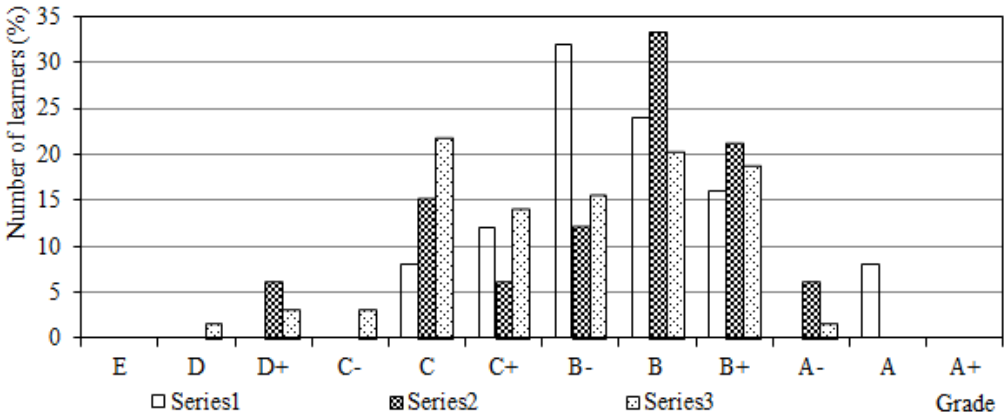

Figure 1: Success at Continuous Assessment (Eligibility grade C or above)

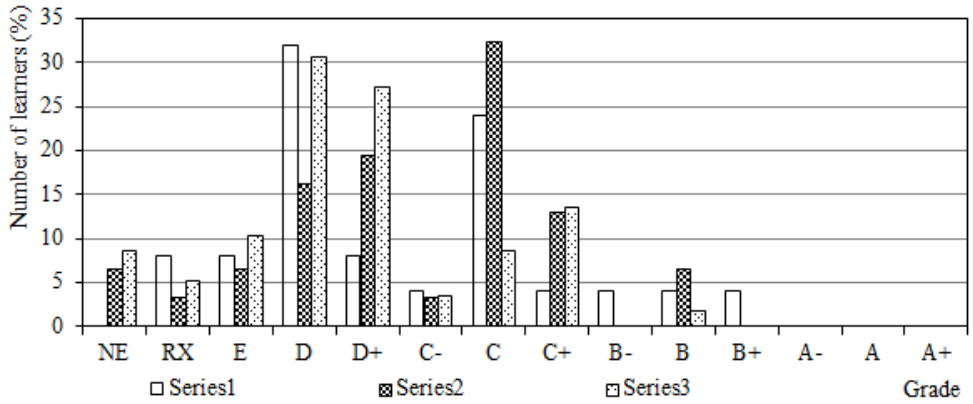

Figure 2. Success at Final Examination (Pass grade ≥ C; RX – not sat; NE – not eligible)

Traditional ODL model limits interaction with peers and the teacher while blended online learning promotes active engagement during learning. Even though blended online mode enhances ODL, learning through social interactions is not a preferred trait among Sri Lankan learners. Therefore teachers are required to facilitate such interactions during learning and during continuous assessment. Such frequent interactions allow both parties to monitor learning progress. Limited access to a computer with internet connection limits frequent use of an online learning environment. This study attempts to quantify how frequent learners access CEX4230 online course, and whether their performance at CA and Final Examination correlate with access frequency. Frequent access motivates teachers to introduce interactive learning activities; infrequent access discourages them making such assignments mandatory.

2. Methodology

This study uses logging-in data collected from the cloud hosted Virtual Learning Environment, EDU2.0 (http://www.edu20.org/). The said VLE was accessed by learners during their study period to view weekly study guides, to schedule laboratory activities, and to upload TMAs and laboratory computations. Weekly study guides referred to study sessions in printed course material. Learners were encouraged to discuss difficulties in each

study session in the discussion forums that were setup in the VLE. A questionnaire survey on their preferred internet access was administered towards the end of their study period. Data collected from sources mentioned above were correlated with learner performance at CA and at the Final Examination.

3. Results

Cohort Type	Active learners	Home	Office	OUSL Centres	Family /friends	Internet cafes
Foundation completed	25	14 [56%]	3 [12%]	10 [40%]	5 [20%]	1 [4%]
A/L Math-stream	33	14 [42%]	5 [15%]	15 [45%]	9 [27%]	3 [9%]
National diploma holders	64	36 [56%]	31 [48%]	3 [5%]	11 [17%]	0 [0%]
Total	**122**					

Table 2: Modes of internet access

Table 2 reports preferred modes of internet access. Learners without a personal internet connection had used an internet café, or those of family members and friends. Some employed learners stated that they prefer to access internet during night time. Figure 3 shows user logging-in data since the beginning of the course. It gives the number of learners logged-in at least once during the past week. The observed trends seam similar across the three cohorts studied. Peak activities were observed during weeks 10-11 (TMA1 due date and prior to CAT1), Wk. 21 (TMA2 due date), Wk. 24 (prior to CAT2), Wk. 31 (TMA3 due date) and weeks 32-33 (corrected laboratory report submission). Even though 94.3% of leaners were eligible to sit the final examination, logging-ins recorded show a downward trend from eligibility due date (Wk. 35) to examination period (i.e. Wks. 39-44). Figure 4 plots (a) average mark for TMAs and CATs and the (b) final examination mark, with logging-in frequency of the three learner cohorts.

