

***“Developing self-aware & self-directed students and staff”***

**Proceedings of the 17th Annual SLAIHEE Conference  
on Higher Education in Sri Lanka**

**organised by**

**Sri Lanka Association for Improving Higher Education Effectiveness  
(SLAIHEE)**



**Friday 30 July 2021**

**9.00 a.m. to 2.45 p.m.**

**Held online via Zoom**

## DEDICATION

Dedicated to the ever-reminiscent memory of Dr Shrinika Weerakoon  
BSc, MSc, MBA(Perth), DBA (Bath, UK), SEDA Accredited Teacher, ASTHE

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

and

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

SDC - SLAIHEE Conference 2021

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17th SLAIHEE Higher Education Conference

on

***“Developing self-aware & self-directed students and staff”***

Friday, 30 July 2021, 9.00 a.m. to 2.45 p.m.

Held online via Zoom (the materials of this conference are available at [www.slaihee.org](http://www.slaihee.org))

### **A WARM WELCOME TO THE CONFERENCE**

This is the seventeenth year since SLAIHEE was established as a non-profit voluntary organisation. From its establishment in 2005, SLAIHEE (Sri Lanka Association for Improving Higher Education Effectiveness) has, jointly with a Staff Development Centre (SDC), organised an annual conference, taking pleasure to provide the only opportunity in Sri Lanka for our university staff to document and discuss the learning enhancements that they have been able to achieve through their subject-related teaching. For the first eleven years, the SDC at the University of Colombo was the organisational partner hosting this annual conference. Then, in its 12th year, the SLAIHEE-SDC conference was hosted by the Staff Development Centre, Wayamba University of Sri Lanka and in the 13th year, was hosted by the Open University of Sri Lanka. 14<sup>th</sup> year, the host became a private HEI, the Sri Lanka Technological Campus with its newly established Centre of Excellence in Teaching, Learning & Innovation (CETLI). The 15<sup>th</sup> conference was supported by the Staff Development Centre, University of Moratuwa. The last (16<sup>th</sup>) conference was held on-line, due to the COVID-related restrictions on meetings, as it followed this year, while introducing presentations from the secondary school sector also.

This SLAIHEE conference has become a Community of Practice and the only national conference in Sri Lanka that focuses exclusively on learning and teaching in the Higher Education (HE) context (SoTL, Scholarship of Teaching and Learning). This year's conference celebrates seventeen years of SLAIHEE and 23 years since the first SDC was established in Sri Lanka (at University of Colombo). Our 23-year history gives us the opportunity to look back and use that experience to question our 'maturity' and where we are, specially with the untimely death of Dr Shrinika Weerakoon who stood, with immense credibility among academics, at the forefront of HE change and improvement in Sri Lanka. She played her role excellently and moved on, much to our disbelief and sorrow. What we will have to say, and do, over the next ten to twenty years is now up to you all and to SLAIHEE. As pioneers in striving to maintain the quality enhancement of HE in Sri Lanka, SLAIHEE has faced and traversed huge challenges and our simple beginnings have enabled us to face these. What challenges the future holds are already palpable, with questions being posed on how we can arrest the decreases in training quality offered at HE institutions and in all its SDCs.

This year's conference theme, *“Developing self-aware & self-directed students and staff”* (for previous conference themes and proceedings, see: [www.slaihee.org](http://www.slaihee.org)) is relevant because it is being increasingly acknowledged in education that quality enhancement requires greater personalisation of the teaching and learning activities carried out by both students and staff. This requires students and staff, and the administration, to become increasingly *self-aware* as well as increasingly *self-directed*. Only then can we have hope that the declining quality of teaching and learning, as well as the quality of training programmes for HE teachers, can be arrested. What we described last year was that quality was being 'severely challenged'. This theme is therefore meant to provide evidence, through the conference keynote and

presentations, that there still remain a sprinkling of quality-conscious minds dedicated to foster the discussion and promotion of effective teaching strategies and methodologies that will bring about this urgently needed enhancement in quality learning.

The conference presentations also show how we can objectively capture evidence of what some younger teachers have achieved in making improvements to bring about quality education and how they have been able to develop self-awareness and *self-directedness*, first in themselves. and next, have proceeded to do so in their students. If a larger body of teachers were to 'borrow' and apply these and other known methods (including in their current on-line teaching) to generate the desired outcomes-based learning, mediated by better staff training, then Sri Lanka will be made a better place for everyone.

However, it is patently clear that a greater community of people will be needed to become committed and to come together to actively support initiatives if even their own children are not to remain inept and unfit to face the emergent yet inevitable changes that they will be called to face in their lives in their not-too-distant futures. No futurologist could have brought the reality of such unanticipated change better than the reality of dismal futures enforced upon us and our youth by changes on disrupted economies, health, food security and education, to name a few, that the current COVID crisis has brought on adults and on their own children. To remain passive any longer would be an abject dereliction of adult duties to these youth, our children, as is seen in various sectors including in education and higher education. The future of youth is 'held in trust' by all of us who claim to be intellectuals but our actions seem increasingly far removed from generating the trust and credibility for us to lay such claim, because what we do 'in the present moment' is what will ensure or destroy that 'future' of youth 'held in trust'. To take a few moments to reflect and re-chart a path on 'what we are doing now' for 'the future of youth' can bring about a rewarding reawakening of the commitments that we had undertaken and, as yet, not too late to be rekindled cooperatively. Let us hope that such *self-awareness* and *self-directedness* would be forthcoming.

We take great pleasure in welcoming you, and our Keynote speaker, Professor Pulani Lanerolle, Professor in Nutrition and Chair, Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo. Professor Pulani's keynote will all make us 'reflect' further on this timely conference theme, to increase our *self-awareness* and prod us into meaningful action.

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

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

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

From SLAIHEE – a big thank you;

- for your participation,
- to the presenters, reporting how they developed and sustained teaching and learning practices to overcome challenges and meet education needs,
  - specially to Professor Pulani Lanerolle for the Keynote speech,
  - to all the special invitees,
- to the reviewers for their speedy and efficient reviews with helpful feedback.

The Conference Organising Committee;

Professor Sunethra Perera, University of Colombo

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This Proceedings Volume edited by;

Chief Editor: Dr Thillaiampalam Sivakumar, University of Moratuwa

Associate Editor: Professor Sunethra Perera, University of Colombo

Assistance of Professor Suki Ekaratne is gratefully acknowledged

## CONFERENCE PROGRAMME

08:30 – 08:55 : Registration & related Inquiries

**Inauguration** [Zoom link: [inauguration.slaihee.org](http://inauguration.slaihee.org)]

09:00 – 09:05 : Conference Announcements by Dr. T. Sivakumar, Past President SLAIHEE

09:05 – 09:10 : Welcome address by Prof. Sunethra Perera, President, SLAIHEE

09:10 – 09:40 : Keynote Address by Prof. Pulani Lanerolle, Professor in Nutrition and Chair, Department of Biochemistry and Molecular Biology, Faculty of Medicine, University of Colombo

09:40 – 09:45 : Vote of Thanks by Dr Iroja Caldera, President-Elect, SLAIHEE

**Technical Sessions** (on-line: as 2 parallel sessions: 22 papers in 5 Sub-Themes )

09:50 – 13:30: Presentations & discussions of peer-reviewed papers

	<b>Parallel Sessions &amp; their sub-themes</b>	
	<b>Session 1 (Room 1)</b>	<b>Session 2 (Room 2)</b>
9.50 - 11:30	<b>1A:</b> Transforming Teacher Practices & Staff Development Impacts	<b>2A:</b> Assessment & Feedback
11.30 -13:30	<b>1B:</b> Transforming Learner Practices	<b>2B:</b> Blended Learning
Zoom Links	<a href="http://inauguration.slaihee.org">inauguration.slaihee.org</a>	<a href="http://session2.slaihee.org">session2.slaihee.org</a>

13:30 – 13:40: Filling (on-line) Feedback Form [ link: [feedback.slaihee.org](http://feedback.slaihee.org) ]

13:40 – 13:45: Conference Closure by Prof Suki Ekaratne

TEN MINUTE BREAK

**AGM of SLAIHEE: Only for SLAIHEE 2021 members [Virtual Room1]**

13:55 – 14:35 : Annual General Meeting (AGM) 2021 - for members  
[Zoom link: [inauguration.slaihee.org](http://inauguration.slaihee.org)]

14:40 : Closure of Activities

### SDC – SLAIHEE Conference, July 30, 2021 - Session Timetable

(page #s refer to pages in Conference Proceedings Book: to plan attending presentations, you can use the ‘conference time-planner’ on p viii)

Session A: Parallel Sessions of Paper Presentations (in Virtual Rooms 1 & 2)			
Session Theme:	Session 1 A: Transforming Teacher Practices & Staff Development Impacts	Session 2 A: Assessment & Feedback	
On-line Venue:	[Room 1: Zoom Link <a href="http://inauguration.slaihee.org">inauguration.slaihee.org</a> ]	[Room 2: Zoom Link: <a href="http://session2.slaihee.org">session2.slaihee.org</a> ]	
Session Chairs:	Dr Jinendra Dissanayake	Dr Ruwani Mayakaduwa	
Time	Paper #, page numbers, author(s), Paper Title	Paper #, page numbers, author(s), Paper Title	
9.50 - 10.10 a.m.	1.1 – on pp. 1-5 (by) <u>Migara Karunarathne</u> <i>Teacher &amp; students’ perceptions on using a lesson plan for effective teaching &amp; learning in online mode</i>	2.1 – on pp. 51- 60 (by) <u>K A D D Kuruppu</u> <i>Teacher &amp; Student perceptions on presentation-based assessment for improving 4C’s of learning in students</i>	<input type="checkbox"/>
10.10 – 10.30 a.m.	1.2 – on pp. 6-11 (by) <u>P Upamali S Peiris</u> <i>Student perception on teaching and learning through narrated PowerPoint and Zoom modes</i>	2.2 – on pp. 61- 65 (by) <u>R Razik</u> <i>Perceptions of Gen Z students on the use of digital gamification for formative assessment</i>	<input type="checkbox"/>
10.30 – 10.50 a.m.	1.3 - on pp.12-17: <u>WCDK Fernando &amp; RMPS Bandara</u> <i>Perception of students in adapting to online learning during COVID-19</i>	2.3 – on pp. 66 - 70 (by) <u>S C Mathugama</u> <i>Use of practical based online teaching and (continuous) assessment methods to enhance student performance</i>	<input type="checkbox"/>
10.50 – 11.10 a.m.	1.4 – on pp. 18-23 (by) <u>M Prabhansrini Dhanushika</u> <i>Self-regulation to fine-tune teaching philosophy, tools to online teaching with Bloom’s digital taxonomy</i>	2.4 – on pp. 71-75 (by) <u>I R Samarathunga</u> <i>Student &amp; staff perceptions on a restructured practical class assessment to increase student engagement and performance</i>	<input type="checkbox"/>
11.10 – 11.30 a.m.	1.5 – on pp. 24-27 (by) <u>HMK Akalanka &amp; K Wijesekera</u> <i>Selected Allied Health Sciences academics’ perceptions on Student Centred Learning and barriers to their adoption</i>	2.5 – on pp. 76 - 79 (by) <u>YAA Kumarayapa &amp; CM Edirisinghe</u> <i>Pre-Post-Review Tests with Problem-solving case studies to improve undergraduate performance in a Microprocessor-based automation course</i>	<input type="checkbox"/>

## SDC – SLAIHEE Conference, July 30, 2021 - Session Timetable (Cont....)

(page #s refer to pages in Conference Proceedings Book: to plan attending presentations, you can use the ‘conference time-planner’ on p vii)

Session B: Parallel Sessions of Paper Presentations		
Session Theme:	Session – 1 B: Transforming Learner Practices	Session – 2 B: Blended Learning
On-line Venue:	[Room 1: Zoom Link: <a href="http://inauguration.slaihee.org">inauguration.slaihee.org</a> ]	[Room 2: Zoom Link <a href="http://session2.slaihee.org">session2.slaihee.org</a> ]
Session Chairs:	Dr Thillaiampalam Sivakumar	Dr Iroja Caldera
Time	Paper #, page numbers, author(s), Paper Title	Paper #, page numbers, author(s), Paper Title
11.30 – 11.50 a.m.	1.6 - on pp. 28-33 (by) NSBM Atapattu, SKK Mudalige & ADP Prasangika: <i>Students’ Perception of &amp; Performance in In-class Debates: A Case Study</i>	2.6 – on pp. 80 - 84 (by) Neranjala Sumathipala <i>Small group activities to facilitate student-centered active learning in an online platform: Student perceptions and peer observations</i>
11.50 - 12.10 p.m.	1.7 - on pp. 34-38 (by) V P Nehra Senadhi <i>Enhancing student skills via online mode: Mind mapping for paving the way towards active learning</i>	2.7 – on pp. 85 - 89 (by) B J S P Abeykoon <i>Use of bichronous online learning to enhance students’ virtual learning experience</i>
12.10 – 12.30 p.m	1.8 - on pp. 39- 43.(by) S D K Wanninayake & Arosha Adikaram <i>Bridging university-industry gap in Human Resource Management graduates: students’ perception</i>	2.8- on pp. 90 – 94 (by) Anuradha C. Senanayake <i>Sustaining Continued Concentration in Class with Blended Learning: Student Perceptions</i>
12.30 – 12.50 p.m	1.9- on pp 44 - 46 (by) K A D D Kuruppu <i>Student interactivity Improvement with a ‘3 minutes for reflection’ teaching activity in an online small-class</i>	2.9- on pp.95 – 100 (by) MGCC Dharmakeerthi & Ayesha Wickramasinghe <i>Adopting distance learning in Fashion Design education: collaborative learning approach during Covid-19 pandemic</i>
12.50 - 13.10 p.m.	1.10- on pp 47 - 50 .(by) W P Srimala K Perera <i>Facilitating student learning with meaningful priming</i>	2.10- on pp. 101 - 106 (by) V G P Pabasara <i>Adaptation of Jigsaw technique to virtual classroom at COVID-19 onset and its effect on student learning experience</i>
13.10 - 13:30 p.m.	1.11- on pp 51 - 55 (by) Purnima Dehiwela <i>Role of fieldwork Vs classwork to enhance research design self-development in Secondary School students</i>	2.11- on pp. 107 - 111 (by) Pushpa Kulanatha <i>Facilitating self-regulation to improve required memorising practice in Ayurveda Learning by perception change and blended learning</i>

13:30 – 13:40 Filling (on-line) Feedback Form [ link: [feedback.slaihee.org](http://feedback.slaihee.org) ]

13:40 – 13:45 Conference Closure

13:55 – 14:35 Annual General Meeting (AGM) 2021 [Zoom link: [inauguration.slaihee.org](http://inauguration.slaihee.org)]



## **Useful notes and contacts**

**Conference Time Planner** - Sessions **1A & 1B**, at on-line Room **1**: [inauguration.slaihee.org](http://inauguration.slaihee.org); Sessions **2A & 2B** at on-line Room **2**: [session2.slaihee.org](http://session2.slaihee.org)

Time	Session 1 or 2	Paper No. (e.g. 1, 2, 4 etc.)	Pages of paper from book	Title /key words /authors	What aspect I can use in my work or explorer in this paper
09.50– 10.10 a.m.					
10.10 – 10.30 a.m.					
10.30 – 10.50 a.m.					
10.50 – 11.10 a.m.					
11.10 – 11.30 a.m.					
11.30 – 11.50 a.m.					
11.50 – 12.10 p.m.					
12.10 – 12.30 p.m					
12.30 – 12.50 p.m					
12.50 - 13.10 p.m.					
13.10 - 13:30 p.m.					
13.30 p.m.	Fill feedback form at <a href="http://feedback.slaihee.org">feedback.slaihee.org</a>				

Thank you for being here

### **Reviewers of papers;**

Professor Sunethra Perera, University of Colombo

Dr Thillaiampalam Sivakumar, University of Moratuwa

Professor Suki Ekaratne, SLTC / CETLI

Dr Iroja Caldera, University of Colombo

Dr Jinendra Dissanayake, University of Colombo

Ms Ruwani Mayakaduwa, University of Colombo

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Dr Priyantha Bandara, General Sir John Kotelawala Defence University

Dr Kasuni Akalanka, University of Sri Jayewardenepura

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

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

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

## Teacher & students' perceptions on using a lesson plan for effective teaching & learning in online mode

Migara Karunaratne

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### Abstract

With the transit of online teaching and requirement for delivering a heavy subject content, I did not have additional time to prepare for my lectures and plan for a proper two-hour lecture schedule. Due to lack of planning of lessons, it became lengthy with in-depth explanations, when lecture delivery became online. This time-consuming approach adversely affected the timely completion of course teaching within the online platform. Students were also demotivated with this practice due to the unsatisfactory completion of course syllabi. To overcome this issue, the lesson plan technique and its theoretical concept that I had used earlier for Face-to-Face teaching was tried out for the online mode. This study was conducted in the first-year 'Population Issues' course in 2020, followed by 135 students. This was implemented for two-hour lectures with two lecture breaks via Zoom online platform. Learning Management System (Moodle LMS) was used to make students aware regarding this new implementation and to provide them with the lesson plan before the lecture. Outcomes were evaluated through self-observations, student and peer feedback. After the implementation, over 90% of the students said that the lesson plan provided more learning opportunities and 83% mentioned that it helped them to improve their preparation for the online lecture as well. Overall, nearly 95% of the students said that this new change was very effective. Peer feedback revealed that it had helped me to focus more on my lecture as well as assisting students to follow the next point to be discussed in a virtual platform. As self-reflection, I realised that working based on a lesson plan in an online mode will help me to work effectively within the allocated time and help enhance my teaching skills. This study suggested that lesson plan technique can be used to enhance teaching and learning opportunities effectively during the allocated lecture times online.

### Background

The Covid-19 pandemic that came about around the beginning of 2020 influenced human tasks in diverse ways. Specially the education system has been negatively impacted by a longer period of lockdowns in most countries including Sri Lanka due to the spread of the Corona virus. Therefore, most primary to tertiary education systems shifted from onsite learning and teaching to online learning and teaching methods (Hayashi *et al.*, 2020). These drastic changes in the education system have influenced teaching and learning in both positive and negative ways.

Sri Lanka as a South Asian country, with the commencement of online teaching both teacher and student, have faced a lot of challenges such as lack of knowledge in information

technology, lack of infrastructure, signal issues, and especially poor practices in online teaching, learning and assessment (Hayashi *et al.*, 2020). These challenges resulted in different issues in teaching and learning practices such as difficulty in completion of practical components of courses, delivery of lectures, student's passive participation, completion of course syllabi within given lecture period, adapting of online assessment methods, etc.

As a lecturer in the Faculty of Arts, I too encountered many such issues with this online transition of teaching and student learning. With a tight semester schedule and heavy teaching workload within the given online teaching system of the faculty, I did not have additional time to prepare for my lectures and plan a proper two-hour lecture schedule for online lectures. Poor or no lesson planning largely limits the effectiveness of teaching. It results in poor time management, unclear direction and the disappointment in both the teacher and students.

As a self-reflection, this was discouraging to me as a teacher and sometimes affected my coverage of the course syllabus within the online lecture period. Students were also sometimes demotivated with this practice regarding the completion of their relevant topics. When delivering my lectures, I prefer to do very lengthy, in-depth explanations regarding each and every point. I reflected that it will help students to gain the needed depth of the subject matter. However, within the given online platform it has been a time-consuming approach and it indirectly affected my ability to complete the lecture as well.

However, to deliver a properly scheduled lecture and provide a comfortable learning environment for students, the lesson plan technique has been used in an online mode. Therefore, to overcome the issues explained above, I planned to apply a lesson plan technique in my online teaching to achieve the following objectives.

- To cover a particular lecture topic within the allocated time for given subtopics
- To focus on particular subtopics easily, without developing a confusion in students

As stated by Milkova (2016), a lesson plan is the teacher's road map of what students need to learn and how it will be done effectively during the allocated lecture time. Most of the time, the lesson plan will show how the sequence of the lesson's subtopics will be delivered to the students. It helps the teacher to work on time as well as effectively complete his or her lecture. An effective lesson plan includes three main components: the lesson opening, which is the introduction to new material; the explicit explanation; and the lesson closing (Milkova, 2016).