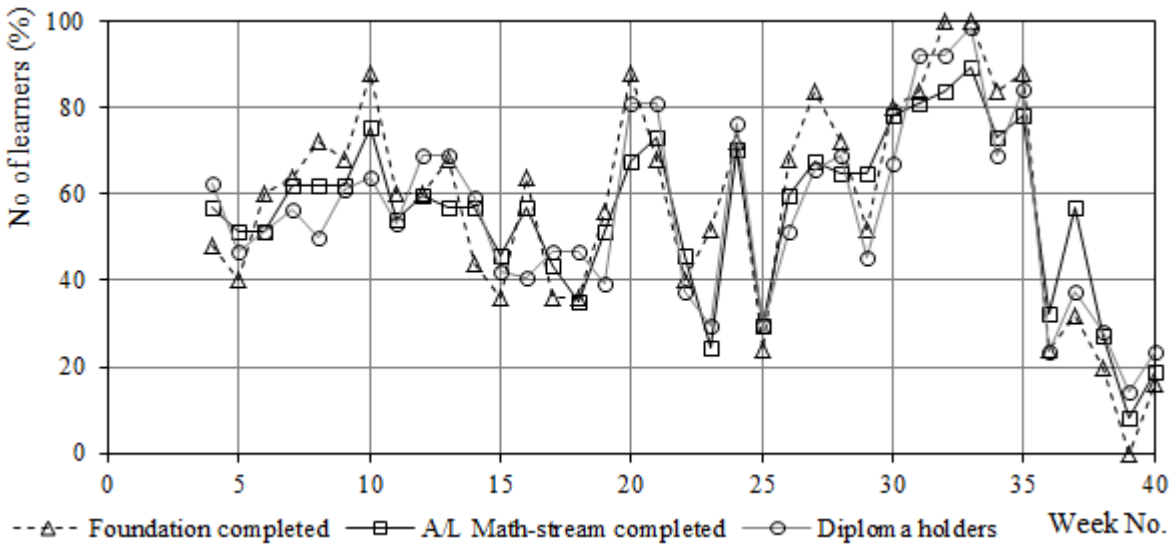

Figure 3: User log-in data with time, logging in at least once during the past week

Both graphs do not show any improvement in performance with logging-in frequency. It also shows that some successful learners had not logged in frequently, implying that they do not rely on weekly study guides uploaded by the teacher.

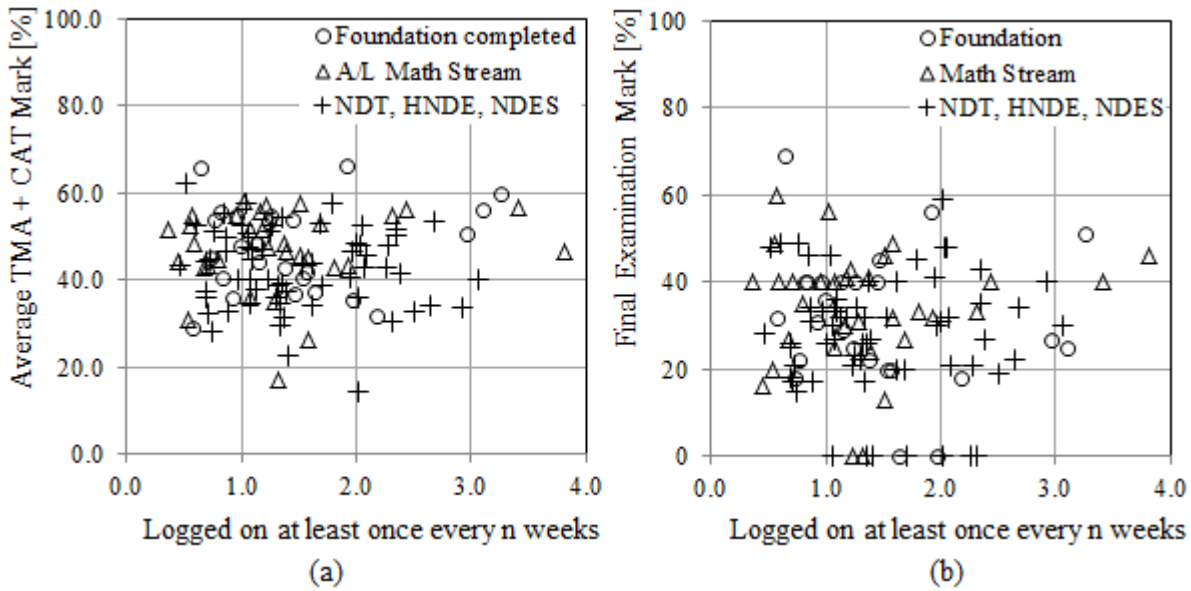

Figure 4: Variation of (a) average TMA+CAT mark and (b) final examination mark with average logging-in frequency.

4. Discussion and Conclusions

Study guides provide useful hints to navigate through study sessions. Figure 3 indicates that approximately 1/3 of learners have not logged in at least once a week to review weekly study guides uploaded by the teacher. Usage peaks before assessment events, however shows significantly low number of logging-ins during academic year end study period.

Observed low average TMA and CAT marks ranging between 30-60% (refer Figure 4a) may have led to poor performance at the Final Examination (refer Figure 4b). It is also observed that some learners had postponed sitting the Final Examination, mainly due to inadequate preparation (refer Figure 2, RX).

This study shows that VLE access of the three learner cohorts studied isn't a serious concern, even though logging-in frequencies fluctuated during the study period. Hence blending on-line mode with the traditional ODL remains a viable option. Learner access enables the teacher to administer a short online quiz, once every two weeks, covering relevant study sessions. This provides learners with the necessary motivation to carry out continuous learning. Assigning bonus marks to those who contribute to discussion forums relating to new learning, and those who provide useful feedback on others' entries are worth experimenting with. Discussion forums can also be used by the teacher to give useful feedback on previous learning, and to give feed-forward to step to the next learning level. As discussed in Biggs (2003), above interventions may motivate many learners to take an active approach towards their own learning.

References

Biggs, J.B. (2003). Teaching for quality learning at university. Buckingham: Open University Press /Society for Research into Higher Education (2nd edition).

Implementation and Evaluation of a Student Centered Learning Method for Pharmacology Lectures in Different Allied Health Disciplines

Kusum de Abrew[1], Ashwini de Abrew[2] & Rumesh Priyadarshana[1]
[1]Department of Pharmacology & [2]Medical Education Development and Research Centre
Faculty of Medicine
University of Colombo
Corresponding Author: kusumdeabrew@yahoo.com

1. Introduction

Recent trends in medical and health professions education have been in the direction of active, student centered learning that would help develop self-driven, life-long learners (Dent & Harden, 2009; Prober & Heath, 2012). However, health professions curricula are often lecture driven, with a majority of teaching input taking place in large groups. One of the greatest advantages of a lecture is its efficiency (Brown & Manogue, 2001), enabling a single lecturer to provide a significant amount of information to a large number of students within a relatively short duration of time. However, in spite of their advantages and widespread use, lectures are often perceived as boring, time wasting and encouraging of passive learning (Brown & Manogue, 2001; Brown & Edmunds, 2009; McLaughlin, Roth, Glatt, Gharkholonarehe, Davidson, Griffin, Esserman, & Mumper, 2014).

It can be argued that these limitations are dependent not so much on the learning method (lecture) as on how the lecture is being delivered. Lectures can be adapted to facilitate the active transfer of knowledge with the co-operation of both the lecturer and the learner (Brown & Manogue, 2001; Graffam, 2007; Brown & Edmunds, 2009; McLaughlin *et al.*, 2014). Methods identified to promote active, student centered learning include incorporation of case discussions, quizzes, group or team activities etc. Two such strategies that have been recently described are *Team Based Learning* – TBL (Parmelee, Michaelsen, Cook, & Hudes, 2012) and the *Flipped Classroom* – FC (McLaughlin *et al.*, 2014). TBL is characterized by three key components: individual student preparation in advance, individual and team tests and devotion of in-class time to decision making tasks (Parmelee *et al.*, 2012). The Flipped Classroom model involves making pre-recorded lectures available to students before class, and use of in-class time for student-centered learning activities (McLaughlin *et al.*, 2014), which is comparable to the advance preparation component in TBL. Both TBL and FC models recognize that the limited time duration allocated for a lecture can be optimized to ensure maximum interaction with the lecturer. Thus during classroom time, the focus is not on the conveying of content, but on clarification and application of knowledge.

The Department of Pharmacology, Faculty of Medicine, Colombo provides teaching inputs to a number of undergraduate teaching programs, including MBBS, BSc. Pharmacy, BSc Physiotherapy, and the Internal Pharmacy certificate course. The courses have a variable number of students, ranging from 12 (BSc. Pharmacy) to 200 (Medicine). While there are some small group teaching/learning activities, curricular inputs are mostly lecture based, with 1-2 hours allocated for each lecture. The objective of this paper is to introduce how the principles of TBL and the FC model were adapted for Pharmacology large group teaching among undergraduates in the allied health professions and to describe their feedback on the adapted method.

2. Methodology

Single consecutive teaching sessions in BSc. Pharmacy, BSc. Physiotherapy and Internal Pharmacy were identified from the scheduled timetable. Each had a specific topic, and were allocated to the author who is a professor in Pharmacology (KdA). The participants were undergraduates/students in the programmes mentioned above. The numbers were approximately BSc. Pharmacy, n=12; BSc. Physiotherapy, n=27; Internal Pharmacy, n=84.

Selected lecture content in the form of a handout of lecture slides were provided either 1-2 days before (BSc. Physiotherapy, Internal Pharmacy) or immediately prior (BSc. Pharmacy) to the lecture. Students were instructed to read and understand the content material before the lecture started. They were informed that this was a new method of teaching and that they will be expected to answer a set of questions individually, based on the content provided.

The session commenced with a set of 10 true/false type questions. After attempting to answer individually, students were allowed to first discuss their answers in pairs, and then in groups of 3-4. They were allowed to refer the handout if they had doubts or for clarification. Each group was requested to reach a consensus on the correct answers. They were then given the opportunity to get clarification from the lecturer on the content covered during the activity. This process was repeated (with a second set of questions) for the duration of the lecture and covered the identified content. These methods incorporated the first two components of TBL by providing the learning material in advance, and use of questions to test individual understanding and as well as group consensus. In addition, our adaptation utilized the FC approach by providing reading material at the commencement of the session and importantly, enabling the lecturer to provide expert guidance, feedback and clarification.

A brief feedback form comprising of five questions on the content delivery method on a four point Likert scale, and one open ended question, was used to obtain student perceptions immediately after the lecture.

3. Results

The adapted lecture delivery method was used for one session each of the BSc. Pharmacy, BSc. Physiotherapy and Internal Pharmacy programs. All students present at the BSc. Pharmacy (n=11) and BSc. Physiotherapy (n=27) sessions and 88% of those at the Internal Pharmacy session (n=74); (total=112) submitted feedback. The majority of the students reported this method of content delivery as more effective than didactic lectures, and reported themselves to be more focused. All students reported having such questions useful or very useful for active learning. As the students were of different disciplines, at different stages of undergraduate study and of different group sizes, statistical comparison of their responses was not done. A summary of the quantitative results is given in Table 1.