According to Straessle (2014), the lesson plan has a strong effect on both the effectiveness and efficiency of how we use our limited time during teaching. Effective teachers systematically and carefully plan for productive use of instructional time. Good teaching needs to employ lesson planning to help students to move systematically toward learner goals. The effective teacher also needs to develop a successful lesson plan to provide direction toward the attainment of the selected objectives.

## Methodology

This study was implemented in the first-year students (number = 135) who followed “DMG 1217: Population Issues” course unit in Sinhala medium in the year 2020 semester II. Before the implementation, I informed the students regarding this new change and how it will be useful to me as well as to them. While explaining the lesson plan, I uploaded the soft copies of the next day’s lesson plan to the Learning Management System (LMS) for student’s awareness. I motivated and encouraged them to read the lesson plan before they come to the next online zoom lecture. This was implemented for the two-hour online lecture with two lecture breaks via Zoom online platform.

Before the implementation, I had practiced working on time allocations within the Lesson Plan and to ensure that I could explain some points easily in ways that students can first initialise and then, deepen topic-relevant knowledge. This practice was extremely helpful for me as a method to control my tendency to provide lengthy explanations as well. In accordance with the lesson plan, I also developed the PowerPoint presentations and two lecture breaks for my lecture to be more attractive and effective (figure 1).

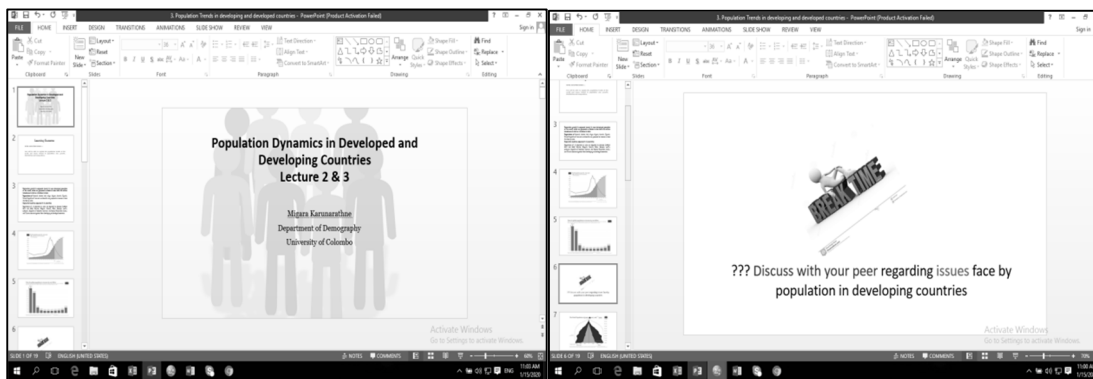


Figure 1. Rearranging lecture materials according to the lesson plan

Accordingly, when I started the online lecture on time and started to deliver my lecture, students participated actively. Guided by the Lesson Plan, I tried to be alert about the time that I had allocated for each subtopic. I conducted two lecture breaks during the online lecture and those lecture breaks were facilitated by breakout rooms and chat box in the Zoom platform for peer and group discussions. It seemed to have been really useful for students and helped me to verify whether students had grasped my points.

After this implementation, outcomes were evaluated through self-observations, student and peer feedback. Student feedback was collected through a google questionnaire and peer feedback was collected via an email that was sent to the peer.

## Results

Before implementing the lesson plan, most of the students were not aware of a lesson plan and how it works. However, after I explained it, they were aware regarding lesson plan and

how much it could be useful to them. Table 1, on the student feedback analysis, shows that after the implementation, nearly 95 per cent of the students said that this new change was very effective. More than 90 per cent of the students said that the lesson plan provided more learning opportunities for them.

Especially 83 per cent mentioned that it helped them to improve their preparation for the online lecture as well. However, nearly 6 per cent of students stated that they were quite 'disagreed' regarding their preparations to the online lectures. On the other hand, 5 per cent of students stated that they need more time to adopt this lesson plan method within the online mode. The majority of students (94.8 per cent) stated that the provided time is enough to adopt to this change.

Table 1. Student feedback on the lesson plan implementation (n= 135)

Statements	Agree (%)	Quite agree (%)	Quite disagree (%)	Disagree (%)	Total (%)
I think this lesson plan method was very effective	94.81	5.19	0.00	0.00	100
This method provided more learning opportunities for us	91.85	8.15	0.00	0.00	100
This method improves my pre-preparation for the online lecture	82.96	11.11	5.93	0.00	100
I need more time to adopt this lesson plan method	0.00	5.19	0.00	94.81	100

Peer feedback revealed that it helped me to focus more on my lecture as well as assisting students to follow the next point to be discussed on a virtual platform. Especially Peer mentioned that this lesson plan had helped me to do my teaching effectively and work on time. It confirmed that I had worked according to the plan, and the suggestion of the peer was that this lesson plan should be applied for all lessons in this course unit.

As a self-reflection, I realised that working based on a lesson plan in an online mode will help me to work effectively within the allocated time and help enhance my teaching skills. As a self-reflection after the implementation, I realised that working based on a lesson plan will help me work effectively within the allocated time and help enhance my teaching skills in an online platform. I realized that most students were curious about this new change and participated actively in the online two-hour lecture.

## Discussion and Conclusion

The results of the study suggested that the lesson plan technique can be used to enhance the effectiveness of teaching & learning in online mode also. Given the workload and online semester schedule, this study shows the potential of a lesson plan and will discuss ways how it can be made more effective and useful for both teachers and students to facilitate better learning and teaching.

As a summary, the lesson plan technique is useful to enhance teacher's effectiveness by improving organisation in teaching and to help enhance students' subject-based knowledge within the online platform. Because most teachers are facing diverse issues and challenges with teaching in a new normal online platform. However, the lesson plan technique can be used as a method to enhance teacher's effectiveness of online-based teaching without creating an additional burden on a newly oriented teaching platform. As a suggestion, and given the workload and new online semester schedule, the lesson plan technique can be particularly useful for both teachers and students in social sciences and humanities. Due to the overall usefulness of this Lesson Plan method that I had earlier used for my Face-to-Face teaching, I am now planning to use it for all my online teaching also.

## References

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## **Student perception on teaching and learning through narrated PowerPoint and Zoom modes**

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### **Abstract**

With the current COVID-19 pandemic, higher education institutes had to suddenly shift teaching and learning to be completed online without much prior time for preparation and planning. According to the knowledge gained from first year undergraduates verbally and through evidence of ZOOM meeting reports, it was realized that most students were having problems connecting to the lecture in real time with consistent reliability. As an alternative, I started uploading narrated Microsoft PowerPoint presentations, saved in video format (MP4), to YouTube linked via Learning Management System. Some lecture sessions were organized intermittently via ZOOM. Feedback responses based on my course, 'Crop Science & Agronomy' for 1<sup>st</sup> year students, were collected. To evaluate the perception of students on the effectiveness of the methods of narrated PowerPoint based video and ZOOM lectures alone and in hybrid mode (blending real time lectures via ZOOM and PowerPoint narrated lectures), the feedback was collected anonymously via Google Form that comprised of multiple choice, open ended and Likert scale questions. There were 51 voluntary respondents in the study, from a total of 87 who were following the course. When only two methods were considered, 86% of students preferred the uploaded narrated PowerPoint over ZOOM lectures, where only 14% of the students favoured online ZOOM lectures. The main reasons to favour narrated PowerPoint recordings were; flexibility of watching lectures, enabling to listen number of times, easy to maintain the pace to take down notes and ease to follow the content. The students who favoured ZOOM lectures did so because they could actively participate and ask questions at the same time. However, when they were asked to select whether they like these methods alone or in a blended way, 95% of the students mentioned they prefer the blended method (uploaded PowerPoint video followed by a ZOOM discussion). Therefore, lecturers could practice 'blended mode' specially for making online teaching and learning process more effective, such as during pandemic situation.

### **Purpose / Background**

Technology has played and continues to play a significant role in the development and expansion of online education. Accordingly, many universities have reported an increase in the use of online tools for teaching and learning. Over the past two decades, academics and institutes of higher education have diversified their education through ICT systems, including Moodle, Microsoft Teams and Zoom applications and Learning Management Systems (LMS) (Alameri et al. 2020). With the current pandemic situation, higher education institutes had to suddenly shift teaching and learning to complete online without much prior time for

preparation and planning. In higher education institutes, most of the educators started uploading lecture notes to the LMS and conducting lectures via live meeting applications available such as ZOOM, Microsoft Teams and Google Meet. While in this process, there were technical and technological barriers faced by students were identified: i.e., no/unstable internet facility, no access to a computer and lack of familiarity with teaching and learning and assessments via LMS, specially for students from rural areas in Sri Lanka. According to knowledge from verbal communication with first year undergraduates and from experience of using ZOOM application with the same students, it was realised that most students are having problems connecting reliably to the lecture in real time. By analysing, meeting report of ZOOM lectures, it was noted that students disconnected and re-joined several times due to internet connection failures, making them harder to be engaged and to follow the lecture continuously. As an alternative, I started uploading narrated Microsoft PowerPoint presentations, saved in video format, to the LMS built up on Moodle. However, discussion, summary sessions and some lectures were organized after once every 2-3 weeks via ZOOM to avoid the feeling of isolation. This study was conducted to evaluate the perception of students on online teaching and learning methods, uploaded narrated Microsoft PowerPoint presentations (in video format) and ZOOM lecture sessions alone and in blended mode.

## **Method**

First year undergraduate students following Food Production & Technology Management degree programme of Faculty of Livestock, Fisheries & Nutrition, Wayamba University of Sri Lanka made up the study sample. The group consisted of 87 students. The online lectures were conducted via the Moodle Learning Management System. In a separate block for each week, I introduced the topic, intended learning outcomes for each week and lecture note/ PowerPoint slides, additional reading. Within each block, I video-recorded a lecture related to the topic of the week and uploaded it. At every 2 – 3 weeks intervals, a ZOOM session was scheduled to conduct lectures / discussions. Therefore, my course was fully delivered online using mainly narrated PowerPoint (video format) along with intervening ZOOM sessions, organized in the LMS. The students were asked to forward their doubts/ questions regarding the topics covered by Narrated PowerPoint to my email, phone or LMS forums. Students' questions in the ZOOM sessions were clarified within the ZOOM session.

The feedback of the students was collected via Google Form anonymously, at the end of the semester. The questionnaire comprised of demographic data, multiple choice questions, open ended questions and Likert scale questions. The students were also asked for the availability of internet connection and accessibility for devices as these factors can change the choice and effectiveness of the teaching and learning method. Data were analysed using descriptive statistics by calculating frequencies in MS Excel.

## **Results**

There were 51 respondents (first year undergraduates) in the survey with 82% female and 18% male representation. The results will be presented below under different sub-headings

### 3.1 Availability of internet connection and devices

It was observed that every respondent had access to a device to continue learning online (Figure 1); 66% of the students had access to both laptop computer and a smart mobile phone to use in online teaching and learning.

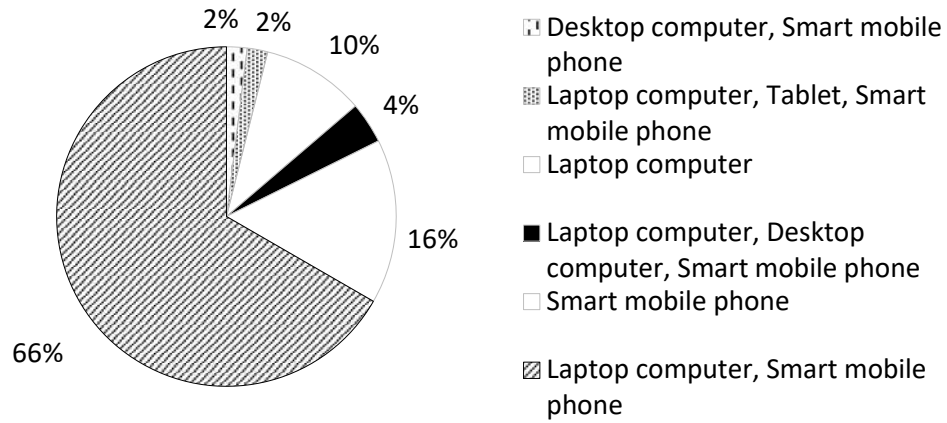


Figure 1. Availability of a computer/device with students for online learning

All the respondents had access to internet; however, about 47% of the students used mobile data as the main source of internet connection for their online learning (Figure 2).

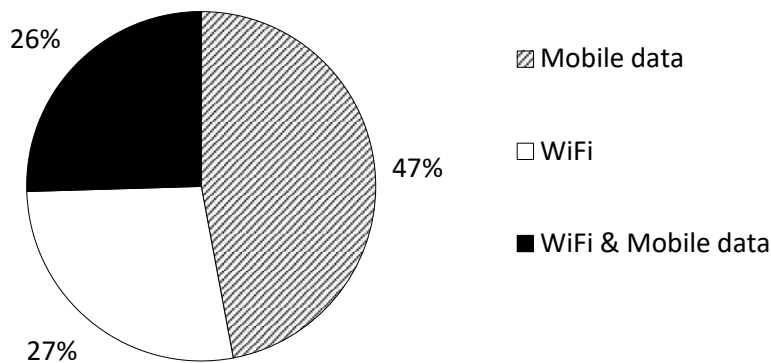


Figure 2. Nature of internet connections available for student online learning

43% of the students spent Rs. 1000-1500 while about 28% of the students spent Rs. 2000- Rs. 2500 for internet connections per month for online learning.

### 3.2 Preferences of students on methods of delivering the lectures

The feedback showed that the majority of the students (86%) preferred the uploaded video recordings of narrated PowerPoint presentations over live lectures via ZOOM. Out of the 51 respondents, only 14% of the students favoured live ZOOM lectures. About 78% of students agree that they felt they are “with the lecturer” (i.e., real time) when they were listening to the uploaded PowerPoint recordings (Table 1). Most importantly, 86% of the students mentioned that, the lecture recordings and the lecture note/guiding materials uploaded to Moodle and YouTube helped them to do self-learning/ student centred learning.

Results of a study conducted by Alameri et al. (2020) also indicated that Moodle, Microsoft teams and Zoom platforms helps students develop their own self-study abilities and improves and encourages them to advance in line with their abilities.

However, when they were asked to select whether they like these methods alone or in a blended way, 95% of the students mentioned they preferred the blended method (PowerPoint video followed by ZOOM discussions) that was conducted.

Table 1. Responses of students on ZOOM lectures and narrated PowerPoint video recordings

Questions	Yes	No	To some extent
Did you feel that you are with the lecturer when you were listening to the recording?	78%	0%	22%
Time to time ZOOM sessions, helped clarifying doubts of live sessions and recorded sessions	76%	2%	22%
Did the recording make you feel that you are in the learning process?	82%	0%	18%
Did the recording help much student centered learning (self-learning)?	86%	0%	14%
Were you bored while listening to lecture recording compared to ZOOM lecture?	2%	57%	41%

NOTE: The frequencies were calculated using the responses of 51 respondents

Table 2. Summary of reasons students provided for their preference towards the method of delivery

Why did you select Narrated PPT	Why did you select ZOOM
Can listen anytime	Can ask the questions at the same time
Can listen number of times	Can actively participate
No problems of poor internet connectivity	
Can take down notes pausing the recording	
Easy to understand	
Can study freely and leisurely	

About 59% of the students 'strongly' agreed and 35% of the students agreed that the video recordings of PowerPoint lectures were informative and easy for them to follow (Table 3). The majority of the students (98%) did like the reading materials and slides uploaded to follow with video recording. About 51% of students strongly agreed that the way of delivery in the video recording of PowerPoint made them engaged in the lecture. Students mostly favoured video lecture recordings due to the flexibility they had for studies.

Table 3. Students responses on effectiveness of narrated PowerPoint video recordings

Frequencies	Strongly agree	Agree	Neither Agree or Disagree	Disagree
The video recording of PowerPoint made me interested in learning the subject	49%	45%	6%	0%
The video recordings of PowerPoint were informative and easy to follow	59%	35%	6%	0%
Providing PowerPoint slides/notes/ reading materials along with recording helped to follow the lecture well.	55%	43%	2%	0%
The voice clarity & way of delivery were sufficient to made me engaged in the lecture	51%	39%	8%	2%
Recording gave the flexibility in learning at my own speed and time.	51%	47%	2%	0%

NOTE: The frequencies were calculated using the responses of 51 respondents

## Discussion/Conclusion

According to the survey, it was found that about 47% of the students use their mobile data to connect to the internet for online education. Therefore, it is more likely that they undergo connectivity issues depending on their location, availability of credit limit and strength of connection. Therefore, connecting to online lectures throughout the day for all the courses in real time would be a huge stress for them. According to the results, 86% of students favoured recorded PowerPoint video uploaded to the Learning Management System over ZOOM lectures. They favour to downloading narrated PowerPoint recordings when they have connection and getting shared among friends to listen. Along with that reason, they have other reasons to favour narrated PowerPoint such as ability in watching over multiple times and taking down and developing notes at their own phase.

However, when they were asked to select whether they like these methods alone or in a blended way, 95% of the students mentioned they prefer present blended method

(PowerPoint video followed by periodical ZOOM discussions). That makes the real time interaction with the lecturer and also provide good self-study time. However, student performance and behavior in these Moodle and Zoom platforms are all influenced by self-efficiency, age, and the training they have had on these applications (Lu, 2010). Moreover, physical and psychological factors of these platforms may either encourage or hinder the attitude and performance of undergraduates (Zandvliet, 2003).

Therefore, lecturers may consider these complex conditions of students and technical platforms for their education in future research studies. Further, factors related to teaching styles and the learning environment and interact to influence students' satisfaction with learning are important (Zandvliet, 2003). Therefore, successful online teaching and learning would be affected by complex set of factors. The present study concludes that providing recorded video lecture materials (PowerPoint) as a support for the students along with periodic ZOOM sessions make the student interest in learning based on current survey results. This blended method has supported all the students those who have not been secured with stable internet connection in Sri Lanka. Future studies might need to identify what other individual, social and environmental factors may influence their learning in these methods.

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## Perception of students in adapting to online learning during COVID-19

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### Abstract

Teaching mode of the first academic semester of year 2020 was abruptly changed from face-to-face to online mode, which was a forced transition due to Covid-19 outbreak. Physical classroom in the traditional system was unexpectedly altered to an online classroom without possessing proper knowledge on technical and pedagogical aspects, which led to undue stress among the teachers and students. Challenges were posed in relation to the conversion and delivery of teaching modules in online mode, with limited infrastructure, under non-availability of conducive teaching/learning environment and with lack of competency on handling information technology during this transformation. Having recognized the teachers' responsibility to provide quality education even amidst this unprecedented scenario, it was investigated to what extent online learning has been effective from students' perspective. Level 2 Civil Engineering undergraduates who follow "Engineering Hydrology" in Semester 3 and "Hydraulic Engineering" in Semester 4 were selected for this study. Semester 3 has been conducted using both physical and online modes whereas semester 4 was delivered completely by online mode. Students' perceptions were collected through a questionnaire survey. The questionnaire survey was formulated based on pros and cons of both physical and online modes and issues related to delivery and assessment and included both open and close-ended questions. Furthermore, suggestions to improve online learning were obtained. It was observed that only 60% of the students (n=20) have been able to use online learning environment effectively, whereas 20% have faced serious technical and delivery issues. The balance 20% were frequently inactive. Only 20% of the students were of the view that online mode promoted self-paced learning, while 80% believed that it provided a flexible learning environment. Nearly 40% stated that online learning enabled more freedom to clarify issues. The study showed that present delivery via online needed amendments for enhancing effectiveness of learning. The results have been utilized in planning the online delivery in the subsequent semester.

### Background

The COVID-19 pandemic has made its impact on almost all sectors of human civilization in a drastic manner. People have been compelled to get themselves adapted to a new way of conducting their daily activities or a 'New normal'. In this backdrop, the global higher education (HE) sector faces the greatest challenge ever encountered. According to United Nations Educational, Scientific and Cultural Organization (UNESCO), 186 countries have implemented a nationwide 'lockdown' by the end of April 2020, which has affected nearly 74% of the total enrolled learners (UNESCO, 2020). Sri Lanka is no exception and most local Universities and HE Institutes are yet to open or function at full capacity due to the prevailing

situation. Students are instructed to stay away from the HE Institutes until a healthy and safe physical environment is established. In most Universities teaching mode of the first academic semester of the year 2020 was abruptly changed from face-to-face to online mode as the only solution available. This forceful transition got underway without possessing proper knowledge on technical and pedagogical aspects related to online teaching and learning, which led to undue stress among the teachers and students. Furthermore, conversion and delivery of teaching modules in online mode, limited infrastructure, lack of a conducive teaching/learning environment and inadequate competency in handling information technology had been formidable challenges during this transformation. In the conventional HE system, students used to follow the programme of study through face-to-face sessions while online learning accounted for only a minor portion of the entire exercise. Hence, in light of the COVID-19 pandemic, students had to undergo a sudden change in mindset by accepting online learning as the only mode of learning available. Level 2 Civil Engineering undergraduates of the General Sir John Kotelawala Defence University (KDU) had to undergo this chaotic situation and hence it was decided to investigate to what extent the online learning has been effective from the students' perspective.