During the session, it was observed by the lecturer that the students were fully engaged in the learning activity and they were enjoying discussing with the colleagues. Many questions were asked to clarify doubts, in contrast to the experience at traditional lectures.

Almost all participating students (n=106) responded to the open ended questions. The responses were tabulated and coded according to recurring concepts. Frequency analysis showed that most comments were on the opportunity given to independently read and understand the handout prior/during the lecture (25 comments), opportunity to clarify doubts (22 comments), improved understanding and sharing of knowledge (21 comments) and opportunity for discussion (17 comments).

Questions	Student responses					
	B.Sc Physiotherapy n= 27, (%)		Internal pharmacy n=74, (%)		BSc. pharmacy n=11, (%)	
1. Effectiveness compared to usual method of teaching						
a. Not effective	-	-	-	-	-	-
b. Somewhat effective	-	-	4	(5.4%)	-	-
c. Effective	8	(29.6%)	14	(18.9%)		-
d. Very effective	19	(70.4%)	56	(75.7%)	11	(100%)
2. Is the handout simple enough to understand?						
a. Very difficult	-	-	-	-	-	-
b. Somewhat difficult	3	(11.1%)	23	(31.1%)	1	(9.1%)
c. Not difficult	18	(66.7%)	43	(58.1%)	8	(72.7%)
d. Easy	6	(22.2%)	8	(10.8%)	2	(18.2%)
3. How focused were you?						
a. Not focused	-	-	1	(1.4%)	-	-
b. Somewhat focused	-	-	2	(2.7%)	-	-
c. Focused	14	(51.8%)	33	(44.6%)	4	(36.4%)
d. Very much focused	13	(48.1%)	37	(50%)	7	(63.6%)
4. Clarification on difficult areas						
a. Not sufficient	1	(3.7%)	-	-	-	-
b. Somewhat sufficient	4	(14.8%)	5	(6.8%)	-	-
c. Sufficient	12	(44.4%)	23	(31.1%)	4	(36.6%)
d. Very much sufficient	10	(37.0%)	44	(59.5%)	7	(63.6%)
5. Questions useful for active learning						
a. Not useful	-	-	-	-	-	-
b. Somewhat useful	-	-	-	-	-	-
c. Useful	8	(29.6%)	6	(8.1%)	-	-
d. Very much useful	19	(70.4%)	68	(91.9%)	11	(100%)

Table 1: Feedback on the content delivery method

In a second level of analysis, these concepts were further categorized to identify overarching themes. The key themes identified were 1) independent learning, 2) improved understanding [supported by increased interest and attention], 3) usefulness of frequent feedback by the lecturer and 4) sharing of knowledge. These findings are summarized in Figure 1.

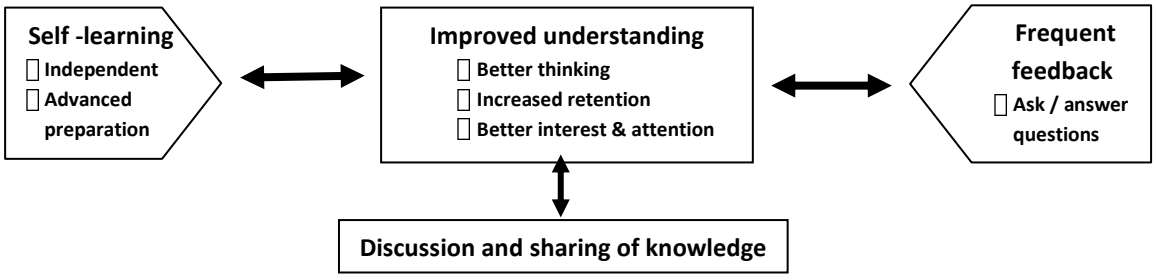

Figure 1: Emerging themes on qualitative analysis

4. Discussion And Conclusion

This study describes the adaptation of two methods to promote active learning, i.e. Team Based Learning (TBL) and the Flipped Classroom (FC) method, at lectures in Pharmacology

at the Faculty of Medicine, Colombo. Although questions were given to enhance the learning process, the format of the questions (T/F type) did not promote decision making or application of knowledge that is a characteristic of TBL. Use of best response MCQs or requiring justification of answers may improve this aspect. Evaluation of this method through student feedback revealed that the students themselves had identified key concepts of both TBL and FC such as more responsibility for their own learning, usefulness of frequent feedback from the lecturer, more effective use of time and better understanding (Figure 1). The qualitative and experiential nature of this study does not support the generalization of the findings to all settings. However, results are encouraging to academics who wish to explore methods of incorporating active learning opportunities into their large group teaching.

References

Brown, G. & Edmunds, S. (2009) Lectures, In Dent, J.A. & Harden, R.M. (Eds) *A Practical Guide for Medical Teachers* (3rd Ed), United Kingdom: Elsevier, 74-85.

Brown, G. & Manogue, M (2001) AMEE Medical Education Guide No. 22: Refreshing lecturing: a guide for lecturers, *Medical Teacher*, 23(3), 231-244.

Densen, P. (2011) Challenges and Opportunities Facing Medical Education, *Trans Am Clin Climatol Assoc*, 122, 48–58.

Dent, J.A. & Harden, R.M. (2009) New Horizons in Medical Education, In Dent, J.A. & Harden, R.M. (Eds) *A Practical Guide for Medical Teachers* (3rd Ed), United Kingdom: Elsevier, 3-9.

Graffam, B. (2007) Active learning in medical education: Strategies for beginning implementation, *Medical Teacher*, 29(1), 38-42.

McLaughlin, J.E., Roth, M.T., Glatt, D.M., Gharkholonarehe, N., Davidson, C.A., Griffin, L.M., Esserman, D.A. & Mumper R.A (2014) The flipped classroom: a course redesign to foster learning and engagement in a health professions school, *Academic Medicine*, 89, 236–243.

Parmelee, D.X., Michaelsen, L.K., Cook, S. & Hudes, P.D. (2012) Team-based learning: a practical guide: AMEE guide no. 65. *Medical Teacher*, 34, e275–e287.

Prober C.G. & Heath, C. (2012) Lecture halls without lectures--a proposal for medical education, *New England Journal of Medicine*, 366(18), 1657-1659.

Assessment of Clinical Reasoning in Forensic Medicine Using a Script Concordance Test: A Pilot Study

Sameera Gunawardena[1] & Ashwini de Abrew[2]
[1]Department of Forensic Medicine & [2]Medical Education Development and Research Centre
Faculty of Medicine
University of Colombo
Corresponding Author: ashwinie@yahoo.com

1. Introduction

Clinical reasoning is a complex, non-linear process that has been defined as the cognitive process necessary to evaluate and manage a patient's medical problem (Barrows & Tamblyn, 1980).It cuts across all disciplines in medicine, and is an essential skill to be developed during the undergraduate teaching programme. However, clinical reasoning is difficult to measure objectively, and several tools have been developed that can indirectly assess this skill in both classroom and clinical settings.

The script concordance test (SCT) is a written test that assesses a specific aspect of the clinical reasoning process: the ability to interpret medical information under conditions of uncertainty (Lubarsky *et al.,* 2013). The SCT has been validated in a variety of settings across medicine and in undergraduate, postgraduate and continuing medical education.

Based on the script theory from cognitive psychology (Custers, 2014), the test presents examinees with a series of brief clinical scenarios, each constructed to be deliberately uncertain or imprecise. Each scenario is followed by a number of questions that provide new information within the context of uncertainty, and requiring the examinees to make a judgment on diagnosis or management. A key feature of the SCT is that there is no single correct answer to a question. Some or all of the responses may be acceptable, as determined independently by panel of content experts. The expert responses are then used to develop the scoring key. The final score depends on how closely the responses of the examinees match those of the experts.

Forensic Medicine is a discipline that deals with the application of medical knowledge in legal settings, particularly with regards to establishing the cause and circumstances of injury and death. Management of forensic cases is challenging as the available information is usually ambiguous and the final diagnosis is often based on a probability rather than certainty. This leads to a high degree of subjectivity and variability in opinion even among experts. Assessing a student's competence in Forensic Medicine is an even more challenging exercise. Conventional assessments are considered reliable tools in assessing how a student would apply a known solution to a well-defined problem (Charlin *et al.,* 2006; Charlin & van der Vleuten, 2004). However, real life forensic scenarios are much more ill-defined and testing a student's ability to analyse the scenario through a multitude of possibilities is extremely difficult.

Thus use of a SCT in this discipline is appropriate as ambiguity or uncertainty can be easily embedded into the scenario to simulate real life forensic encounters. Similarly students are allowed a range of possibilities within which to answer and are not penalized for their variability in opinion. The objective of the present study was to develop and pilot a SCT as an

alternative assessment tool in undergraduate Forensic Medicine that emphasizes on assessing clinical reasoning.

2. Methodology

A brief SCT with 6 clinical scenarios was developed by the authors, who were from the fields of Forensic Medicine (SG) and Medical Education (AA). Colour photographs of injuries and x-rays were used to provide visual inputs. Each scenario had 2-4 responses, making a total of 20. The contents were based on common clinical scenarios experienced by third year medical students during the 2 week medico-legal clinical rotation and were designed to reflect the uncertainty present in real life medico-legal clinical encounters. The scoring key was developed based on the responses of five Consultant Forensic Pathologists.

The SCT was given to third year medical students at the end of their rotations along with the conventional end of appointment evaluation. As the students had not experienced SCT before they were given a clear briefing on the purpose of the test and how it should be answered. The test including the images, were administered electronically. The results were analysed using Microsoft Excel. A scoring key was developed based on the response of five experts (Consultants in Forensic Medicine) and each item was assessed against the scoring key based on the established scoring procedures. The final score for each student was presented as a percentage of the maximum score. The scores were further compared to the scores of the conventional end of rotation assessment.

3. Results

Item quality was analysed based on the responses of the experts, which revealed five items (shaded columns in Table 1) that were discordant. Items 18 and 20 showed perfect concordance among the scoring (expert) panel.

Panel	**Item number**																			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Expert 1	2	2	2	2	-2	0	-2	1	2	0	1	2	-2	2	0	2	0	2	-2	2
Expert 2	0	-2	0	1	-1	0	-1	1	1	0	0	-1	-1	1	0	-2	-1	2	2	2
Expert 3	-1	0	-1	2	0	-1	-2	2	2	-1	2	-2	-2	-2	-1	2	0	2	0	2
Expert 4	2	1	-2	2	0	-1	-2	2	2	0	1	-2	-2	2	-2	2	0	2	-2	2
Expert 5	0	-2	0	2	0	2	-1	1	2	0	2	1	-2	1	-1	1	0	2	-1	2
Mode	**2**	**-2**	**0**	**2**	**0**	**0**	**-2**	**1**	**2**	**0**	**1**	**-2**	**-2**	**2**	**0**	**2**	**0**	**2**	**-2**	**2**
Variance	1.8	3.2	2.2	0.2	0.8	1.5	0.3	0.3	0.2	0.2	0.7	3.3	0.2	2.7	0.7	3	0.2	0	2.8	0

Table 1: Expert Panel Responses

A total of 65 third year medical students completed the SCT at the end of the medico-legal clinical rotation. Scores ranged from 19.4% to 81.9% (mean=44.6%, median=42.9%, SD=13.3). The distribution of scores is illustrated in figure 1. Internal consistency was low, with a Cronbach alpha co-efficient of 0.51. Less than half the students (n=28, 43%) scored over 50% for the SCT (Figure 1). Spearman's rank order correlation was run to determine the relationship between the SCT and conventional assessment marks. There was a negative correlation between the two marks, which however, was not statistically significant (r_s = (-) 0.178, p=0.156).