As per Bignoux and Sund (2018), the online learning environment varies significantly from the traditional learning environment with respect to learners' motivation, satisfaction and interaction. Certain studies have revealed that the perception of students related to online learning is affected by factors such as age, gender, prior knowledge on information technology and individual learning styles (Shrestha *et al.*, 2019; Salloum *et al.*, 2019). Bączek *et al.* (2021) investigated the perception of students on online learning in Poland during the COVID-19 pandemic and found that technical issues had been the key challenge for the majority of students. Shetty *et al.* (2020) reported that undergraduates in India had favourable perceptions towards online learning during the COVID-19 pandemic despite experiencing lack of socialization, distraction by social media and technology related issues.

Knowlton (2000) developed a theoretical framework for the online classroom synthesized with student-centered learning. Figure 1 shows the model of the online classroom with the teacher's role in which the course and student interaction is framed by providing resources (web and traditional) and opportunities. However, in order to maintain the dynamics of the online classroom, interaction among students and reaction to students' initiatives need to be established. Raeburn *et al.* (2009) reported that online courses redesigned in agreement with constructive alignment concepts, showed significant increase in student engagement and achievement of learning outcomes.



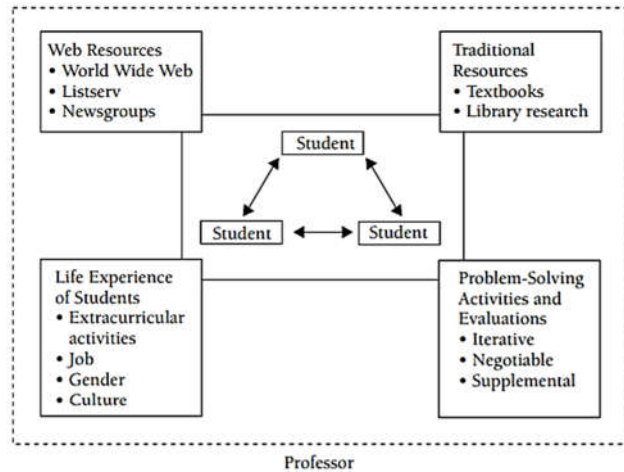


Figure 1. Model of the online classroom (Knowlton, 2000)

## Methodology

Level 2 Civil Engineering undergraduates (n=24) who followed “Engineering Hydrology” module in Semester 3 and “Hydraulic Engineering” module in Semester 4 were selected for this study. Semester 3 has been conducted using both physical and online modes during which the lecturer physically appeared online. However, semester 4 was delivered completely by online mode due to the prevailing COVID–19 pandemic. Students’ perceptions were collected through an online questionnaire survey developed using Google forms. The questionnaire was formulated based on four sections: general information, comparison of face-to-face learning against online learning, delivery of online sessions and assessments. Questions in section 2 were assessed based on a 5-step Likert scale whereas section 3 questions were presented by both dropdown and multiple responses types. In addition to the above, one open-ended question was included in section 4. The distribution of the questionnaire among the students was administered by an instructor and a link to the Google form was made available on the students’ WhatsApp group.

## Results/Discussion

Only twenty (20) students submitted their responses (6 Female & 14 Male) during the given time period. The responses of the section 1 revealed that the majority of students (90%) expressed that they possessed medium level IT skills that needed for online learning while the balance 10% possessed lesser IT skills. Furthermore, only 4 students (20%) had experienced online learning previously. The analysis of questions in section 2 is shown in Table 1. The response was converted into a respective score by considering SD = 1 and SA = 5.

Results of section 3 elaborated students’ perceptions related to the online learning platform and nature of the online learning environment. Although the majority of students (65%) preferred the Zoom platform, only 15% indicated their preference for the KDU Learning Management System (LMS) integrated with any online platform (Zoom, MS Teams etc.). Results revealed that 80% of the students have been able to use the online learning environment effectively. Multiple responses on the nature of the online environment were inquired and the results are depicted in Figure 2.

Table 1. Analysis of questions in section 2

No.	Statement	Distribution of response					Mean score
		SD	D	N	A	SA	
1	Online learning is more <b>effective</b> than face-to-face learning	5 25%	6 30%	7 35%	2 10%	0 0%	2.30
2	Online learning allows more <b>active participation</b>	4 20%	10 50%	5 25%	1 5%	0 0%	2.15
3	Online learning helps to gain more <b>knowledge</b>	2 10%	5 25%	7 35%	5 25%	1 5%	2.90
4	Online learning provides more freedom to <b>clarify issues/questions</b>	2 10%	5 25%	5 25%	7 35%	1 5%	3.00
5	Online learning provides more <b>interaction</b>	4 20%	8 40%	6 30%	2 10%	0 0%	2.30
6	Online learning provides a more <b>flexible learning environment</b>	1 5%	1 5%	2 10%	9 45%	7 35%	4.00
7	Online learning promotes more <b>self-paced learning</b>	2 10%	9 45%	5 25%	1 5%	3 15%	2.70
8	Online learning is prone to more <b>technical/delivery issues</b>	4 20%	4 20%	8 40%	2 10%	2 10%	2.70

Note: SD-Strongly Disagree, D-Disagree, N-Neutral, A-Agree, SA-Strongly Agree

Figure 2 also confirmed that the students have accessed using different methods such as live online lecture, recording, uploaded lecture materials etc.

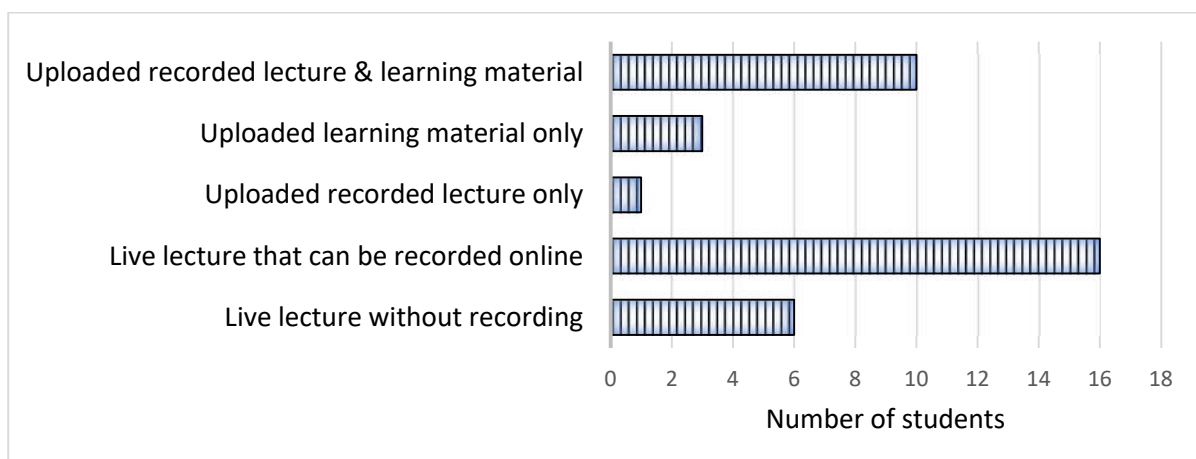


Figure 2. Nature of the online environment

With the forced transition to online learning, initially, there was a limited opportunity for assessment. However, it was noted that except for 2 students, others attended for all online assessments. Quiz (90%) and in-class test (75%) were the preferred types of assessments. Most importantly, nearly 60% of students were in agreement that feedback given to online assessments had been useful. Eight students (see Table 1) indicated that online learning enabled more freedom to clarify issues. Some students further mentioned that the feedback helped to construct their own knowledge and requested to continue with the thread of feedback which may be considered as one of the reflective practices. Responses for the open-ended question corresponded to both positive and negative aspects of online learning and described students' perception on how to improve the same further. Table 2 shows some of the present limitations identified by students and proposals to address them together with suggestions for the improvement of online learning.

Table 2. Limitations and suggestions for improvement relevant to online learning

Limitations (with proposals to address the issues)	Suggestions for improvement
<ol style="list-style-type: none"> <li>1. Network connection issues (For assignments - extension of deadline; For lectures - recorded lecture)</li> <li>2. Feel monotonous (switch on video of both the lecturer and students)</li> <li>3. Duration of a lecture to be reduced (split lectures)</li> </ol>	<ol style="list-style-type: none"> <li>1. Need more interactive sessions for active participation</li> <li>2. Conduct more tutorial classes</li> <li>3. Solving numerical problems in-class</li> <li>4. Quiz after each topic</li> </ol>

It is observed that 60% of the students are of the view that online learning does not provide more interaction (see Table 1) and the same was also highlighted in the suggestions. This confirms the necessity of reinforcing interaction among students with framing performed by the teacher, as explained in the online classroom model developed by Knowlton (2000).

## Conclusion

The lockdown and travel restrictions of the country due to the Covid-19 pandemic transformed the delivery of higher education from face-to-face to online learning abruptly. The study revealed that only 20% of students had experienced online learning prior to this scenario and 20% of students agreed that they had faced serious technical and delivery issues. While 20% of students appreciated self-paced learning, 80% accepted that online learning created a more flexible learning environment. It is recommended that more interaction need to be maintained considering the higher level of students' dissatisfaction on online learning. The findings show that there have been many negative perceptions towards online learning in spite of reporting few positive aspects related to the learning environment and clarification of subject matter. Redesigning online courses with the application of constructive alignment would enhance the effectiveness of the same.

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## **Perceptions on teacher self-regulation to fine-tune teaching tools and teaching philosophy using Bloom's digital taxonomy when transiting to online teaching**

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### **Abstract**

The current Covid-19 pandemic has challenged Higher Education (HE) through enforced conversion of physical classrooms to an online platform, thereby requiring changes to teaching and learning techniques to suit online delivery, compared to Face-to-Face (F2F) classrooms. An effective teaching philosophy (TP) forms the backbone of the teacher's teaching process to make student learning effective. As a result of a teaching development course which I followed and having subsequently updated my HE teaching and learning knowledge, I developed a robust TP to strengthen my teaching. As this sudden change of F2F learning to online mode adversely affects students' active engagement and student-teacher interaction for effective learning, I self-rated myself as 'low' for online teaching new to me. Therefore, I explored, and then used, tools that could allow bringing back student interactivity for online active engagement. As simply applying tools not aligning with pedagogic strategy was insufficient, Bloom's digital taxonomy which stresses the integration of digital tools in Bloom's Revised Taxonomy was used as a ladder approach to move students' thinking skills to higher order level. Tools for student active engagement and student-teacher interaction that can be integrated in online teaching were identified using Bloom's digital taxonomy. A fine-tuned TP with those tools was then applied in my online teaching. Effectiveness was evaluated (1 to 5 Likert scale, with 5 as highest) through student feedback and self-rating. When teaching was changed from F2F to online and with integration of tools such as Breakout Room, Annotation, Chat, etc. into my online teaching, no significant reduction was observed of the '5' excellent scale in student ratings. Average ratings of 75 (n) students were used for the evaluation. My self-ratings improved only slightly at the beginning from 2 (fair) to 3 (good) and later, it improved to 5 (excellent). This study shows how a self-regulated teacher can fine-tune existing TP to sustain an "excellent" rating of teaching quality when transiting to online classrooms, particularly when a robust foundation for teaching effectiveness has previously been put in place.

### **Background**

It is a well-known fact that Covid 19 outbreak has dramatically changed the teaching and learning environment in Higher Education (HE) to a digital platform. Teachers who engaged in Face-to-Face (F2F) classrooms were challenged to adapt to the online teaching in leaps and bounds. However, online teaching has already been in the system in the form of distance learning which has a long history (Stern, n.d.). According to Keengwe and Kidd (2010), online distance education has been changed and improved with technology since 1960. Now it has become the most required educational platform accompanied with learning management system of the educational institutes and already improved more with social networking

elements (Keengwe and Kidd, 2010). There are plenty of studies done under e-learning education that emphasizes the more essential characteristics of a quality online learning environment (Meylani, et al., 2015; Rodríguez, et al., 2014). However, Stern (n.d.) has highlighted the characteristics that both student and teacher should possess for effectiveness at the online platform such as self-motivation, good organizing skills, time management, being familiar with computers and the internet, being resourceful, active engagement with Q&A sessions, and students' proficiency for typing and word processing. With regard to online teaching, one of the popular online platforms, Zoom, plays as leader in integrating some of the above mentioned features to a learning platform (Video Conferencing Systems, n.d.).

Under the current situation, almost all the universities in Sri Lanka became Lanka Education and Research Network (LEARN) members and are being provided the Zoom technology platform for online teaching as a reliable video conferencing system (Video Conferencing Systems, n.d.). However, it is not only applying a feasible system, but also aligning with pedagogic strategy, that will make the current online teaching challenges to be overcome in a successful way through creating efficient and high quality online classes (Rodríguez, et al., 2014).

Moving in that direction, this study used two of the most overarching and effective components in HE instructional pedagogy to fine tune teaching tools as suited to the online teaching at the Zoom supported platform. These were well-defined teaching philosophy (TP) which boosts teacher's teaching quality (Dhanushika, 2018) and Bloom's digital taxonomy which allows integration of digital tools in Bloom's Revised Taxonomy (Churches, 2008).

## **Methodology**

An effective TP that was well suited to F2F classrooms has been reported by Dhanushika (2018). It is basically focused on three popular theories in HE which are Biggs's 3P model, Biggs's three levels of teaching, and X-Y teaching climates. These are outlined below under sections A, B and C. As a fresh online teacher, I experienced that TP (TP F2F) to lack tools for bringing about online students' active engagement and also for improving online student-teacher interaction. Further, since my students in the online class were in their final year, learning process should be developed to make students in achieving their high order thinking skills (HOTS). Therefore, while integrating digital tools to my teaching process, Bloom's digital taxonomy (Churches, 2008) was followed to adjust TP F2F as suited to online classrooms. Forthcoming sections will elaborate how I added tools under the main components of the TP F2F.

### **A. Fitting to the Biggs's 3P model**

At the beginning, I thought that TP F2F would be well fitted to the online classroom. Therefore, significant changes could not be done in the presage stage of the Biggs' 3P model when following my online teaching for that particular class. The lesson learnt from that experience highlighted the fact that the importance of being knowledgeable about not only just technical tools but also on how to match the technical tools with the pre-scheduled teaching strategies. However, I changed my procedure within first three weeks since the lack of students' interest on the online lecture was observed. As it is crucial to proceed with

the students having various capacities in the classroom, a range of teaching tools which can be adapted to the online classroom were examined and applied. Breakout Room, Annotation, Chat, Share Screen, Poll, etc. which are facilitated by Zoom were incorporated to different learning tasks in the online classroom of 75 students. Quick student feedback, obtained time to time through chat and through Moodle guided me on how I should change my teaching process.

#### B. Being Level 3 teacher

According to the concept behind “being level 3 teacher”, students should jump in to the water to learn how to swim. That was the biggest challenge I observed in my online classroom to be achieved. Since the student’s video in the Zoom platform had already been off due to network issues, it was impossible to action the strategy of keeping students’ activities ‘in sight’ in the online classroom. I followed several methods to overcome this issue. I used breakout rooms to get students’ involvement in the group discussions. Further, I allowed students to share their answers to the class by using “share screen” option during Q&A sessions. Students were given permission to annotate on my slides to make their comments and to fill the gaps. Furthermore, “Recap” session, “Review” session, defining a definition, and pointing out mistakes encouraged the students to be active in my online class room.

#### C. Changing teaching climate form X to Y

It is obvious that the online learning platform can give more freedom to students. However, as expected as in Y teaching climate, I should have to ensure that the students are not misusing the freedom and also that they have developed self-control when completing a task in the online classroom without their teacher. Activity named as “switching roles” facilitated me to achieve that task successfully. Students were assigned a particular lesson to study without teacher’s help. Host power was transmitted to the batch representative. Then I left the meeting by allowing students to learn the lesson in their own way. At the end of the time given to them, I joined the class and picked a student randomly and asked to explain the lesson to the whole class. It motivated students to be more responsible towards their self-study without involving in other unnecessary tasks.

Table 1 shows the digital tools used in my online classrooms in order to accomplish different learning activities under the different scenarios of my TP. Further, it included the levels of Blooms taxonomy which can be reached through those learning activities. I had a very limited time to explore the use of digital tools before I started my online lectures since the conversion from F2F to online happened in the system instantly. Therefore, my focus was limited to Zoom features, Google feature for Collaborative documents (Google slide, Google sheet) and open source software for programming, even though, there are lots of digital tools which can be incorporated in online teaching. Effectiveness of the teaching process which was based on the fine-tuned TP has been evaluated through student feedback and self-evaluation.

## **Results**

Seventy-five students were included in my online classroom. Student feedback has been compared with the feedback obtained when these same 75 students were in their F2F class room. Table 2 indicates the summary of the student feedback. Figure 1 shows the self-rating for 14 online lecture sessions. Evaluation was done under three main aspects; students’ active

engagement, student-teacher interaction, and overall satisfaction. Self-evaluation rubric was used to rate each component.

Table 1. Application of Bloom’s Digital Taxonomy

Level of Blooms Taxonomy	Learning activity	Digital Tool
Remembering	<ul style="list-style-type: none"> <li>Recap session using Cue sheet</li> </ul>	Video Conference, Chat, Poll, Virtual Background
Understanding	<ul style="list-style-type: none"> <li>Learning “Definitions”</li> <li>Commenting on the mistakes appear on the slide</li> </ul>	Searching/Googling, Mind Map, Chat, Annotate
Understanding Applying	<ul style="list-style-type: none"> <li>Q&amp;A sessions / timed quiz</li> <li>Think-Pair-Share</li> </ul>	Chat, Poll, Moodle, Breakout Room, Non-Verbal Feedback
Applying	<ul style="list-style-type: none"> <li>Sharing answers/ideas</li> <li>Uploading answers for quizzes</li> </ul>	Share Screen, Chat, Poll, Moodle
Analyzing	<ul style="list-style-type: none"> <li>Data Analyzing</li> </ul>	Spreadsheet, Use of Open Source Software
Evaluating	<ul style="list-style-type: none"> <li>Review on the discussion</li> <li>Review on the new technique</li> <li>Review on new lesson</li> </ul>	Video Conferencing, Short Presentation, Share Screen, Breakout Room (Chat Room)
Creating	<ul style="list-style-type: none"> <li>Find a project idea and design a flow chart.</li> </ul>	Flow Chart, Mind Map, Share Screen, Breakout Room

Table 2. Summary of Student Feedback at end of course teaching

Evaluation aspects	F2F Class Room	Online Class Room
Introduction to objectives and content of the course	4.80	4.82
Quality of the course materials provided	4.72	4.80
Quality of teaching	4.93	4.87
Conduct of lecture as scheduled in the time table,	4.80	4.79
Level of interactions with the students	4.95	4.89
Overall rating	4.91	4.89

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

Table 1 is evidence of my improvement which I achieved after adhering to modified TP. No significant reduction was observed in student ratings at ‘excellent’ scale for my online teaching. According to figure 1, my self-rating on very first day was a “signal” for me to take



an immediate action regarding my online teaching process.