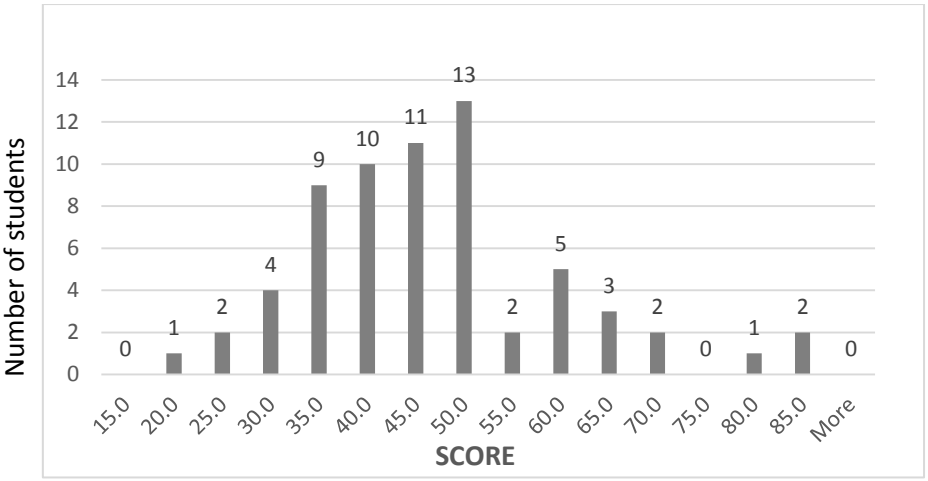

Figure 1: Distribution of scores

4. Discussion and Conclusion

Ability to provide essential medicolegal services is a key outcome of the MBBS programme of the Faculty of Medicine, Colombo. Examiners attempt to assess both theoretical knowledge as well as analytical clinical reasoning through traditional assessment methods. Often complex clinical scenarios are included as a preamble to the question to stimulate analytical thinking. However, the amount of information that can be provided within a scenario is fixed and does not allow for the variability that is seen in real life clinical practice. More importantly, the marking scheme rarely accounts for the wide variation in clinical judgment that exists within forensic experts and despite the precautions of blueprinting, paper scrutinizing and content validation, there still exists a high degree of examiner subjectivity and even institutional subjectivity when marking student responses. Due to this reason students run the risk of being penalized for alternative or different opinions.

The expert panel responses clearly demonstrate the variability in clinical judgment for given scenarios. This is an ideal feature of the SCT (Fournier *et al.,* 2008). All experts had given the same response for items 18 and 20 indicating that they were more suitable for a multiple choice or best response format. More importantly, five items (2, 12, 14, 16, and 19) showed high variance, caused in fact by a discordant score by a single examiner. However, this outlier resulted in significant increase in variance, due to the small expert panel. Ideally, as described by Tan *et al*. (2014) these overly concordant and discordant items may be removed to optimize the test before analysis. However, due to small numbers, we did not perform an analysis of an optimized test.

The test scores reflect the range of reasoning ability of the students in the given case vignettes. It is possible that the high proportion of students with less than 50% indicate a low competency among undergraduates in their clinical reasoning in ambiguous situations. However, given that the test showed low internal consistency such an inference may not be justified. The low Chronbach's alpha may be due to either the low number of test items and/or the small expert panel. Similarly, the effect of unfamiliarity to this new format of assessment both on the students as well as the expert panel should also be considered as an important factor.

Our study was limited to 5 cases and 20 items, whereas systematic review of previous research shows that approximately 75 items (20-25 cases) are required (Fournier *et al.*, 2008). Similarly, the ideal number of experts has been suggested by some authors as 5-10 (Charlin *et al.*, 2000) while others suggest the range to be 10-20 (Fournier *et al.*, 2008; Lubarsky *et al.*, 2011). Constructing the test is a time consuming exercise particularly when developing scenarios that contained the right amount of ambiguity. The test was of low cost and easy to administer. This was particularly so as the investigators chose to use a computer based format. Published reviews on the SCT suggest the use of this test as an online assessment format may be more practical (Brownell, 2009). The investigators of this study concur with this view and feel that since the SCT cannot be used as a replacement for existing assessments it should be incorporated into an institution's learning management system with the marking being an entirely automated process. This is to prevent the SCT overburdening the already overloaded assessment schedule.

Further research is needed on the generalizability and the test's acceptability to learners. Particularly where a small number of experts are available, the impact of any erroneous decisions would be considerably harmful. In such situations, removing test items that reduce the reliability is recommended. The investigators propose further exploration of the use of SCT as a standard assessment tool in Forensic Medicine. Familiarity with the SCT could be improved by using the test during mock assessments or clinical teaching sessions.

References

Barrows H.S.& Tamblyn R.M. (1980) *Problem-based learning. An approach to medical education*. New York: Springer Publishing Company.

Brownell, A.K. (2009). The Script Concordance Test. [Comment Editorial]. *Canadian Journal of Neurological Sciences*, 36(3), 272-273.

Charlin, B., Gagnon, R., Pelletier, J., Coletti, M., Abi-Rizk, G., Nasr, C., & van der Vleuten, C. (2006). Assessment of clinical reasoning in the context of uncertainty: the effect of variability within the reference panel. *Medical Education*, 40(9), 848-854.