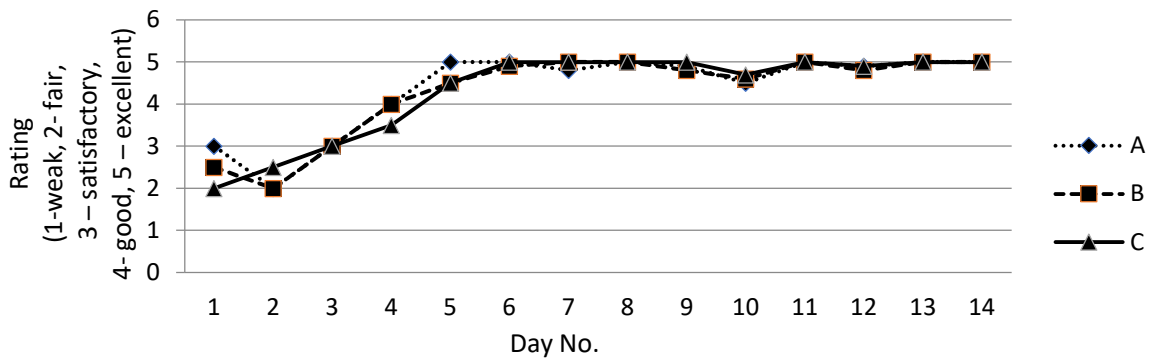


Figure 1. Teacher's self rating for online teaching (A: satisfaction on student active engagement, B: satisfaction on student-teacher interaction, C: overall satisfaction)

Thereafter, my self-ratings improved slightly from 1<sup>st</sup> day to 5<sup>th</sup> day since I was trying to fix the 'holes' in my teaching process during that period. After rescheduling my teaching process as I indicated in the above sections, I was able to proceed in the correct track to do my online teaching effectively and effectiveness was rated at '5' on the rating scale, as shown in the above chart.

## Discussion and Conclusion

Findings in this study have involved the perceptions on teacher self-regulation to fine-tune the TP F2F by incorporating new teaching tools as suited to online teaching. Basically, ideas presented in this paper encourage the teachers to investigate how to integrate new tools with teaching strategies to achieve active learning in the classroom and encourage the institution to conduct an awareness session for the students about new technology.

As a whole, good TP can be considered as an everlasting exercise. Therefore, a self-regulated teacher should have a 'dynamic' TP which can be modified with respect to the inevitable changes happening in Higher Education. With that aspiration, this study shows how a teacher can fine-tune the existing TP to sustain student active involvement and interaction when adapting to online classrooms, given that existing TP was one that had been well defined on a robust foundation. However, a teacher will not be able to achieve the effectiveness and high quality in teaching with respect to this kind of sudden transformation of pedagogy in HE single-handed. It should be a collaborative work that is supported by a good initial training course and institution's facilitation of new technology.

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## Perceptions held by selected Allied Health Sciences academics on Student Centered Learning and barriers to their adoption

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### Abstract

Despite presence of novel learning techniques, many academics are still using traditional teaching methods and how many adopt Student centered learning (SCL) approaches is not reported. Thus, the aim of the study was to investigate the academics perception on SCL. A mini workshop of SCL was conducted for the academics of a Health Sciences Faculty of a Sri Lankan university. Using a questionnaire comprised of open-ended questions (given before and after the workshop), data on type of teaching methods used and types of teaching methods they wished to incorporate into their teaching introduced by the workshop were collected. The participants (n=20) included senior and junior academics in areas of Nursing (n= 6), Pharmacy (n=6), and Medical Laboratory Science (n=8) degree level programmes. Among them only 15% (n=3) had received a training on SCL. However, majority (70%) were using SCL related activities (group discussions, question and answer sessions, student presentations, active reading and practical demonstrations). Minority (n=3) were of the belief that traditional teacher centered learning is more beneficial to students. After introducing different SCL approaches during the workshop, 100% of the participants said they will adopt SCL activities including active reading, active writing, role plays, small group discussions, jigsaw method, question and answer sessions, posters in their teaching. Majority (95%) of participants believed that SCL will facilitate deep insights and will make an interactive learning environment for the learners. However, 35% of participants believed that SCL adds additional work to the teacher. Limitation of the space of the classroom, time and difficulty to teach theoretical aspects and concepts were the identified limitations for SCL adoption by the participants. All participants believed that having similar workshops to share the novel teaching methods used by peers will be beneficial to uplift the quality of teaching.

Even though academics believe SCL is more effective, few academics (30%) still practice teacher centered approaches. Introducing more workshops on SCL and teaching methods will be beneficial to improve quality teaching.

### Background

Previous studies have confirmed that appropriate teaching-learning style enhances students' academic performance (Komarraju *et al*, 2011). Preliminary studies conducted on

student centered learning (SCL) approaches have also proven that students have explicit positive views on active engagement in the classroom. Many students have expressed that giving time to prepare for special sub-topics and presenting their findings to peers helped improve their presentation skills, self-confidence and deep understanding of the concepts. Thus, students have indicated active reading, small group discussions and Jigsaw methods as effective teaching methods (Akalanka, 2019). SCL helps the student in active engagement of the learning process and also helps in deep and lifelong learning.

However, regardless of novel learning techniques, many academics prefer traditional teaching methods over SCL methods. The facilitators need an open mind to accept the challenges associated with transformations of teaching practices. During the transformation of teaching practices to student centered manner, facilitators also need to add some extra effort to preplan the lesson to confirm that all the intended learning outcomes are covered from the used SCL techniques/ activities.

Research reveals that teachers' beliefs about teacher and student roles are still very much teacher centred. Various reasons are identified for the same, including system-wide barriers hindering the adoption of SCL and teacher trainings offered. The findings draw attention to an urgent need for alternative teacher training programmes that would focus on changing teachers' traditional beliefs enabling them to put theory into practice and adopt student-centred roles (Aliusta and Bekir, 2017).

Staff Development programmes in majority of Universities in Sri Lanka have now incorporated many programmes on novel teaching trends to enhance the quality of teaching of academics. As the authors of the study obtained the training of trainers from University of Leicester, United Kingdom, on SCL, it was anticipated to disseminate the knowledge gained with the academics among the same Faculty by organising a workshop. Since how many academics adopt SCL approaches is not reported, the aim of the study was to investigate the academics perception on SCL before the workshop.

## **Methodology**

A mini workshop on SCL was conducted for the academics of a Health Sciences Faculty of a Sri Lankan university. Using a questionnaire comprised of open ended questions (given before and after the workshop), data on type of teaching methods used and types of teaching methods they wished to incorporate into their teaching introduced by the workshop were collected. Each participant was given a time to explain the teaching methods they use, while they were asked to recall the best teachers they had met in life and to recall their teaching strategies. It was discussed why those teaching strategies were effective. Within the workshop, participants were actively engaging in pair work, mini group discussions, Jigsaw method and poster presentations.

## Results

The participants (n=20) included senior and junior academics in areas of Nursing (n= 6), Pharmacy (n=6), and Medical Laboratory Science (n=8) degree programs. Among them only 15% (n=3) had received a training on SCL. This was due to majority of participants, being senior academics, not having attended the staff development programmes, or being newly recruited academics, they have not had a chance to follow staff development training at the time the workshop was conducted. However, majority (70%) were using SCL related activities (group discussions, question and answer sessions, student presentations, active reading and practical demonstrations).

Minority (n=3) were of the belief that traditional teacher centered learning is more beneficial to students. They believed that a lecture is 'content full', as lecturer prepares it with considerable effort to cover all the intended learning outcomes.

When participants recalled the qualities of the best teachers they had met in life, the identified teaching techniques/ qualities were: being simple when explaining, telling stories or bringing up examples/jokes that made them remember the theories behind, ethical behavior and kindheartedness and also the friendly nature they developed within the classroom.

After introducing different SCL approaches during the workshop, 100% of the participants said they will adopt SCL activities including active reading, active writing, role plays, small group discussions, jigsaw method, question and answer sessions, posters, in their teaching, while stating that they were not feeling that they were in the learning process as the workshop was filled with interactions. Majority (95%) of the participants believed that SCL will facilitate deep insights and will make an interactive learning environment for their learners. However, 35% of the participants believed that SCL added additional work to the teacher. Limitation of the space of the classroom, time and difficulty to teach theoretical aspects and concepts were the identified limitations for SCL adoption by the participants. All participants believed that having similar workshops to share the novel teaching methods used by peers will be beneficial to uplift the quality of teaching.

## Conclusion

Even though academics believe SCL is more effective, in the sampled group, few academics (30%) practiced teacher centered approaches. Introducing more workshops on SCL and teaching methods will be beneficial to improve quality teaching.

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## Students' Perception of and Performance in In-class Debates: A Case Study

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### Abstract

Debating, one of the oldest and most effective teaching tools, particularly in achieving attitude and mind-set focused learning objectives, is not widely used under science/technology related teaching environments. Since, contemporary undergraduate curricular emphasises on achieving attitudinal and mind-set related learning objectives, issues of using in-class debates (ICD) as a teaching tool need to be investigated. The objective of this paper is to discuss the students' perception of and performance in ICDs. The study was conducted among undergraduates following the BSc in Green Technology programme at University of Ruhuna. Nine ICDs on topics related to the content of the course "Sustainable Livestock Production Systems" were conducted among 95 undergraduates of two consecutive years (n=95). After the completion of ICD series of each cohort, a structured type questionnaire was administered to collect students' perception of ICDs. Students' attendance was significantly higher for debates (97%) than regular lectures (77%). Students rated ICDs effective or highly effective as an interactive teaching tool (87%) and for improving attitudes (93%), soft skills (93%) and knowledge (91%). The suggested optimum number of a team and the length of a talk were 5 members and 4 minutes, respectively. Many (98%) suggested that ICDs be evaluated either individually (54%) or as teams (41%). However, 34% suggested not to evaluate oratory skills. Students' marks for ICDs ( $76.4 \pm 0.7\%$ ) were significantly higher than the continuous evaluation marks ( $67 \pm 1\%$ ) obtained by the same students for seven randomly selected courses that they followed. The students' major concerns about ICDs include, ICDs do not prepare students for semester-end examination, disadvantageous for students with poor communication skills and may create conflicts among students. Nevertheless, all respondents recommended ICDs for the course in question while another 79% and 71% recommended it for some or all other courses, respectively. Students perceived ICDs as an effective and interactive tool for improving knowledge, attitudes and soft skills. Students concerns about ICDs highlight that care should be taken in setting conditions for debates and assessment.

### Background

Learning experience becomes more effective when teaching methods are diverse, interactive and student-centered. However, in-class-lectures are the most popular and sometimes the sole mode of delivery amongst many university teachers. In contrast, active, inquiry and group interaction-based teaching approaches such as discussions, seminars, presentations and debates are considered more student-centered (Ebert-May et al., 1997). Though there could be some disadvantages such as making students develop biasness towards dualism and

confrontational environment amongst the students (Tumposky, 2004), numerous studies have shown that in-class debates (ICD) are an effective teaching method. Apart from developing content, debates improve students' argumentation and oral communication skills as well. Debating develops higher-order psychological functions such as analysis, synthesis and evaluation, and critical thinking skills. Schroeder and Ebert (1983) suggested that debates help to minimize instructor bias on students making their own opinion on some controversial issues. Meanwhile, Berdine (1987) opined that debates improve soft skills and make students open-minded.

Despite the range of advantages, due mainly to the lack of interest and/or awareness, ICD could be identified as an under-utilized teaching method. Debates have often been used in humanities, social sciences, psychology and marketing teaching environments. Some course content areas of science and technology related degree programs, for example ethical aspects, controversial subject areas and areas where attitude adjustments are required could best be delivered using ICDs. However, such attempts, particularly under Asian social/cultural conditions are found to be limited. This paper first discusses our experience on the introduction of ICDs to deliver a part of the course content as the continuous evaluation components of a science/technology related degree program. Subsequently, the paper analyses the students' perception of in-class debates in improving knowledge, attitude and soft skills and as an interactive teaching method and compares students' performance in debates with that of other evaluation components.

## **Methodology**

The study was done with two consecutive batches (2014 and 2015) of second year-second semester students (n=95), following the course, "Sustainable Livestock Production Systems" of BSc (Green Technology) degree program, at the Faculty of Agriculture, University of Ruhuna, Sri Lanka. Debates were introduced as the continuous evaluation component of the two-credit course of which the main delivery modes were conventional in-class lectures and field visits, solely conducted by the first author of this study. At the beginning of the lecture program, students were briefed about the objectives, outline and the evaluation procedures of the debates. Students were assigned into teams each comprising of either 5 (2014 batch) or 4 (2015 batch) students. Appropriate debating topics were selected by the teacher. Proposing and opposing team of each topic was decided by tossing. Students were given six weeks for the preparation and encouraged to meet the lecturer during this period. Captains were given two talks of five minutes while each of the other team members was given four minutes for a talk. Each talk was individually evaluated for its content (70%) and oratory skills (30%). Aspects considered under content were the quality of facts supporting the topic (40%), depth of analysis (40%) and counter arguments (20%) while clarity of the talk (25%), vocal emphasis (25%), eye contact (25%) and the acquisition and the maintenance of the attention of the audience (25%) were considered under oratory skills. Evaluation of the debate was done by the first author. Students were allowed to use PowerPoint presentations to support the talks and that was the case in all the talks. A team member operated the PowerPoint presentation while another member was delivering his or her talk.



Debates were considered as the continuous assessment component of the course. Students were informed that in the final examination paper, one of the six questions of which four have to be answered would be based on the debates. Two weeks after the end of the ICD series and before the final examination, students rated the effectiveness of ICD in a five point Likert scale, in developing good attitudes (3 statements), improving knowledge (4 statements), soft skills (4 statements ) and as an interactive teaching method (4 statements). Furthermore, students' views on advantages and disadvantages of and optimum conditions for ICD were also gathered using a structured-type questionnaire. The teacher who conducted the course did not involve in this part of the study. Students' marks in debates, a set of other randomly selected continuous evaluation components (seminar, group reports, individual presentations, lab reports) conducted by other lecturers and in final examination of the course "Sustainable Livestock Production Systems" were statistically analysed. Data were statistically analysed using MINITAB (Ver 16). Where applicable, Chi square analysis was done to determine the effects of gender and batch on the students responses obtained as categorical variables. Students' marks and attendance (%) were analysed using simple t test.

## Results

The sample was of ethnically diverse (Sinhala 87%, Tamil 7% and Muslim 6%) and comprised mainly (61%) of females. Students' university entry level performance as reflected in Z score was not significantly different between 2014 ( $1.01 \pm 0.23$ ) and 2015 ( $1.07 \pm 0.29$ ) batches.

Students' attendance was significantly higher for debates (97%) than regular lectures (77%). An overwhelming majority of students rated ICD either effective or highly effective in improving attitudes, knowledge and soft-skills (Table 1). Though many students rated ICD either very effective or effective as an interactive teaching method as well, the percentage of students those who held that view was lower than those for other three aspects; improving attitude, knowledge and soft skills. Furthermore, 3% of the students were of the opinion that ICD were ineffective or very ineffective as an interactive teaching tool while another 10% held a "neutral" view. Meanwhile, no students rated ICD as ineffective or very ineffective in improving soft skills or attitude. Effectiveness of ICD in improving subject knowledge and information searching skills and developing more balanced idea about the topics discussed was also clearly stated by the students.

Disadvantages of ICD as identified by the students are given in Table 2. Though students identified debating effectively improves the knowledge, 56% of them stated a better knowledge could have been gained had the teacher covered the topics that dealt in ICDS. Some students (43%) suggested that ICDS are disadvantageous for those who are not good in communications, may create unnecessary conflicts and do not prepare them well for semester-end examination. Interestingly, some (48%) said that losing the debate made them unhappy and while 37% suggested that ICDS created conflicts among students.

According to the students' opinion, the optimum number of a team and the length of a talk were 5 members and 4 minutes, respectively. Many (98%) suggested ICD be evaluated either individually (54%) or as teams (41%), allocating 65% and 35% of marks for contents and oratory skills, respectively. Interestingly, 34% suggested not to evaluate oratory skills. Though

on average a team had met 4 times to discuss and met the teacher 1.7 times (and at most 6 times) during the preparatory period, only 54% had rehearsed the debate.

Students' marks for ICD (76.4±0.7%) were significantly higher than the other methods of continuous evaluation marks (67±1%) obtained by the same students for seven randomly selected courses that they followed. Interestingly, all recommended ICD for the course in question while another 79% and 71% recommended it for some or all other courses, respectively.

Table 1. Undergraduates' perception on the in-class debates (n=95)

Attribute	Very effective/ Effective (%)	Neutral (%)	Very ineffective/ ineffective (%)
Developing good attitudes	95.0	4.7	0.0
Improving soft skills	93.2	6.8	0.0
Improving knowledge	91.0	8.0	1.0
As an interactive teaching tool	87.0	10.0	3.0

Table 2. Perceived disadvantages regarding the debates as a continuous assessment component

Perception	Agree/Strongly Agree (%)	Neutral (%)	Disagree/Strongly disagree (%)
I got a biased idea about the topic I debated	6.0	0.0	94.0
It was difficult to when one gets a topic against his/her personal opinion	8.0	31.0	61.0
Debates create unnecessary conflicts	37.0	14.0	49.0
Debates are disadvantageous for students having poor communication skills	43.0	13.0	44.0
A better knowledge could have gained if the same topics were covered by the lecturer	56.0	22.0	22.0
Losing the debate made me feel unhappy	48.0	38.0	14.0

## Discussion and Conclusion

Better student attendance for ICD than regular lectures coupled with better marks received for the question that was based on ICD topics indicate the effectiveness of ICD as an effective teaching method. Osborne (2005) has also reported an improved attendance for debates than for formal lectures. Apart from students' genuine enthusiasm, incorporation of debates into evaluation process (both continuous evaluation process and final examination) might also

have contributed to increase their active engagement in debate series. Furthermore, ICD seems to have stimulated peer learning as evidenced by preparatory discussions that took place among students. Chickering and Zelda (1987) emphasized an active interaction between students and teachers as one of the seven fundamental elements of undergraduate education. Lack of student-teacher interaction has been identified as one of the key deficiencies of higher education (Lehmann and Söllner, 2014). It was experienced that the number of times students met the teacher in preparation of ICDs was much higher than those in connection with conventional lectures. Results of this study strongly suggest the effectiveness of debates as a mean of promoting student-teacher interaction as well.

Chandrakumara (2014) pointed out that soft skills are one of the four factors that determine the employability of graduates in Sri Lanka. Students also perceived ICDs are effective in improving knowledge, attitude and soft skills. Soft-skills that could be improved by ICDs include communication skills, English oral communication skills, information searching skills, and critical thinking skills and working in teams.

Goodwin (2003) also reported that students resist debate if they think (1) debate promotes hostility, (2) disadvantageous for demographic groups preferring non-competitive communication styles, or (3) and is too unfamiliar. However, introduction of ICD as a component of the continuous assessment component and giving a question in the semester-end examination ensured the participation of all student, eliminating any resistance or reluctance, if any. Dundes (2001) have reported that students, who did not typically speak in class, were more likely to share their opinions during a debate. A similar situation was observed in this study as well. Contrary to students' negative perception; it was observed that poor communication skills had little or no negative effect on students' performance in debates. In fact, Combs and Bourne (1994) reported statistically significant improvement in oral communication skills due to ICD participation.

Students' negative feeling about the losing the debates and suggestion that ICD create unnecessary conflicts, indicate students personal-level involvement with this activity. However, this observation contradicts with many students' disagreement on the statements "I got a biased idea about the topic I debated "and "it was difficult to when one get a topic against his/her personal opinion". Nonetheless, it suggested that during the preparatory period the teacher should advise the students not to consider debate topics personally and ICD a competitive activity.

In conclusion, students' perception of and performance in ICDs suggest its effectiveness as an effective learning tool for improving knowledge, attitudes and soft skills. Students concerns about ICDs highlight that care should be taken in setting conditions for debates and assessment.

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## **Enhancing students' skills via online mode: Use of mind mapping for paving the way towards active learning**

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### **Abstract**

A 'Mind map' is a visual diagram which can be used to organize information on one's mind. It helps students to actively participate in learning while developing their skills. Due to the COVID 19 pandemic, courses are delivered via online and therefore, students find it hard to organize their lessons. Moreover, the majority of students find it difficult to maintain continuous attention on the lesson. During last year's paper marking, it was highlighted that many students were unable to apply sampling methods and due to that they lost marks. In this context, it was explored whether mind mapping can be used as a method to help students to develop skills while ensuring students' attention on the lesson. The activity had been combined with the Structure of the Observed Learning Outcome (SOLO) taxonomy and was conducted with 33 students in the third year, following the course unit 'Social Research Method' offered in the Demography Special Degree Programme. Initially the lesson on sampling methods was explained to the students and subsequently, they were instructed to draw a mind map based on sampling methods and to present the same. Outcome of this activity was assessed using peer feedback, student feedback and through observations by the teacher. It was observed that 82% of the students had strongly agreed that mind mapping had helped them to grasp lessons better, while all of them had indicated that it enhanced creativity and analytical skills. Furthermore, 86%, 64%, 86% and 88% of students had stated that it improved their time management skills, critical thinking, presentation skills and organization skills respectively. Findings suggested that mind mapping can be successfully implemented in order to enhance skills of students and to maintain continuous attention during virtual lessons.

### **Background**

Mind mapping is considered as one of the information processing strategies in which information is permanently stored in memory by sophisticated processing. Furthermore, mind mapping is a learning technique which uses a non-linear approach that encourages the learner to think and explore concepts using visual-spatial relationships (Arulselvi, 2017). It is a visual diagram used to record and organize information in a way that the brain finds captivating and easy to process. Therefore, the mind map can be identified as a tool for organizing information. In this context, Fadillah (2019) mentioned that the use of mind mapping gives three advantages, namely: (i) encouraging the students to think and organize their ideas before writing something; (ii) facilitating the students to develop their ideas and (iii) helping the students to remember ideas better. On the other hand, by developing the mind map, students can enhance not only the organizational skills but also their critical thinking and in-depth thinking. Pudelko et al. (2012) revealed that one of the key teaching and learning strategies that has recently emerged in higher education as a means to support

student critical thinking, is the nonlinear learning technique of mind mapping. Furthermore, Savich (2009) found that the focus on critical and independent thinking was an effective way for teachers to maximize the engagement of students in the class. On the other hand, Mona & Khalick (2008) stated that the maps have a positive impact on student achievement since they can enhance their deep thinking 'out of the box'. Buzan (1993) mentioned that by using keywords in a mind map, a student stimulates his or her mind to dig deeper and to see greater detail on thoughts that were previously vague. This in turn enhances students' thinking capacity. Al-Jarf (2009) investigated the impact of using mind mapping software on students' acquisition of English writing skills. Furthermore, Goodnough and Woods (2002) discovered that by engaging in mind mapping, students can actively participate in the lecture and perceive mind mapping as a fun, interesting and motivating approach to learning. On account of that, students have always been passionate about using key words in Mind maps rather than phrases or a collection of words (Buzan, 1993). Moreover, Howe (1970) revealed that mind maps help students to maintain continuous attention on the lecture.

Due to the COVID 19 pandemic, lectures are delivered via online for over one year and therefore, students find it hard to organize their lessons. This was exemplified by the section on 'method of sampling' in the course unit 'Social Research Method' offered in the Demography Special Degree Programme, during last year's paper marking. It was highlighted that many students were unable to apply several types of sampling methods. Most students seemed to be confused on random sampling methods and non- random sampling methods frequently and as a result they lost marks at the examination. Moreover, the majority of students found it difficult to maintain continuous attention on the lesson during online delivery and at the end of the session more than half of the students had left the lecture. In this context, the aim of this study is to examine whether mind mapping can be used as a strategy in order to create an active learning environment that helps to develop students' skills via online, while ensuring students' attention on the lesson.

## **Methodology**

SOLO taxonomy was combined to this activity with the intention to gradually uplift the students to the pre-structural stage and then to the extended abstract stage. The activity was implemented for third year 33 students in the Demography Special Degree Programme under the course unit 'Social Research Method'. Initially, during the three hours lecture session, the lesson on Sampling Methods was explained for 1-hour and 40 minutes and then students were invited to draw a mind map ( on paper or digitally) on random and non-random sampling methods within 15 minutes. Finally, 5 students were selected randomly and invited to present their mind maps by sharing the screen. Outcomes of this activity were assessed by sending google sheet for the peers and students via mails and peer feedback forms, student feedback forms and through teacher's observation.

## **Results**

Based on the presentation on mind map and student feedback, it was observed that students had shown a positive perception on the activity and they could actively participate in the

lecture. Also, 82% of students strongly agreed that the mind map activity helped them to understand the lecture. Furthermore, 68% of students mentioned that this activity was a good opportunity for them to participate actively. In the lecture and 100 percent of all students strongly agreed that they were able to enhance their creativity. Some sample creations are shown in this Figure 1 illustrates few mind maps presented by the students.

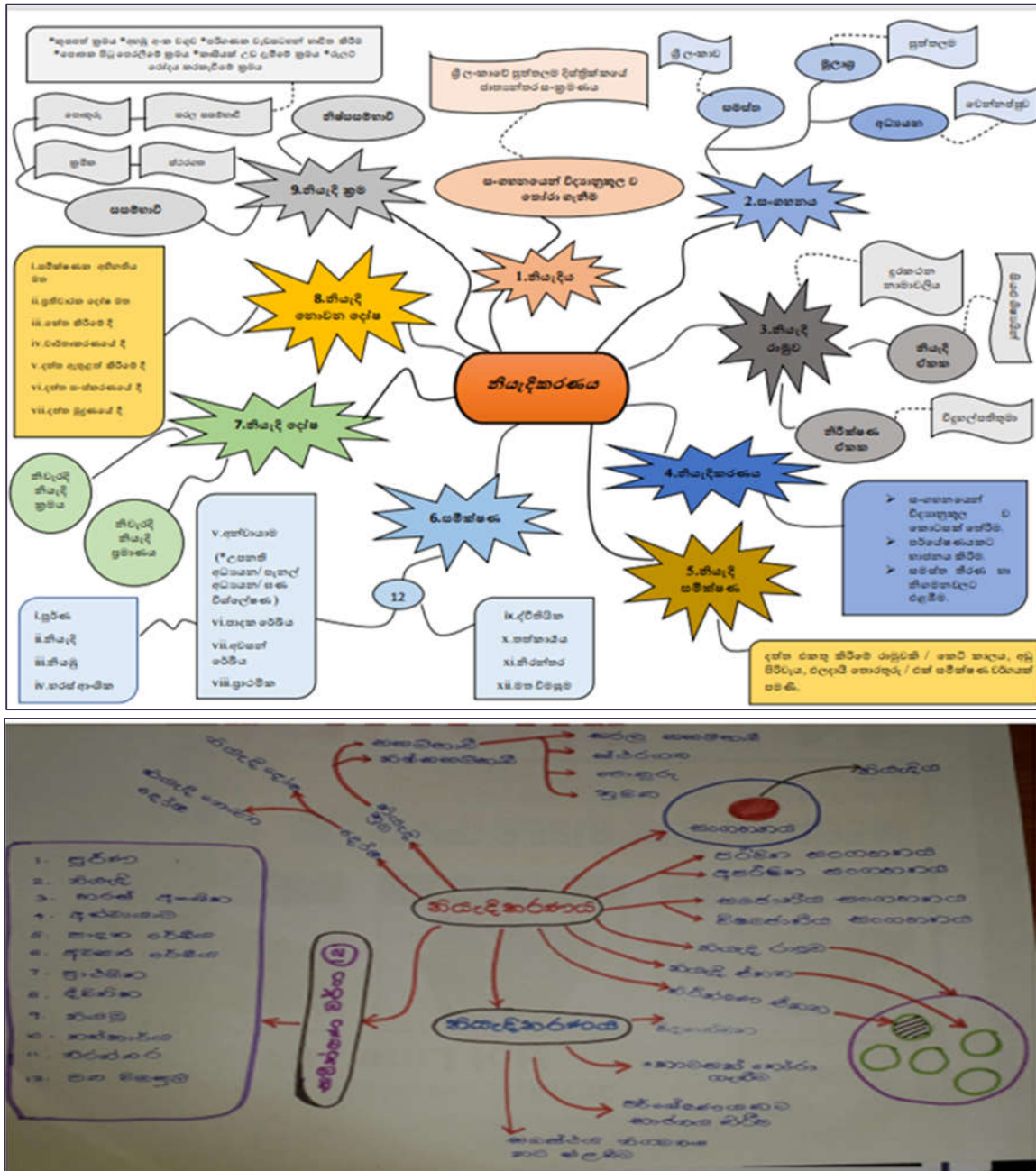


Figure 1. Mind maps presented by the students

It was noted that during the aforesaid task, some students faced difficulties due to lack of communication devices, issues related to network connection caused by lack of infrastructure facilities and financial difficulties. In order to overcome this, they were encouraged to draw a

mind map on a paper and share it using their mobile phones. It was evident that it was possible to observe how this activity supported the students to engage in the lesson ,internalized it and how well they enjoyed the activity. Furthermore, Boyson (2009) asserted that by using mind mapping, students can recall the subject matter. Mento et al. (1999) detected that a mind map method helps to understand the content without taking notes. The aforesaid could be confirmed on completion of the task. Moreover, students mentioned that by engaging in this activity they were able to enhance their presentation skills, time management skills, organization skills, critical thinking etc., as shown in Table 1.

Table 1. Student perception on their skills enhancement through Mind-Mapping activity

Key areas of skill enhancement	Student feedback (%)				
	Strongly disagree	Disagree	Somewhat agree	Agree	Strongly agree
At the end, activities with Mind mapping activity:					
helped to understand the today's lecture	-	-	17.9	28.6	53.6
helped to actively participate in the lesson	-	-	32.2	32.1	35.7
promoted creativity when designing the Mind map	-	-		50.0	50.0
enhanced the knowledge	-	-	14.3	64.3	35.7
enhanced time management skills	-	-	14.0	50.3	35.7
helped to keep my continuous attention on the lesson	-	-		50.0	50.0
stimulated my critical thinking	-	-	36.0	28.3	35.7
developed my presentation skills	-	-	14.3	53.6	32.1
enhanced my analytical skills	-	-		64.3	35.7
developed my organizational skills	-	-	6.0	23.7	64.3

As per Table 1, 86%, 64%, 86% and 88% of students stated that mind mapping had improved their time management skills, critical thinking, presentation skills and organization skills respectively. Peer comments suggested that this activity helped students to become well organized in learning sampling methods. According to the lecturer's reflection, the activity, helped students to grasp the content of the lesson. It was observed that the students gradually enhanced their organizational skills as the definitions, their importance, types and application of different sampling methods as they were discussed through the mind map. Students used various symbols and colours to highlight different themes and key factors respectively in an organized manner with confidence.



## Discussion and Conclusion

It is evident that students' engagement by engaging in the mind mapping activity seems to develop their organizational skills in particular. Furthermore, students' responses provide evidence that mind map activity encouraged them to find new ways of summarizing what they have learnt. The results further suggested that the mind map had stimulated students to actively and continuously participate in the lecture until the end of the session. It had also helped them to improve creativity, time management, and presentation skills. In conclusion, reveals mind mapping can be strategy for enhancing skills through active learning helps students' ideas/concept effectively while ensuring continuous attention during virtual lessons.

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## **An effort to bridge university-industry gap in Human Resource Management (HRM) graduates: students' perception**

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### **Abstract**

University-industry collaborations are encouraged globally. Despite industry-based continuous assessments, industry-focused subjects, and industrial training element of the Bachelor of Business Administration (BBA) Degree, the theory-practice knowledge gap is severely experienced by management graduates who in turn encounter issues in employability and adaptability to organisational requirements. It further affects the recognition for the degree in the industry. In order to overcome this dilemma, a programme called 'I-achieve', was implemented in 2019 by HRM Department, Faculty of Management and Finance (FMF), University of Colombo for undergraduates specialising in HR. The aim of 'I-achieve' was to expose undergraduates to real-world HR practices coupled with academic work to enable them to enter the labour force by knowing what the HR profession entails. 'I-achieve' was conducted throughout Semester VII (15 weeks) via four components. 1) I-pops – Visits to four different manufacturing and service settings, 2) Interactive sessions – Six sessions on practical aspects of subject areas, personality and attitude development, 3) Everyday English - English language sessions four days a week (2 hours each) to develop English language skills, and 4) Mentoring and shadowing – Five sessions where students were assigned to an organisational Head of HR – who mentored and allowed students to shadow him/her to observe how organisations implemented HR real-time. To evaluate success, we used written feedback from 18 students and oral feedback from all 27 participants, industry collaborators and reflections from programme coordinators. The analysis revealed that students perceived that 'I-achieve' helped to bridge HR practices-theory gap which enabled them to perform well at internships in Semester VIII. Student feedback further indicated that they obtained a realistic understanding of the HR profession, adapted more quickly to work and behaviour in organisations, and their use of the English language at work improved. Approximately 80% of the participants of 'I-achieve' were offered permanent employment by organisations where they completed their internships. Approximately 85% of these participants attributed this opportunity to the personal development provided by 'I-achieve'. Industry collaborators and coordinators indicated a considerable improvement in students' adaptability and knowledge on industry practices succeeding 'I-achieve'.

### **Background**

Unemployment and underemployment among graduates from State Universities has been a significant social, economic and political issue in Sri Lanka for over three decades (Ariyawansa, 2013; Chandrasiri, 2008; Singam, 2017). On the one hand, this has been a result of factors

such as Sri Lanka's low economic growth performance that failed to create dynamic employment opportunities for graduates as well as fresh graduates waiting for job opportunities in the public sector which is identified as the 'protected segment' of the labour market because of job security, higher benefits, lower effort and more prestige rather than taking up available opportunities in the private sector (Chandrasiri, 2008). On the other hand, research has revealed that a mismatch between the mix of skills and attitudes demanded by employers and offered by graduates (Ariyawansa, 2013; Chandrasiri, 2008; Fernando & Cohen, 2017) and lack of coordination and cooperation between Universities and the industry (Singam, 2017) has led to unemployment, underemployment or significant time gaps between graduating and finding employment among Sri Lanka's State University graduates. In response, though Sri Lankan State Universities implement curriculum reforms to introduce market demand-oriented courses and subjects, staff development, career guidance services, and quality assurance and accreditations (Chandrasiri, 2008), the issue prevails with unemployment rates accounting for 32.2 per cent of State University graduates in general and 27.7 per cent of management graduates in specific by the year 2018 (Gunaratne et al., 2018). In contribution to bridge the skill and attitude demand-supply gap and university-industry gap, we at the Department of HRM, FMF, University of Colombo introduced a programme named 'I-achieve' to undergraduates specialising in HRM. 'I-achieve' included four components, namely, 1) I-pops (industry visits) to manufacturing and service settings 2) Interactive sessions with experts in subjects, personality and attitude development 3) Everyday English sessions and 4) Mentoring and shadowing sessions with senior HR managers.

'I-achieve' was launched and conducted to attain three primary objectives. Firstly, industry visits (I-pops), interactive sessions and mentoring and shadowing sessions were designed to enable undergraduates to practise experiential learning which refers to the process of learning through transforming experiences, learning by doing or learning by engaging the learner in the phenomena being learnt (Domask, 2007; Kolb, 1984). Secondly, all components of 'I-achieve' focused on bridging the gap between employer-expected skills and attitudes and those offered by graduates (Ariyawansa, 2013; Chandrasiri, 2008; Fernando & Cohen, 2017). All four components of this programme intended to develop 'employability soft skills' of undergraduates including English language and communication skills (mainly through English Everyday sessions), personality development, manners, ethics, maintaining external appearance (through interactive sessions), leadership skills, and other work-related skills such as discipline, time management and organising skills (through mentoring and shadowing sessions) which have been highlighted as lacking in undergraduates from State Universities in prior studies (Ariyawansa, 2013; Fernando & Cohen, 2017; Singam, 2017). Thirdly, 'I-achieve' intended to expose undergraduates to real-world workplaces by improving cooperation and coordination between university and industry which has been described in the literature as a vital factor to generate graduate employment (Collet, et al., 2015; Singam, 2017).

## **Methodology**

Collet et al (2015) reveal that the skills mismatch between expectations of employers and supply from graduates is partly due to employers not properly communicating their skill requirements to the higher education sector. To overcome this communication gap, 'I-

achieve' was launched in July 2019 with the participation of HR professionals from the industry, fellow academics and undergraduates specialising in HRM. This launch was conducted, firstly, to discuss with and obtain feedback from industry personnel on the components of 'I-achieve' and to identify if these would develop skills and attitudes they expected from graduates. Secondly, to obtain support from the industry as three of the four components of 'I-achieve' were solely industry-based and finally, to create a database of industry personnel who were willing to provide industry visits, deliver interactive sessions, mentor students and allow them to shadow them in organisations. Thereafter, 'I-achieve' was implemented with undergraduates in Semester VII during 15 weeks allocated for the semester. Table 01 provides a summary of 'I-achieve' components and session objectives.

Table 1. Components, sessions and objectives of 'I-achieve'

<b>Component</b>	<b>Session</b>	<b>Objectives</b>
I-pops (04)	Apparel manufacturer	Observe and learn how HRM is implemented in the apparel manufacturing sector
	Battery manufacturer	Observe and learn how HRM is implemented in a relatively high-risk manufacturing organisation
	Labour Department	Identify the role of the Labour Department
	Labour Tribunals, Employers Federation of Ceylon and Human Rights Commission	Identify and describe the role of these public sector institutes in HRM Obtain first-hand experience on how these organisations function
Interactive Sessions (06)	Attitude development and motivation	Introduce the importance of right attitudes at work Discuss expectations of employers for HR profession Motivate participants to develop required attitudes
	Business etiquette and personal grooming	Discuss the importance of business etiquette Explain personal grooming Describe how to maintain a pleasant outer appearance at work
	Importance of soft skills development for employment	Describe the importance of soft skills and strong communication capabilities in employment Explain the importance of developing English language skills to find suitable employment
	Forming a successful career in HR	Define tips to become a successful HR professional Discuss skills, knowledge and attitudes necessary to become a successful HR professional
	Role of HRM in the banking sector	Discuss how HR is implemented in a leading bank in Sri Lanka. Define changes in HR overtime in the banking sector
	Table etiquette	Engage participants in a session on table manners
Mentoring and shadowing sessions (05)	Sessions were conducted for 3-4 student groups allocated to each mentor	Provide tips on career development Help make career choices. Provide general life lessons when required. Allow participants to be in mentor's work premises to observe day-to-day HRM tasks
Everyday English (04 per week)	Conducted with the	Develop English speaking, writing and reading skills Improve public speaking and presentation skills

	assistance from DELT1	
Awarding Certificates	A certificate was awarded to participants who maintained 80% attendance for sessions under each component at a certificate-awarding ceremony	

Source: Authors' creation based on data from 'I-achieve'

To evaluate success of 'I-achieve', we obtained and analysed written feedback from 18 students and oral feedback from all participants. Feedback was obtained after the compulsory 6-month industry-based internship, a part requirement of the BBA Degree programme. We specifically inquired the time gap participants experienced between internship and permanent employment, and to what extent 'I-achieve' would have reached its objectives of assisting undergraduates to understand real-world HR practices, and enabling them to enter the labour force by knowing what HR profession entails. Further, we gathered oral feedback from mentors and programme coordinators to triangulate data provided by participants, to obtain the 'industry-perspective' and ideas for future development of 'I-achieve'.

### Results

Analysis of participants' feedback revealed how 'I-achieve' influenced them in four ways. Firstly, participants perceived that observations and experiences gained from I-pops, shadowing and interactive sessions conducted by HR professionals exposed them to the real-time working environment which enabled them to bridge the gap between what they have been learning in classroom and actual HR practices. Additionally, during shadowing sessions, the participants were allocated to conduct certain HR activities such as documentation with organisations' HR teams which enabled them to learn by doing. Some students had to orally present to the company management their learning from mentoring and shadowing which improved their confidence and communication skills. Secondly, participants perceived that Everyday English sessions improved their speaking, reading and comprehending abilities and boost their self-confidence to face interviews conducted in English, public speaking and conducting presentations which were vital during their internships and permanent employment. Thirdly, participants perceived that the opportunity they received to be mentored by senior HR professionals enabled them to learn the requirements to become successful HR professionals. Finally, participants perceived that completing 'I-achieve' in Semester VII enabled them to successfully find and complete their internships in Semester VIII by easily adapting to organisational contexts, comprehending the relationship between theory and practice and demonstrating communication, team building and leadership capabilities that added to their personality. Additionally, the analysis revealed that approximately 80% of 'I-achieve' participants were offered permanent employment by organisations where they completed their internships in. One student was offered a permanent job at the organisation she participated as a mentee under 'I-achieve'. This resulted in zero or minimal time between internships and permanent employment for many of the students. Approximately 85% of these participants attributed this to the personal development provided by 'I-achieve'. Feedback from industry collaborators and course coordinators confirmed and provided further evidence to the aspects participants revealed.