Charlin, B., Roy, L., Brailovsky, C., Goulet, F., & van der Vleuten, C. (2000). The Script Concordance test: a tool to assess the reflective clinician. *Teaching and Learning Medicine*, 12(4), 189-195. doi: 10.1207/S15328015TLM1204_5

Charlin, B., & van der Vleuten, C. (2004). Standardized Assessment of Reasoning in Contexts of Uncertainty, The Script Concordance Approach. *Evaluation & the Health Professions*, 27(3), 304-319.

Custers, E.J. (2014). Thirty years of illness scripts: Theoretical origins and practical applications. Medical teacher(0), 1-6. doi:10.3109/0142159X.2014.956052.

Fournier, J.P., Demeester, A., & Charlin, B. (2008). Script concordance tests: guidelines for construction. *BMC Medical Informatics and Decision Making*, 8(1), 18.

Lubarsky, S., Charlin, B., Cook, D.A., Chalk, C., & van der Vleuten, C.P. (2011). Script concordance testing: a review of published validity evidence. *Medical Education*, 45(4), 329-338.

Lubarsky, S., Dory, V., Duggan, P., Gagnon, R., & Charlin, B. (2013). Script concordance testing: from theory to practice: AMEE guide no. 75. *Medical Teacher*, 35(3), 184-193. doi: 10.3109/0142159X.2013.760036.

Tan, K., Tan, N., Kandiah, N., Samarasekera, D., & Ponnamperuma, G. (2014). Validating a script concordance test for assessing neurological localization and emergencies. *European Journal of Neurology*, 21(11), 1419-1422.

Application of Student Centered Learning as an Active Learning Approach in Design Education

Sithumini Rathnamalala & Mr. Kamal Wasala
Department of Integrated Design, Faculty of Architecture
University of Moratuwa
Corresponding Author: kamaldwasala@gmail.com

1. Introduction

Creativity is generally defined as any behavior that leads to ideas or problem solutions that are original in a given culture or cultural context (Rivard & Faste, 2012).

Improving creativity has been identified as a fundamental aspect of design education and can be achieved by improving the analytical thinking skills of students (Matheson, 2006). A key aspect of education is the learning techniques of students. An interesting study conducted by a team of researchers of the Carnegie Mellon University to identify learning principles published in the book titled '*How Learning Works*' (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010) describes many significant concepts in both teaching and learning practices and how they can be relate to the student's learning process. These concepts are: (1) transfer; (2) knowledge organization; (3) motivation and value; (4) feedback; (5) students' prior knowledge; and (6) practice, fluency, and integration. (Rivard & Faste, 2012).

This research paper aims to illustrate the above mentioned cognitive teaching and learning concepts in relation to design education and to present solid study outcomes based on a pilot project titled 'Active Citizen' conducted using the above stated learning domains, which was successfully completed by design students. The community development project 'Active Citizen' was implemented by the British Council and has been introduced into the curriculum of several international universities recently. The Faculty of Architecture considered this a great opportunity to develop cognitive learning techniques in design education. Hence, the project was converted into a community development design project. The project was introduced to students of Level Two who are supposed to engage with design projects related to 'problem solving' according to the predetermined themes. A total of 43 student designers engaged in the project.

Research was centered upon three objectives which were; analyzing the effectiveness of student centered learning in design education, practicing problem based learning in real life experiences and exploring problem solving approach in design education.

2. Methodology

This exercise was planned and implemented based on the above discussed six concepts of teaching and learning (Ambrose et al., 2010) while achieving the vision of Active Citizen project which is 'a world where people feel empowered to engage peacefully and effectively with others for the sustainable development of their communities through all the activities which they involved'.

Students were expected to design product or system solutions for issues identified in their community. Instead of introducing problems to solve, students were encouraged to uncover problems which really mattered to them in their ordinary lives. Students were facilitated to engage in a group activity named 'Community Mapping' where they were guided to draw a map of their community. After completing the map they were asked to stick 'Happy face' stickers in the areas they feel happy. Other areas to be mapped were 'Sad face' and 'Issue found - Attention required'. After completing community mapping, students were asked to present their map and the rationale for the stickers. The next activity was a fishbowl activity where the students discussed issues identified on the map and were guided to prioritize such issues. The third activity was to present a role-play representing the identified issue. The minimum character representation was five and the student groups were supposed to give a comprehensive demographic description of the imagined characters at the end of the play. After the role-play activity, student groups were guided to conduct community research to find out whether the issue was a real community issue or social issue, what factors caused the issue, how to overcome it etc. Students were asked to conduct their survey both qualitatively and quantitatively.

3. Results

A total number of 43 evaluation forms were distributed among participants of the project and response rate was 100%. Questions in the evaluation form were identified and categorized according to the six learning concepts. In the analysis, responses of 1 and 2 were grouped together as were responses 4 and 5 thus covering them to 3 responses; disagree, neutral and agree.

First questions were based on activities related to recalling and using the student's prior knowledge in the existing design context. According to Chart 1, 70 % of participants agreed that the revision sessions which planned to remind related theories learnt in level one were useful to the other stages. 88 % of the participants mentioned that their prior knowledge facilitated their active involvement in the fishbowl activity while the rest of participants expressed a neutral opinion.

'Concept- Transfer' is what allows a student to take an isolated fact and apply it to a new context, internalizing the fact as a general principle (Rivard & Faste, 2012). Therefore the next activities were planned to enhance student's transferring skills. Students were supposed to identify a community issue through the community mapping activity which ended up with a challenge to interpret the identified issue as a role-play and to give biographies for each character. In the analysis of data, 70 % of participants considered the role-play activity as a good method to transfer their imagination, knowledge and previous experience into a new context while 14% of participants disagreed. Questionnaire development and guest lecture sessions can be mentioned as other activities which targeted to improve student's transferring skills.

The next learning concept was 'Knowledge Organization'. Beginners form sparse relationships between facts, often because they are not yet familiar enough with the material to do more than rote memorization. Experts form dense structures of their knowledge that allow them to navigate complex relationships with ease (Rivard & Faste, 2012). Students were encouraged to use 'mind maps' in different stages of their study and 88% of participants considered mind mapping as an effective way of data organization while the rest gave a neutral response.

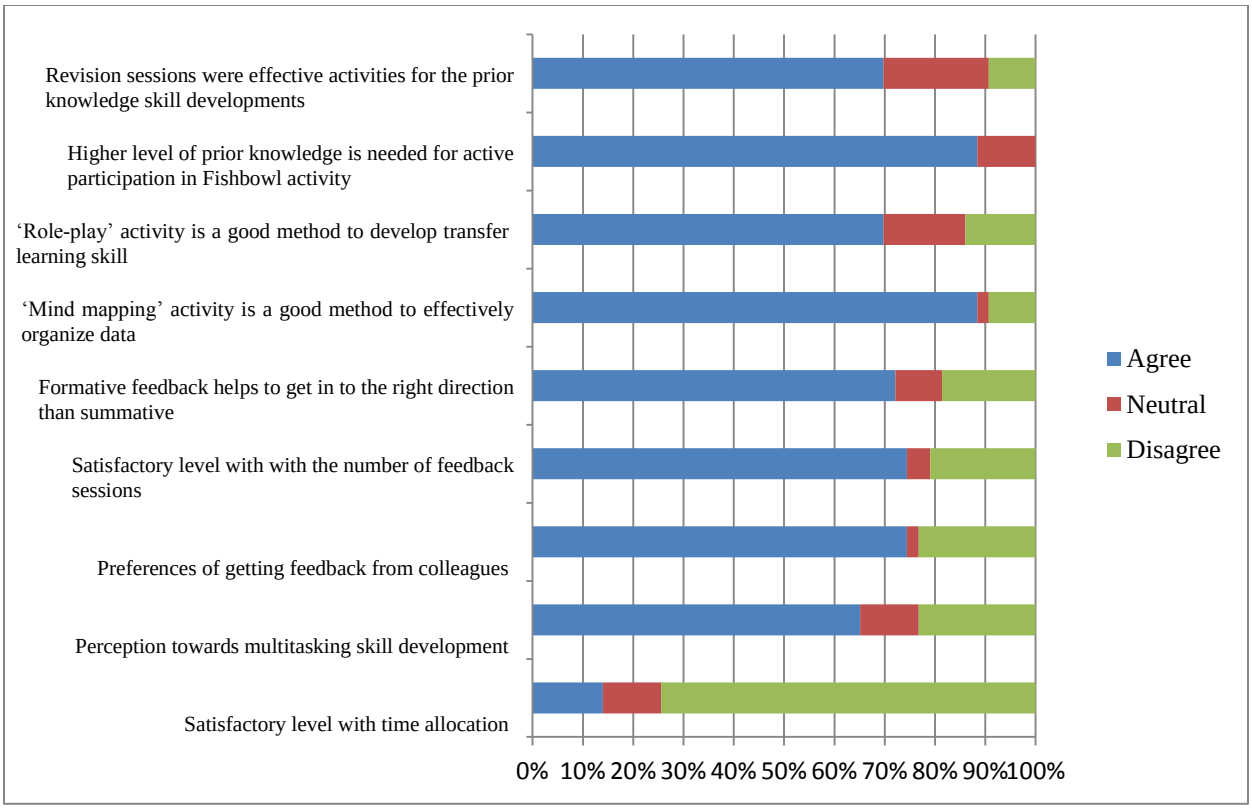

Figure 1: Summary of evaluation results

The fifth learning concept of 'Feedback' was practiced at the different stages and at the end of the project. 72% of students preferred to receive formative feedback before summative feedback. The majority of participants stated that formative feedback helped them to develop their skills and guided them in the right direction. 74% were satisfied with the number of feedback sessions and the majority of the students were satisfied with the opportunity to get feedback from the colleagues.

According to Rivard and Faste (2012) the proficiency we give students depends on their ability to do more than one thing at a time. The project consisted of multiple activities which overlapped and students were supposed to develop multitasking skills while improving targeted skills. 65% of students answered that they were able to develop their multitasking skills while 75% of students claimed that they did not have enough time to practice their individual skills.

4. Conclusion and Recommendations

In conclusion, although it is apparent that overall results of the project were positive, a number of areas to be further fine tuned and improved in the next attempt can be identified. Major attention should be paid to the length of time allocated for the project. More than 75% of students requested to extend the length of in the next attempt. All the focused areas were accepted by the majority of students as positive. On the other hand, more than 20% of students were not satisfied

with most of the activities. Hence, this research should continue taking into account these considerations.

References

Ambrose, S., Bridges, M., DiPietro, M., Lovett, M., & Norman, M. (2010). *How learning works.* San Francisco: Jossey-Bass.

Matheson, B. (2006). *A culture of creativity:*. Wellington: Centre for Creative Industries, Wellington Institute of Technology.

Rivard, K., & Faste, H. (2012). *How Learning Works in Design Education: Educating for*. Newcastle, UK: DIS 2012 In the Wild.

Sternberg, R., & Grigorenco, E. (2000). *Teaching for Successful Intelligence.* California: Corwin press.

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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 help authors to improve their subsequent writing and submissions.