### Discussion and conclusion

'I-achieve' was the first comprehensive programme implemented in the Faculty of

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Management and Finance, University of Colombo to bridge the university-industry gap and theory-practice gap. Confirming prior findings (Domask, 2007; Riebe, et al., 2013), this study revealed that the combination of industry visits, interactive, mentoring and shadowing sessions allowed students to engage in active learning by experiencing and exposing themselves to the 'real-world' of the workplace which enabled them to understand the ground-truth of what they have been reading about in books, learning in classrooms and hearing from experts. Additionally, most participants experiencing zero or minimal waiting time between internships and permanent employment confirmed the importance of strong university-industry collaborations (Singam, 2017) to not only exchange views on how to identify and fill skill gaps experienced by graduates from State Universities (Collet et al., 2015) but also to provide graduates from State Universities better access to employment opportunities in private sector organisations. Also, exposing undergraduates from State Universities to private sector organisational cultures and contexts would enable to change their belief that public sector jobs are better (Chandrasiri, 2008). "I-achieve" could benefit disciplines other than Management by redesigning components to suit their subjects and employer requirements. We aim to further develop "I-achieve" by redesigning and adding components based on changing industry needs and feedback from parties involved. Carrying out a tracer study to assess the success of the programme may be considered in future.

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## **Improvement of student interactivity using a “3 minutes for reflection” student activity in small-class undergraduate online teaching**

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### **Abstract**

The objective of this research was to enhance the effective learning engagement of undergraduates during online teaching through improved interaction, because it was experienced that student interaction during previous online lectures was minimal, with only two or three students actively interacting as the lectures were conducted through screens only. Selecting a fourth year course (Aviation Quality Management) having a small group of 16 students and using the reflection stages of Kolb’s Learning Cycle to reflect on the effectiveness after introducing the new learning practice, 3 minutes were given for students to reflect on what they learnt within the online lecture. Next, they were asked to type “the key points what they learnt on that day” and send to the lecturer as a private message in the “Zoom Chat”. Therefore, it avoids copying from another. This practice was done without prior notification. It helped the lecturer to identify “learning standards” of the students related to that day’s online lesson. The lecturer traced students who did not submit answers to the given questions on “Zoom chat”. After 3 minutes, students were asked to post their answers in the “Zoom chat” to visualize to everyone. This practice of “3 minutes for reflection” was repeated each week throughout the semester. It was observed /experienced that on the first day of this online course, 16 students attended and 14 of them posted chat responses. Gradually, by the online lecture in the 2<sup>nd</sup> week, all 16 students actively took part in the online lectures and posted answers due to adapting to practice this new “3 minutes for reflection” method. Based on the student feedback form that was used, all 16 students indicated that the “3 minutes for reflection” practice helped them engage in effective interacting practice during online lectures.

### **Purpose/Background**

The Covid-19 pandemic has significantly challenged all students and lecturers in higher education worldwide (Rapanta et al, 2020). Therefore, we all had to adapt to online teaching and learning from face-to-face lecture room teaching. In this context of teaching and learning through screens, it is vital to identify the students learning levels as the lecturers cannot observe students all the time unlike in physical lecturing (Vonderwell, 2014). It is important to maintain an interaction between learners and lecturers specially in online teaching. Therefore, it is important to reconstruct student and lecturer roles in online teaching and learning activities. In the process of implementing online teaching and learning it is required to introduce certain pedagogically valid contact knowledge strategies (Rapanta et al, 2020). The “minute paper” is a technique that involves asking learners to provide answers for one or

two questions, prepared and based on the content covered in the lecture and given before the lecture time ends. To use the minute paper, the lecturer typically stops the lecture for few minutes before the end of the timeslot and the lecturer asks the students to answer one or two questions based on students grasp of the content. For example, the questions of “What was the most important concept you learnt in the lecture today?” or it could be a question of “What concepts were less clear in today’s lecture?” (Whittard, 2015). The minute paper could be considered as a two-way flow of information which has the potential to encourage engagement and the lecturer’s reflection of their own teaching and learning practices (Whittard, 2015), which is far more important in online teaching and learning. The objective of this research was to enhance the effective learning practice of undergraduates during online teaching through improved interaction, because it was experienced that student interaction during the online lecture was minimal as the lectures were taught through screens.

## **Methodology**

The study group consisted of 16 students in a course module named “Aviation Quality Management”, which the undergraduates of the Department of Aeronautical Engineering followed at their final year at the university. During the lecture, 3 minutes were given for students to reflect on what they learnt within the online lecture. On some occasions, students were asked to read the presentation slide and share their own ideas through “Zoom chat” in 2 stages in the online lecture. A question was posted in the “Zoom chat” and in the first stage, the students were asked to reply privately to the lecturer, to avoid copying from each other. The question was created based on what they were expected to have learnt during the online lecture. The questions were similar to “What are the key points what they learnt today?” or “Study the shown presentation slide and share your thoughts in the Zoom chat”. At the end of 3 minutes, at the second stage, students were asked to post their answers in the “Zoom chat” as a common message to visualize to everyone. This practice of “3 minutes for reflection” was repeated each week throughout the semester.

## **Results**

Figure 1 illustrates the layout of “3 minutes reflection” conducted in “Zoom chat” during the lecture of Aviation Quality Management lecture. It was traced that there were students who did not submit answers to the given questions in “Zoom chat”. After 3 minutes, students were asked to post their answers in the “Zoom chat” to visualize to everyone. However, it was identified that on the very first day of introducing this practice, there were 2 students who did not post answers after the 3 minutes time duration, which maybe the case with students who had less interaction with all of us during the lecture. There were only 14 responses from a total of 16 students.



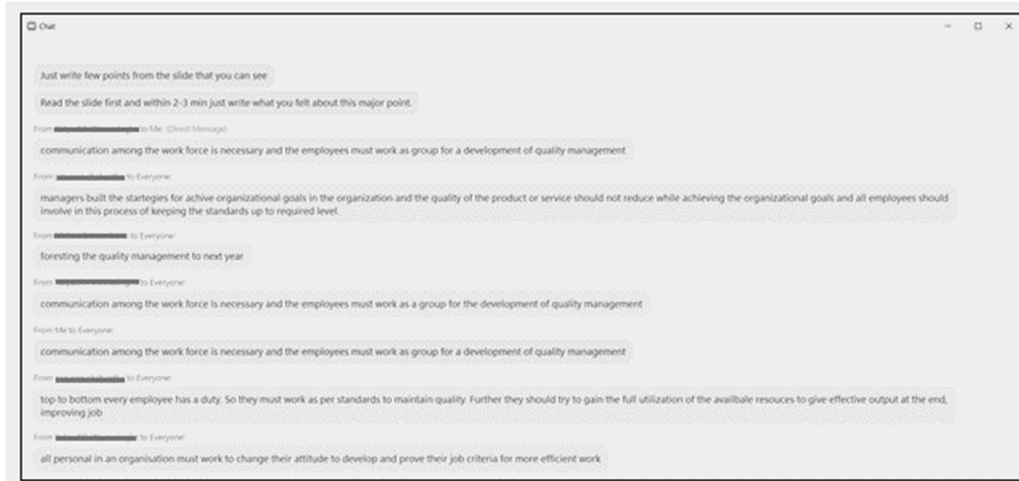


Figure 1: Layout of responses from “3 minutes reflection” conducted in “Zoom chat” during the lecture of Aviation Quality Management lecture

However, it was identified that after repeating this practice of 3 minutes reflection in the following weeks, gradually the students had become adapted to the 3 minutes reflection practice, which was evident with the students having better interaction in the online lecture.

## Discussion and Conclusion

It was observed and experienced that all students actively took part in the online lectures after practicing “3 minutes for reflection” method during the online lectures. This reflection method was found as a remedy that enhanced the interaction between lecturers and students during online teaching.

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## Facilitating student learning with meaningful priming

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### Abstract

Relating a meaningful priming when teaching, by establishing a relationship between known and new information appears to improve cognitive functioning. Most importantly, the prior knowledge or the meaningful priming provides a structure into which the new information can be integrated. As facilitators, if we can provide a meaningful priming activity to a new teaching topic, students' learning curves can be positively stimulated. The way in which our students learning can be stimulated with this has not been investigated adequately. This study explored whether students could be stimulated towards effective learning of a new concept using a meaningful priming. In this study, which was conducted with 60 students following the semester 3 Textile Technology course, a meaningful priming was considered as a situation relevant to the new concept to be taught and familiar to all students in the class. The formulated priming was uploaded to a Moodle discussion forum one week before the lecture. A question, related directly to the given situation was asked and a justification to their answer was required. A feedback was given for answers before the lecture. Priming was repeated with the continuation of the same lecture. At the end, a question was given to check students' achievement of the relevant learning outcome. Previous year students also answered the same question; however, priming activity was not there. Students enthusiastically participated in priming discussions. Their justifications showed their assumptions about given situations. Last year, 47 % correct answers were given to the same question without priming. This year, 96% of students answered correctly to the same. The results indicated that a meaningful priming could stimulate students to actively engage in the lecture gaining deeper knowledge. Further, the facilitator gains a better idea about the students' cognition level of the topic-to-be-taught, which can be used to formulate the lecture more effectively.

### Background

When learning can be related to meaningful experiences and contexts of one's daily life, learner's mind can be successfully engaged in learning, because they feel connected and important. Learning is clearly intensified when it is connected to something meaningful. There are many studies which show that meaningful contextual support for learning is associated with greater interest and better motivation to accept challenges in the learning process, which result in intensified cognitive performance (Borke, 1975; Anderson, 1990; Lave & Wenger, 1991; Bransford *et al.*, 1999).

These researchers recommend simple methods to create meaningful contexts that can be used to support learners. Some of the methods recommended in different setups of learning are, providing a review relevant to the area of study, allowing to read chapter summaries prior to reading a chapter and asking questions relevant to the area of study prior to teaching and embedding examples while teaching (Anderson, 1990). Borke (1975) suggested that meaningful context advances learning to great heights that cannot be achieved in an abstract

context. She further explained that a personally relevant context is always the best.

When a learning activity is immediately preceded by a pre-action phase it is called priming (Mathews & Mitrovic, 2009). In this phase, if a meaningful and familiar context is presented to the learner as a priming, learners can use those meaningful underlying structures in the priming session to anchor their new knowledge to. Further, a meaningful priming can enhance knowledge assimilation and processing because with this, the learning journey can be started with a motivation to fill gaps in the learner's existing knowledge.

The way in which our students learning can be stimulated with priming has not been investigated adequately. The dislocated connection in my teaching and student achievements of learning outcomes that I saw in previous years, made me realize that this is mainly due to the facilitator not understanding students' mindset properly, which leads to a lack in facilitating them towards achieving expected outcome.

Therefore, this study explores whether learners could be facilitated towards deeper subject learning by introducing a meaningful priming phase before starting the lectures.

## **Method**

The study was conducted in the year 2020 with 60 students of semester 3 following the module Product Development in Textile and Clothing Technology course. In the year 2020, during the Covid19 lock down period, classes were conducted online. The above module was also conducted through Moodle platform and relevant notes were prepared as PowerPoint presentations and uploaded into Moodle. Compared to the same class being conducted physically, doing it virtually was a challenge at that time, for which thorough thinking and a different preparation was needed.

Therefore, to facilitate learning, the first topic of the module, a meaningful priming phase was planned with a reflection phase at the end. A situation relevant to the new concept to be taught and familiar to all students was identified at first. Then, one week before uploading the lecture to Moodle, the priming activity was uploaded to a discussion forum with a simple explanation of the purpose of the activity as shown in Figure 1 below. Priming was repeated with continuation of sub topics of the same lecture in subsequent weeks.

In the first priming activity, a situation student can easily connect to was presented and a question was asked for which they had to answer by selecting items in the given situation. Whichever the item they select, a justification for that was required. A feedback was given for answers before the lecture in the same discussion forum. Later, the questions asked in subsequent priming activities were connected to the situation presented at first priming activity.

Finally, when the topic was presented fully through Moodle for three days in three consecutive weeks, an essay type question was uploaded to Moodle as an assignment to check students' achievement of the relevant learning outcome. After covering the same topic, the same question was asked from the students in the previous year too. However, a priming activity was not conducted last year.

### Topic 1 - Priming 1 (27/04/20)



Product Development Process - Before the Lec 1

Hidden from students

Dear Daruwana,

Before I start loading you with information on this topic, lets see your understanding about the product development process of the garment industry.

Then it will be easy for me to facilitate you along this topic.

We are going to start a discussion on a problem that you can face as an entrepreneur. I have named it as 'case 1'. you can answer only once and no one will see your answers till the end.

Figure 1. Appearance of priming activity 1 in Moodle page

## Results

All students participated in all three priming activities. Two students always answered these questions through the Whatsapp application as they did not have computers. Students' enthusiasm was encouraging although they were remotely attending the classes during this lockdown period.

It was noticed that in all priming activities, answers and given justifications were different to each other. Answers and justifications given by three students were close to the expected outcome. One representation taken from first Moodle discussion forum is shown below in Figure 2.

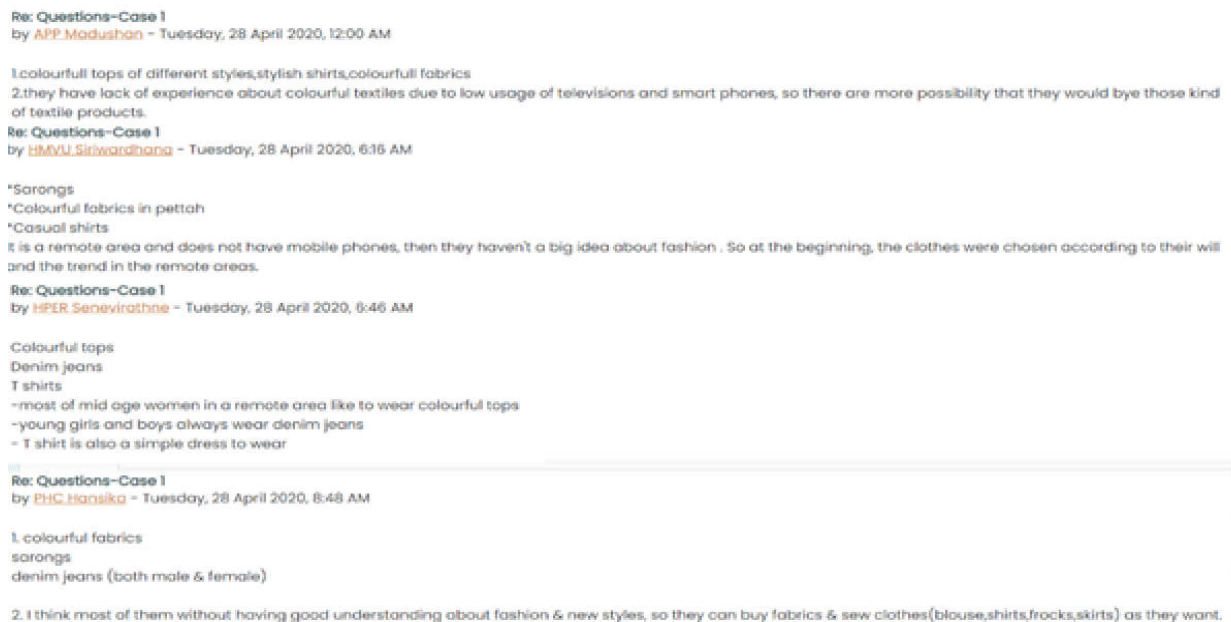


Figure 2. Representation of the answers to priming activity 1

The question asked after finishing the topic to check the achievement of relevant learning outcome was answered by all students. There were 96 % correct answers. Answers given by the remaining two students were partially correct.

Last year, out of 61 students in the class, only 47 % correct answers were given to the same question without priming.

## Discussion and Conclusion

As soon as the first priming activity was over, it was understood that, giving a prompt feedback for 60 different answers/justifications before doing the proper lecture would have been overwhelming if the priming activities were not properly planned. Since the priming activities were planned considering the total focus of the topic, while giving the feedback, maximum effort was put into reiterate students' thinking towards the area that was to be covered in each lecture.

Students' justifications to their answers in the priming activity 1 clearly showed that they have made lot of assumptions based on their familiarity of the given situation. Therefore, my feedback was constructively composed to make them see that they were assuming things without proper questioning and analyzing of the situation. Later, it was noticed that the answers/justifications students gave for questions asked in the subsequent priming activities were much focused and were less based on assumptions.

More importantly, for the first time, 60 different viewpoints before starting the lecture alarmed me. This made me to review and restructure each of my presentations to suit learning capacities of many in the class with special attention to the difficulties students are facing in the lockdown period.

Although, the question asked after finishing the topic was correctly answered by 96% of the students, which was comparatively higher than the last year result, the teaching learning environments were totally different. However, if we consider the virtual-class, in which students had to understand the key ideas of a lecture remotely and in an isolated situation, it was possible that the priming activity was responsible for getting a higher number of correct answers for the question asked at the end of the lecture. To test this premise a repeat study will be conducted in the current year too, with a further planned reflection phase.

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## **The role of fieldwork in enhancing research design self-developmental capability in Secondary School students compared with exposure limited to classroom work**

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### **Abstract**

Content in humanities is changing at present making subject matter more interdisciplinary. Secondary school education in international schools has become more comprehensive and competitive to better prepare their students to transit to, and to follow, international tertiary education more effectively. Decreasing resources (teachers included), cost and time have driven subjects such as Geography to become confined to classroom learning with a lack of experiential learning through activities such as fieldwork. Reducing fieldwork activities in this subject can make students less practical as well as confine students' explorative nature making them passive, less motivated learners. This study uses Kolb's (1984) learning cycle as a tool to observe performance in designing a research study comparing two learning experiences using 18/19-year-old Advanced Level students. Fifteen (15) students were exposed to each learning experience made up of fieldwork techniques and classroom lectures, and tasked to undertake researching into two topics which were: Success of Coastal Management (CZM) and Issues related to Urbanization (UP). Students were taken to Galle as part of fieldwork in CZM whereas for the UP task, they were only exposed to classroom lectures and related activities. As the assessment for both topics, students were asked to submit an individual report. The teaching method effectiveness was evaluated through feedback forms as well as marks attained on the submitted reports. Research design reports based on fieldwork learning experiences scored a higher average mark of 78.6 ( $\pm 3.7$ ) compared to the classroom-based average mark of 61.8 ( $\pm 8.1$ ). Stronger students excelled in areas in which they were self-motivated through their personal interests, while average students had improved from literature surveys that led to their reports. Feedback showed that all students had a very positive attitude towards the fieldwork not merely as an outdoor fun activity but a learning experience through independent learning. As fieldwork experiences seem to result in better student performances, education authorities should seriously explore making field visits mandatory to enhance learning experiences and skills of secondary school students, along with collecting more data on similar studies with larger student samples.

### **Background**

At present the education system in the world is moving towards STEM (Science, Technology, Engineering, Mathematics), tending to push disciplines in Art, Humanities and human sciences out of the education system (Reiter, 2017). The need for humanities in our classrooms is important to bring in the balance and perspective in life, which we sadly lack in today's society. In such a state, it is imperative that educational reforms would be focused on interdisciplinary nature of education. Geography as a subject of humanities, has evolved

over a long time. Perhaps more importance was given in the age of travellers when cartographers were making maps and securing a territory was a priority. Geography as a subject has a new meaning since the age of map making. Geography can be explained as a study of place, space, and the environment, and of people and others in relation to those (IAGI, 2021) while another can explain it as a study of the relationships between place, space and time on human scales. Geography has oscillated between offering deterministic, positivist, structuralist, humanistic and, more recently, affective accounts of human encounters with nature (Daniels, DeLyser, Entrikin, & Richardson, 2013). Whatever the definition, it is clear that the subject has a direct relationship with humans and nature; hence the interrelationship should be maintained at all times.

Teaching Geography in secondary schools requires skills and preparation which need to be on par with the syllabi, resources and the time frame. As per teachings of Coe, Aloisi, Higgins and Major (2014), there are six guidelines in achieving the fullest potential of the students. The very best teaching would be the combination of all components at different levels for a long period of time but the following two components stand out from the rest.

- 1) Knowledge - a solid base of knowledge would be one of the key factors in delivering the ideas as well as recognizing how students may likely make any misconceptions, and hence to be proactive about it.
- 2) Quality of instruction - proper assessment and evaluation of knowledge and have a positive review would be a good practice to make sure that students embed their skills more confidently. (Coe, Aloisi, Higgins, & Major, 2014)

Therefore, when teaching Geography as a subject it is imperative to combine the explorative nature where a teacher becomes a facilitator in learning. To achieve this objective, it is important to incorporate fieldwork in Geography lessons.

#### Importance of field work in Geography

Fieldwork is a staple feature of a formal curriculum in humanities and social studies education in schools as well as tertiary educational institutes (Chang & Ooi, 2008). Content in humanities is changing at present making subject matter more interdisciplinary, hence the usage of fieldwork in Geography as a subject need to be on par with the present-day changes. Field work allows and enhances student thinking capacity while improving cognitive abilities and affecting learning amongst students, while classroom achievability is far less or concentrated in comparison (Nundy, 1999). Furthermore, fieldwork gives the student the real feeling of exploratory research as many skills are developed through actual field work such as enquiry and observational skills, data collection, data analysis as well as problem-solving skills along with ICT skills, Therefore, in many curricula it is suggested that secondary students are encouraged to take part in an enquiry based Geographical field research.

#### The problem

At present, Secondary school education in international schools has become more comprehensive and competitive to better prepare their students to transit to, and to follow, international tertiary education more effectively. Since STEM education is attracting greater preference among students, the humanities try to incorporate as many branches as possible from many study disciplines - eg. Economic Geography, Political Geography, Cost benefit analysis, Bio geography etc.

For most Geography teachers, field work is a vital component as a teaching tool as well as a personal achievement tool. In fact, most teachers are encouraged to complement teaching with field work sessions, when designing the schemes of work as well as when designing and revising the national curriculum. Decreasing resources (teachers included), cost and time have driven subjects such as Geography to become confined to classroom learning with a lack of experiential learning through activities such as fieldwork. Reducing fieldwork activities in this subject can make students less practical as well as confine students' explorative nature making them passive, less motivated learners. Therefore, the objective of this study was to compare the success of learning as well as self-development in students when exposed to fieldwork and when exposed to in-class environment, given a task of conducting research activities.

## **Methodology**

This study uses Kolb's (1984) learning cycle as a tool to observe performance in designing a research study to compare two learning experiences using 18/19-year-old Advanced Level students. A purposive sample of fifteen (15) students were exposed to two learning experiences that comprised of fieldwork techniques and classroom lectures, with the task of researching into two topics given to them. These topics were: Success of Coastal Management (CZM) and Issues related to Urbanization (UP). As fieldwork for the CZM task, students were taken to Galle, whereas for the UP task, they experienced only classroom lectures and use of internet facilities. Both research work was advocated according to the inductive method where students are allowed to be more open minded and exploratory in nature. The CZM research was carried out initially before the UP research. In the initial phase the students began with exploring the area, recording specific observation and data. Thereafter, data analysis was carried out to understand the patterns and the formulation of hypothesis that students initiated. The research ended with the development of general conclusions, submitting a final report based on the research. However, in the UP-research, exploration and observation and data collection was carried out in the classroom using secondary data such as GIS maps, blogs and websites where as CZM research was based on Primary data collected from the fieldwork.

As the assessment component for both topics, students were asked to submit an individual report based on the individual hypothesis they proposed and the success of their research findings. Both reports were marked using the same criteria. Furthermore, to evaluate the effectiveness of the two teaching-learning methods and related experiences, feedback forms were used to identify student preference as well as how much they gained and to identify which areas need to be improved in teaching. Overall to help analyse the success of the lesson and the teaching technique, both marks attained by students as well as reviews of the feedback forms were used.

## **Results and discussion**

Research design reports based on fieldwork learning experiences scored a higher average mark of 78.6 ( $\pm$  3.7) compared to classroom-based average mark of 61.8 ( $\pm$  8.1). Stronger students excelled in both activities, through self-motivation and personal interests while



average students had attained marks through literature surveys that helped them in completing their reports. Comparing the marks attained in both activities, it is clear that students have shown a higher mark attainment in fieldwork related activities than at the classroom-based activity. It was evident that the high achieving students had done well in both assessments yet the weaker students were far behind in the UP research compared to the CZM research. Some students showed tremendous amount of organising skills as well as people skills such as negotiations and interviewing skills.

Most of the weaker students were quite active in the fieldwork research where they were compelled to use their quick-thinking abilities and 'street smartness' in interviewing and observing respondents. In this context, it was evident that most of the high achievers were a bit reluctant in talking to respondents during the field visit in Galle. Consequently, the weaker students were far more active than the academically stronger students during the fieldwork.

The research that was carried out, with only the class work, showed skills of search and identifying, mostly on extracting information from secondary sources. Some students shared their findings with other students yet the activity became more of an individual project even though the activity was assigned as a group work. Weak students did not show much enthusiasm nor any new skills apart from copying down information contained in secondary sources. The reports lacked depth and was more or less the same among all students, which greatly lacked uniqueness that showed up in the CZM reports. The assessments marks clearly showed a discrepancy and a gap in attainment between the weak and high achieving students.

Teacher feedback results showed that all students had a very positive attitude towards the fieldwork not merely as an outdoor fun activity but a learning experience through independent learning. Feedback on classroom activity was satisfactory where only 40% of the students mentioned it as 'good'. Furthermore, in their comments, many had mentioned that UP research was mostly based on improving their understanding of the subject matter, yet other skills such as interaction and problem-solving skills were at a very low level of attainment. It was also mentioned that weaker students were not given much opportunity to show their skills based on multiple intelligence and that they could have designed a better route to inquiry.

## **Conclusion**

The two teaching-learning activities carried out for the Secondary school students have shown clear differences in the outcomes. When Field work activity was carried out, the students have shown a distinctive higher achievement. The pathway or route to inquiry was clearly identifiable to students when they were engaged through the field activity, as depicted by the marks achieved, whereas the class room research was not as effective, as shown by the low marks as well as the larger gap that was generated between the weak and strong student attainments.

It is also important to note that fieldwork using primary data is far more successful to bring about 'student engagement' and 'interdisciplinary thinking' than secondary data-based research, which reflects on enhanced learning attainable via Kolb's model (1984) of experiential learning. This was so, even though all students had to use more skills in Primary

data collection as they were challenged through language barriers, time planning/management, negotiations and ICT skills far more than in the secondary data-based activity. Although both activities develop 'understanding' on how to conduct research, yet fieldwork seemed to be the favorite of every student. Apart from subject matter, student interaction, negotiation, empathy and problem-solving skills were highlighted in the fieldwork activity which made some students more confident and independent in their work after the field work activity and can therefore be commended as the general way in which 'holistic education' should proceed. Based on their teacher feedback forms, it was felt that students gained much more than the subject knowledge in the fieldwork activity than in the classroom activity. It is also important to realise that multiple intelligences of students were stimulated at different levels during the fieldwork.

In conclusion, fieldwork experiences seem to result in better student performances, interest as well as holistic education. Education authorities should seriously consider making field visits mandatory to enhance learning experiences and skills of students. This should not be confined to just Geography as a subject but to other subjects as well. Inquiry skills need to be cultivated from primary education level and this seems possible by making it mandatory for students to conduct at least one field work from any of the subjects they prefer so as to enhance their learning skills and making environment a part of their study than a 'fact' in a text book. Furthermore, it should be mandatory that teachers be trained to be explorative in teaching and letting students develop and enhance multiple intelligences through fieldwork activities, irrespective of subjects they teach. In doing so, we as educators can be satisfied with the contribution as facilitators in supporting the development of an interdisciplinary, empathetic independent citizen in the country.

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## **Teacher & Student perceptions on presentation-based assessment for improving 4C's of learning in students**

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### **Abstract**

The objective of this study was to foster 4C's of learning through presentation-based assessments that involved 57 engineering students. As the lack of student interaction was observed, it was decided to assign group work to nurture interaction among them while practising 4C's approach. The students were given a task to make a presentation based on a particular area in the curriculum assigned by the lecturer. They were required to present the slides prepared by themselves, as it could improve their own creativity. Further, the students were given the opportunity to raise questions from the presenters with an intention to improve their communication skills. The students were encouraged to ask questions by awarding additional marks, as raising questions by their own could help to improve their critical thinking ability and on the other hand, answering a questions also required critical thinking aspect to some extent. As this was a group task, the students were required to collaborate with each other, which helped to empower their collaborative skills. The feedback forms were given to the students at the end of the module where all the students (100%) stated that presentation-based assessment method helped them to improve their thinking capability towards new areas in the subject matter which they had not thought before. In addition, they mentioned that group presentations made them more comfortable rather than individual presentations, which also showed improved communication and collaborative aspects that they had experienced during the activity. There were 3 students who created videos on their own other than slides which also showed use of their creativity skills. Based on the feedback obtained from the students and also through the self-observation of the lecturer, it could be stated that presentation-based assessment method could improve 4C's skills of learning.

### **Background**

There are 4 skills which are recommended to be mastered by students as part of their 21<sup>st</sup> century learning (Rusdin and Ali, 2019), namely, communication, collaboration, critical thinking and creativity (4Cs). These skills should be in the learning process to facilitate an effective high quality learning which could fulfil the needs of 21<sup>st</sup> century education. Fostering 4Cs skills in higher education improves quality learning environments which are required to produce graduates with the skills needed to be successful as future citizens and leaders (Rusdin and Ali, 2019). There are many pedagogical strategies that the teachers can employ to induce 4Cs in the teaching and learning process (Goldberg, 2012). However, it was reported (Rusdin and Ali, 2019) that students are unable to integrate 4Cs skills in their learning process as the teachers fail to foster 4Cs skills. There are student-centered teaching and learning strategies such as discussions, problem/project-based learning, think-pair share, jigsaw and mix-pair-share (Arends, 2015) which are known to improve communication and collaboration

skills of students (Nganga, 2019).

I observed that students lacked these skills and were reluctant to ask questions specifically when there were more number of students. Such reluctance worsened where the students were 'multi-cultured'. The objective of this study was to address these concerns by fostering 4C's of learning through the use of presentation-based assessments.

## **Methodology**

In the presentation-based assessment that was used in this study, the 57 students of the class were grouped (3-5 per group) and requested to prepare a presentation on the subject area assigned to them by the lecturer, while avoiding selecting the same topics among the groups. An analytic rubric (Table 1) related to the assessment criteria were provided in advance in order to make clear these assessment criteria. All presenters were required to present the slides which were prepared by them to ensure that every student in the group contributed to prepare slides in the presentation.

At the time of assessment, students in the audience were given the opportunity to ask questions from the presenters and obtain 2 marks for each question asked. This was announced just before the presentations started on the presentation day, to avoid presenters giving pre-created questions to the audience during their own presentations.

Each group had a 20 minute presentation time, followed by 10 minutes for audience questions. At the end of each presentation, the lecturer provided feedback to each group. The analytic rubric (Table 1), that had been distributed to students in advance, was used to assess the presentations. It was developed based on 4Cs concept.

Feedback forms were given to students at the end of the module to evaluate student perceptions, to verify whether these students welcome this intervention or not. It was a qualitative feedback, having verbally informed them that feedback was to evaluate how they felt on this presentation-based assessment. Feedback forms contained space for students to write any general comments.

## **Results**

On analysing the submitted feedback forms, 100 % students welcomed this intervention stating that it had encouraged them to actively listen to their peer's presentations to raise questions at the end of the presentations. Further, they commented that because they have to present the slides that they prepared, each student in the group had to get involved with the preparation of the slides. They mentioned that they had to communicate several times while preparing the presentation to make sure everyone's slides aligned with the given objective. Students also stated that presentation-based assessment method helped them to improve their thinking capability towards new areas in subject matter that they had not thought of before. In addition, they mentioned that group presentations made them more comfortable rather than individual presentations.

Table 1. 4Cs based analytic rubric used to assess the presentations

Criteria	Marks	Below Expectation	Need Improvement	Satisfactory	Very good	Exceptional
		0 - 29	30 - 49	50 – 69	70 – 79	80 – 100
<b>Creativity (idea generation)</b> Create new ideas and worthwhile ideas		Does not attempt to develop new and valuable ideas	Attempt to develop new and valuable ideas	Develop new and valuable idea using existing knowledge and resources	Develops new and valuable ideas using both existing and new knowledge as well as existing and new resource	Consistently develops new and valuable ideas using both existing and new knowledge, as well as existing and new resources
<b>Critical thinking (Synthesize idea)</b> Effectively synthesizes and makes connections between information and arguments		Does not attempt to understand the connection between information and arguments	Attempt to understand the connection between information and arguments	Is able to understand there is a connection between information and arguments but is not able to determine what they are on their own	Is able to understand and make the connections between information and arguments	Is able to apply the connections between information and arguments in order to support a perspective
<b>Communication (Multiple media)</b> Utilize multiple effectiveness as well as assess their impact		Neither attempt nor complete crafting a product using multiple and technologies multiple media and technologies and did not effectively reflect on the effectiveness and impact of the product	Attempted but did not complete crafting a product using multiple and technologies multiple media and technologies and did not effectively reflect on the effectiveness and impact of the product	Crafted a product using multiple media and technologies but did not effectively reflect on the effectiveness and impact of the product	Crafted a product using multiple media and technologies and reflected on the effectiveness and impact of the product	Worked creatively to craft a comprehensive product using multiple media and technologies and thoughtfully reflected on the effectiveness and impact of the product
<b>Collaboration (Shared responsibility)</b> Assume shared responsibility for collaborative work, and value the individual contributions made by each team member		Does not contribute for the group's work and does not share or respect others' ideas too	Contribute very little for the group's work and does not share or respect others' ideas	Attempts to share responsibility of groups' work	Participates and contributes to group's work equally while valuing all members' ideas and contribution.	Motivates all members to share in contributions equally by valuing all members' ideas and contributions.

Based on the analytic rubric used in table 1, table 2 was developed by extracting the aspects which were underlined in each component of 4C criteria for presentations.

Table 2. Extracted details based on the analytic rubric used to evaluate presentation-based assessment

Performance aspects	Indicator
<b>Creativity (Idea generation)</b>	
Fluency and flexibility in thinking and expressing thoughts, as well as the ability to modify (elaboration) or create something new (originality) in the form of the idea and the real work. The development of real ideas and works of creativity and innovation based on creative thinking	1) Idea generation. 2) Openness and courage to explore 3) Creative outcome
<b>Critical thinking (Synthesize Idea)</b>	
The capability of evaluating a situation to make decisions through ideas, evidence, reasons, and information in an effort to solve problems. The development of critical thinking is done by giving a reason effectively, while making judgments and decisions, to solve problems	1) Information 2) Interpretation and analysis 3) Problem solving 4) Constructing arguments
<b>Communication (Multiple Media)</b>	
The ability to absorb, deliver, and connect with the information and ideas in a variety of modes of language (spoken, signed, and visual).	1) Engaging in conversation and discussions - answering for the questions raised by the peers - asking questions from the peers 2) Usage of communication tools 3) Listening 4) Communicating in diverse environments 5) Delivering oral presentations
<b>Collaboration (Shared responsibility)</b>	
The ability to work in teams to achieve common goals.	1) Leadership and initiative 2) Cooperation 3) Responsibility and productivity 4) Responsiveness

The components in table 2 illustrate the aspects concerned in the assessment process related to 4Cs.

### **Discussion and Conclusion**

As students were asked to raise questions it could help to improve their critical thinking ability. On the other hand, answering a question also required critical thinking aspect to a certain extent. As this was a group task, the students were required to collaborate with each other, which could empower their collaborative skills too. Furthermore, there were 3 students who created videos, on their own initiative, other than slides which also showed their creativity skills use. The student feedback responses indicated that all students preferred this presentation-based assessment method and experienced communication and collaborative aspects during the activity. Together with the student comments and my observations, the findings showed that students were facilitated to think in new ways and that it is possible to use the methods described in this study to initiate the development of 4C's of student learning, such as through self-facilitated practice of creativity skills, critical thinking, communication and collaborative skills.

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## Perceptions of Gen Z students on the use of digital gamification for formative assessment

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### Abstract

Formative assessment which is testing of student learning as and when the lessons are delivered is a very important initiative which benefits both students and teachers. The most common technique used in practicing formative assessment is to ask questions relating to the content covered in a lesson. However, this practice is not inclusive of every student. The students who volunteer to answer the questions are usually the same students, raising the question on the level of student engagement. One major bottleneck that hinders inclusion of each student in formative assessment is the time constraint. This issue is particularly pertinent in large classes. In order to improve the student participation in formative assessment, an online quiz based on a free online educational gaming app, where the students had to provide the answer through their mobile screens was introduced. The gaming feature included an automatically generated point system which announced the leading point holders. The app provided the answers in real time, and a quiz report on how each student performed in the quiz is automatically generated at the end of the quiz game. 96% of the students informed that they were more engaged, and they learnt more because they paid more attention on the days the game was played in class. 94% of the respondents confirmed that the app-based game helped them to learn better. 68% of the students informed that interacting through the mobile phone helped to beat boredom, while 100% of the students agreed that the gaming feature stimulated their learning and engagement level. Poor internet connection was mentioned as the only impediment associated with practicing the app based formative assessment. Student feedback on the activity proved that the objective of inclusion and engagement level in formative assessment could be improved with the new intervention practiced. The results also endorsed the existing literature on preferences of digital interventions in day to day lives of the Generations Zs.

### Background

Assessing the level of student learning, as and when the teaching tasks are performed is an integral part of effective teaching, which is equally important for both students and teachers. These assessments help teachers to (a) evaluate whether the students could grasp the knowledge in the expected manner and (b) appraise the effectiveness of the teaching tools and techniques used by the teacher in disseminating knowledge. Technically this type of assessment is called formative assessment which is specifically intended to provide feedback on performance to improve and accelerate learning (Sadler, 1998).

One of the most convenient and regularly practiced methods of formative assessment is



conducting question and answer sessions either during the lesson breaks or at the end of a lesson. However, these question and answer sessions are not inclusive of each and every student in class, specifically in large class settings. Formative assessment supports the expectation that all students can learn at high levels and counteracts the cycle in which students attribute poor performance to lack of ability and therefore become discouraged and unwilling to invest in further learning (Boston, 2002). Thus, when all learning partners are not included, these question and answer sessions do not serve the purpose of formative assessment. Further, it is also observed that in these question and answer sessions, the same learning partners regularly volunteer to answer, eliciting an even bigger problem on the level of student engagement in class.

As a course facilitator frequently teaching in large classes sized over a hundred, I was constantly struggling to overcome these twin issues of student inclusivity and engagement in formative assessment in a manner which did not consume extra time. Alternatively, I searched for a mechanism that enables teachers to practice formative assessment real time, where each and every student, who belonged to generation Z preferred to engage and interact, without consuming extra time, could take part irrespective of the class size.

Generation Z, born from 1995 through 2010, has been profoundly shaped by the advancement of technology. Through smartphones, broadband Internet access at home, or an online connection at school, Generation Z students have had access to technology in education than any other generation at their age (Seemiler and Grace, 2017). Kyryakova *et al.* (2014) highlight today's learners are digital natives and have a new profile. They grew up with digital technologies and have different learning styles, new attitude to the learning process and higher expectation from teaching and learning. Many contemporary researchers on education highlight that in resolving the lack of student engagement in classroom activities traditional methods may not help and instead methods such as gamification, could be more effective in improving learners' motivation and engagement (Goksun and Gursoy, 2019; Kyryakova *et al.* 2014).

Gamification is integration of game elements and game thinking in activities that are not games. Elements of gamification include users, tasks that users perform, points that are accumulated as a result of executing the tasks, level which users pass depending on points, badges which serve as rewards for completing actions, and ranking of users (Kaa, 2012 as cited by Kyryakova *et al.* 2014). There were many digital learning applications which has free versions such as Kahoot, Quizziz, and conventional learning management systems which used gamification features. Based on the internet reviews, and positive experiences in the trial sessions experimented, I opted to introduce Kahoot quizzes as an intervention to overcome the twin issues of lack of inclusivity and engagement in formative assessment. Before introducing the Kahoot quiz to the class, several test runs were carried out with randomly selected students to ensure operational efficiency and detect and solve potential problems and pitfalls. The objective of this intervention was to improve student inclusivity and engagement in formative assessment.

## Methodology

Using an experimental research design, the Kahoot app based quiz was introduced to the participants of the course HRM 3314 – Employee Resourcing, in the academic year 2021 with class size of 26 students (n=26). The students in this class were born in the year 1997 and they belong to the Generational cohort of Gen Z. This intervention required students to possess a smart phone thus before implementing this activity, I checked and confirmed that each participant of this course had a smart phone. In order to compare the perceived level of engagement, the quiz was not conducted in every session, but in randomly selected sessions. On the days the quiz was practiced the same announcement was made as at the beginning of the class. Out of 15 sessions in the semester, the Kahoot quiz was conducted during 7 sessions.

A major feature of the Kahoot quiz is that the questions appear on the screen of the teacher, and the participants provide their answers through a smart mobile phone screen using a graphical user interface (GUI). Kahoot explain that they have deliberately incorporated this feature where the students have to look at the teacher’s screen to read the question in order to avoid excessive use of mobile phone by the student. In an ordinary class set up, this may be a hindrance to the students who may be sitting at the back, however in online mode, the students could view the teacher’s screen through their computer screen.

Each quiz had 10 – 15 questions directly related to the topic discussed on the same day. The app provides the teacher the flexibility to choose the type of questions and time allocated to answer the questions. However, the free version of the quiz allows only multiple choice questions and true or false questions. The quiz was created in the web based app <[www.kahoot.it](http://www.kahoot.it)> by the teacher. On average it took about 25 minutes to create a quiz with 15 questions. The students needed to install the free Kahoot app in their mobile phones. Once the quiz is launched, a key is displayed on the teacher’s screen and the students need to enter the quiz key to join and take the quiz. The quiz responses only whether the student’s answer is “correct” or “incorrect”. The gamification features of the Kahoot quiz which has an inbuilt point system, ranks each student. After each question, a podium featuring the top three performers is displayed on screen, at the end of the quiz a grand podium announcing the top three performers appear on screen. At the end of quiz, a report on performance is automatically generated real time, which details two important performance indicators: (a) how each student performed at each of the question of the quiz and (b) how each question was attempted by the students. The report can be shared with students immediately. On average, a quiz with 15 questions could be conducted within 10 minutes depending on the type of question. At the end of the semester, a Google form was shared among the participants to assess their perceptions on the use of the Kahoot app for formative assessment. The form contained 21 closed ended 5 point Likert scale questions and 2 open ended questions.

## Results and Discussion

Kahoot automated the entire question and answer session, including marking, and student ranking within a short time framework without taking extra time of the teacher. Time factor is a major bottleneck to execute effective formative assessment. The primary objective of this experimental study was not to test the impact of Kahoot on academic performance of the

students, but to improve the student inclusivity and engagement in formative assessment. As mentioned earlier and endorsed by the extant literature, formative assessment has a positive ripple effect on improving the academic performance of the students.

In terms of attaining the objective of inclusivity, all most all students took part in the quizzes, however there were few students who joined the sessions through their mobile phones and these students could not switch between the teacher’s screen and the Kahoot app to provide the answers as the quiz requires the students to look at the screen of the teacher to view the question simultaneously.

In terms of attaining the objective of improving student engagement, 96% of the participants informed that on the days that it was announced that Kahoot will be played, they paid more attention to the lecture, because they wanted to do well in the quiz. 92% of the participants indicated that they felt more active in class on the day Kahoot was played. All students unanimously (100%) agreed that the gamification feature of the app with points, rating, badges and podium stimulated their participation in the activity. In terms of knowledge facilitation 84% of the students indicated that Kahoot helped them to confirm the knowledge gained in class and 96% informed that they felt learnt more on the day Kahoot was practiced. 95% of the participants indicated that they would prefer if Kahoot can be extended in other courses as well (Please see Figure 1).

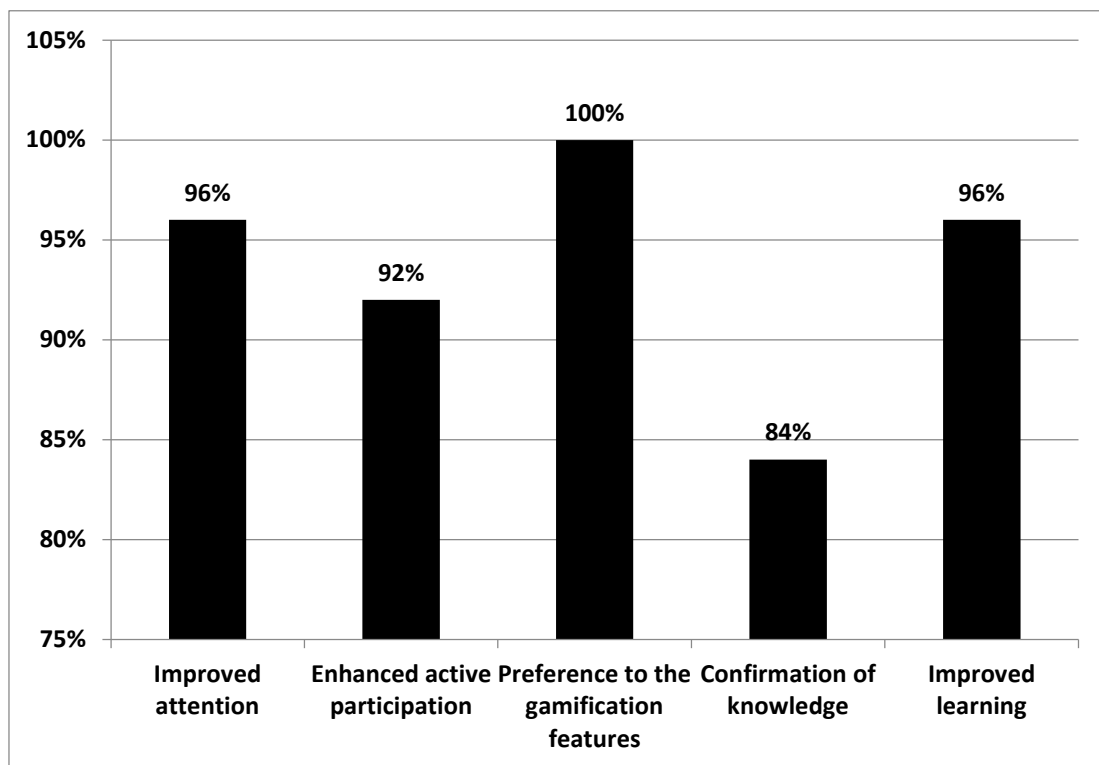


Figure 1. Summary of student responses to the feedback on the use of Kahoot quiz

Although it was not intended, the results revealed that the practice of Kahoot not only improved student inclusivity and engagement in formative assessment, but also as a bonus outcome this intervention had created a more active learning environment in the class. One participant informed: “Kahoot is very enjoyable game and through this we give full attention to the lecture. It's very very interesting and I like to play kahoot allot”. Another student

mentioned: "It's interesting and enjoyable. I think it should continue with all the sessions. I like to play Kahoot in more subjects". This is being confirmed by Kyrakova *et al.* (2014) who highlighted that Gamification has bilateral effects - they can affect students' results and understanding of the educational content and create conditions for an active learning environment.

The feedback also revealed that some students, who were reluctant to answer during traditional face to face question and answer session, felt more confident by participating through the quiz because the app helped to overcome the fear of embarrassment of providing an incorrect answer openly. One student informed: "This is a good app for the students who are little embarrassed to answers face to face like me".

Connection issues was the main impediment highlighted by the students in taking part in the Kahoot quiz, while a few students mentioned about lack of multiple devices (mainly by the students who joined the sessions through mobile devices) as the app requires simultaneous access to view question and provide answers.

## Conclusion

Overall, the Kahoot app improved student inclusivity in formative assessment. Participant's perception confirmed that the new intervention of using Kahoot app for formative assessment improved their engagement level and comprehension while stimulating an active learning environment.

As a future research, the current experimental study could be extended to assess the impact of Kahoot quizzes on summative academic performance which would shed some light among enthusiasts who are keen on introducing similar app based quizzes in their classes.

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## Use of practical based online teaching and continuous assessment methods to enhance student performance

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### Abstract

Due to the Covid-19 outbreak since March 2020, remote learning via online is seen as one of the ways to continue tertiary education. Conducting assessments effectively became the main challenge. The aim of this study was to investigate the effect of practical based online teaching and assessment methods used over students' performance. Two courses, one with onsite assessments and the other with online assessments, were analysed. Since the student number was 800 in course 1, 3 real time online sessions were conducted and a problem sheet targeting the Continuous Assessment (CA) was given. Their CA was a mid-semester examination and they preferred to have onsite CA. However, CA could be conducted only for 50% due to prevailing situation. Thus for course 2 with class size 98, practical based online assessments were tried. In practical/tutorial sessions, case studies similar to real world situations were discussed. Manual calculations were done as tutorial and same was done using MS-EXCEL as the practical. Two online CAs (CA1, CA2) on practical parts were given and 2 weeks per CA were given to upload the answers. These CAs differed slightly based on student registration number. In course 1, 275 out of 800 students (34%) submitted answers for problem sheet. Among them, percentages for performance levels, excellent, good, satisfactory and unsatisfactory were 53%, 30%, 9% and 8% respectively. For CA, percentages were 76 %, 15%, 7% and 2%. In course 2, all 98 students submitted answers for CAs. Respective percentages for excellent, good, satisfactory and unsatisfactory levels were 93%, 6%, 1%, 0% for CA1 and 97%, 3%, 0%, 0% for CA2. Although discussing a related problem sheet prior to CA could increase the excellent level to 76% in course 1, 50% are awaiting to face CA. Conducting online CA for rest would be an alternative. Over 90% reached the excellent level with a 100% of completion rate in course 2 implying the practical based CAs were more effective while bringing copying to a minimal.

### Background

Due to the Covid-19 outbreak in March 2020, University Grants Commission announced the closure of state Universities from 13<sup>th</sup> March 2020. During the university closure remote learning via online is seen as the one of the ways to continue tertiary education even though there are many challenges on the ground.

All internet service providers in Sri Lanka provided free internet access to university servers during Covid-19 pandemic until the 31<sup>st</sup> August 2020. Both students and faculty members immensely benefited through this solution. According to the LEARN report, as of 23 August 2020, 13 million activities (e.g., accessing reading materials, following lecture slides, attending online quizzes) using learning management systems were launched in a peak week during May (Hayashi et. al, 2020).

Institute of Technology University of Moratuwa (ITUM) also initiated online teaching from April 2020 for the students of ongoing academic year. Later in May 2020 online mode was used to conduct the Intensive English Programme for the new intake of 2020 and online teaching is continuing for both the batches. Academic course for new intake students was started even without Inauguration. Thus even though the online teaching has been started, conducting assessments online became one of the main challenges for academics as well as for students. Some challenges identified by Bulter-Henderson and Crawford (2020) in online assessments were anxiety and cheating of students, staff and student perceptions, authentication and security, interface design and technology issues.

This study investigated the effect of practical based online teaching and assessment methods that were used on students' performance.

## **Methodology**

Remote online delivery and assessment are novel experiences for many universities, which presents many challenges, particularly when safeguarding academic integrity. For example, invigilated assessments, often considered as more secure, are not an option given the current situation and detecting any cheating would be significantly challenging (Gamage et al., , 2020). Online real time lectures, recorded tutorial classes, uploading relevant materials to MOODLE (Modular Object Oriented Distance Learning Environment) were used as the teaching methods in present study. Relevant materials such as handouts, power point presentations were uploaded at the beginning of the week. Recorded lecture, tutorial/practical were uploaded after the relevant real time session.

### Assessments in Course 1

These students were from new intake and since the class size is large (800), 3 real time online lectures with class size around 270 were conducted for 5 weeks. During these 5 weeks 2 tutorials were given. At the end of 5 weeks, a problem sheet (PS) with questions similar to continuous assessment was given and students who wished to submit answers were allowed do so. CA of course 1 is a mid-semester examination and students preferred to have it as onsite assessment. CA was conducted only for 400 students by splitting 400 into two groups, (100 + 300) in two different times adhering to prevailing health guidelines. Two versions of the assessment were prepared for two groups and marking was done manually.

### Assessments in Course 2

Since onsite CA could be conducted only for 50% for course 1, practical based online assessments were planned for course 2. These students were semester 4 students and the class size was 98. Real time lectures were conducted for 12 weeks. Practical/tutorial sessions were conducted separately for first few weeks. Later, lecture sessions included relevant practical/tutorial lessons as well. In practical/tutorial sessions, case studies similar to real world situations were discussed. Manual calculations were done as tutorial and same was done using MS EXCEL computer package as the practical component. Two online CAs (CA1, CA2) were conducted. Students were given 2 weeks per CA to work on EXCEL and upload the answers. These CAs differed slightly based on student registration number.

Total mark considered for both CA, PS in course 1 and 2 CAs in course 2 was 15. Row marks were divided into 4 categories as 'excellent' for marks in the range 12-15 (>80%), 'good' for

marks 9-12 (60% to 80%), 'satisfactory' for marks 6-9 (40% to 60%) and 'unsatisfactory' for marks below 6 (<40%).

This study analysed the performance of students in course 1 with onsite assessments and course 2 with practical based online assessments. Graphs such Box and Whiskers plot (Figure 1.a.) and bar charts, tables and descriptive statistics were used to highlight the salient features of the study.

## Results

### Performance in Course 1

Students' performance in the PS and CA were analyzed. 275 students out of 800 (34%) submitted answers for problem sheet. Marked scripts with comments were sent to them individually. Further model answers for the problem sheet were uploaded highlighting the common mistakes of students. Distribution of row marks of PS and CA are shown in Figure 1.

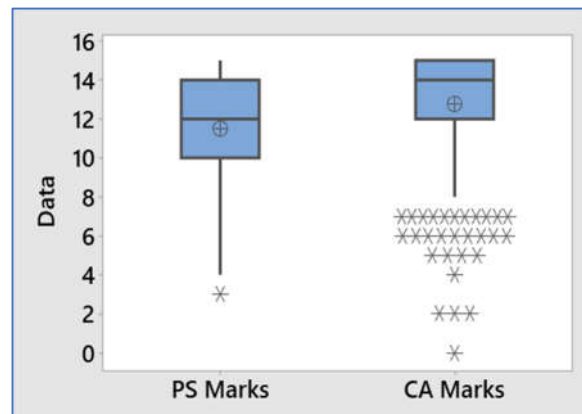
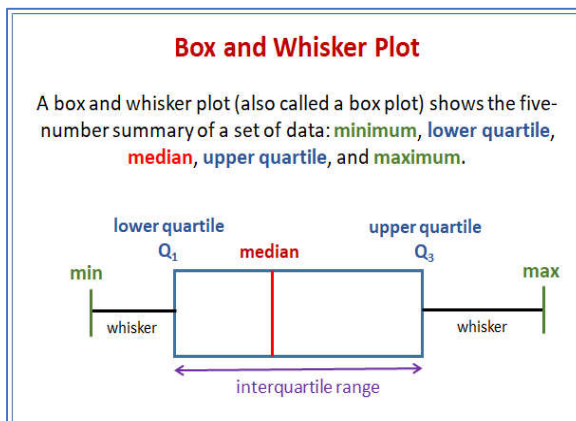


Figure 1.a. General Box and Whiskers plot

Figure 1.b. Box plot for marks in course 1

According to figure 1.b, PS marks ranged from 3 to 15 for 274 students and CA marks ranged from 0 to 15 for 396 students. 75% of PS marks are above 10 and 75% of CA marks are above 12. Averages for PS and CA marks are 11.5 and 12.76 respectively.

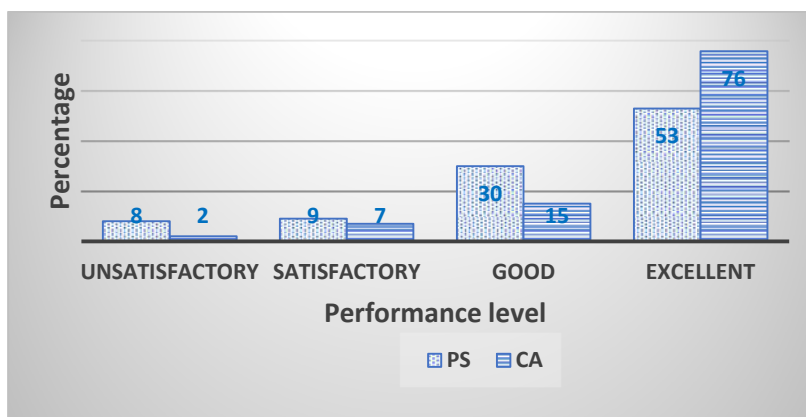


Figure 2. Performance levels of problem sheet and CA in course 1

Percentages for performance levels for PS and CA are presented in Figure 2. According to this

figure, percentages for performance levels, excellent, good, satisfactory and unsatisfactory were 53%, 30%, 9% and 8% respectively for the problem sheet. For CA, percentages were 76 %, 15%, 7% and 2%. This highlights that excellent level has increased to 76 % and unsatisfactory level has decreased to 2%.

CA Performance for same fields (400 students) in the previous year semester 1 in onsite mode reported that 31%, 44%, 20% and 5% for excellent, good, satisfactory and unsatisfactory levels. Problem sheet was not given to them and this could imply that giving a PS prior to the assessment could improve students' performance.

### Performance in Course 2

Two case studies aiming the practical components conducted were given as CAs and students needed to use EXCEL computer package to complete both CAs. Case study 1 was given as CA1 and two versions were prepared. Version 1 was given to first 50 students (1-50) and version 2 was given to second 50 students (51-100). In version 1, one data value was changed according to student registration number. Similarly, in version 2 another data value was changed. There were altogether 18 different versions of the assessment and answers were prepared using EXCEL.

Case study 2 was given as CA2. Among 60 data values, 4 data points were removed, students had to enter their registration number as those data values and perform the required test in EXCEL. Since the data values were different from student to student they got different outputs. Submitted answers were marked using EXCEL outputs. Table 1.a shows the summary statistics and Table 1.b. shows the performance level wise percentages for CA1 and CA2 . All 98 students submitted both CAs. Marks ranged between 8.5 to 15 for CA1 and 10 to 15 for CA2 with average marks of 13.88 and 14.38 respectively. When the performance levels were considered excellent percentage was above 90% in both cases and there were no students in the unsatisfactory level.

When their previous CA performance was considered, relevant percentages for performance levels were 7%, 25%, 48% and 20% in semester 1.

Table 1.a. Summary Statistics for Course 2

Summary Statistics	CA1	CA2
Mean	13.88	14.38
Median	14	15
Mode	15	15
Standard deviation	1.47	1.17
Minimum	8.5	10
Maximum	15	15
Count	98	98

Table 1.b. Performance levels for Course 2

Performance Level	% for CA1	% for CA2
Excellent	93	97
Good	6	3
Satisfactory	1	0
Unsatisfactory	0	0

### **Discussion and Conclusion**

Discussing a related problem sheet prior to CA could increase the excellent level from 53% to 76% in course 1. However, 50% (400 students) are awaiting to face CA and possible date to conduct their CA cannot be determined due to the prevailing situation of the country.



Investigate the possibilities of conducting online CA for rest would be an alternative. Among the first 100 students who came to the Institute to complete CA, there were 5 students with device and connection issues and had difficulties in following the course online. It can be assumed that similar percentage might had such problems among other 300 students too. According to Hayashi et.al (2020) also, the lack of consistently stable, high-speed internet access was the most significant challenge for students and faculty in continuing tertiary education during the early onset of Covid-19.

In course 2, although there were different versions of CA1 it was found while marking that some students had copied answers and some had submitted answers for a different version. They were also informed to resubmit the answers for the correct version. Gamage et al. (2020) highlighted that despite the changing academic situation during the pandemic situation, academic integrity and assessment security are still indispensable. For CA2, students got different data sets and no copying was reported. Marks of CAs showed that over 90% reached the excellent level for both CA1 and CA2 with a 100% of completion rate.

Marking CA for first 100 students in course 1 and CA1 for course 2 (98 students) was done in same time period and it was found that marking using EXCEL output was time saving compared to manual marking. *Frankyl and Schratt-Bitter (2012)* highlighted benefits of online testing as releasing results quickly, saving time in its administration, improved readability and convenience. No previous semester 4 course was available to compare the performance of course 2. However the performance was much better in semester 4 compared to their semester 1, onsite CA performance. Further, since the Institute has started registering students for intake in 2021, practical based online teaching and assessments methods can be employed for the new intake of semester 1, to further explore this method.

The results of this study showed that conducting online practical based case studies as CAs were more advantageous over conducting onsite CAs while bringing copying to a minimal.

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## **Student and staff perceptions on a restructured practical class assessment to increase student engagement and performance**

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### **Abstract**

The National Diploma in Technology curriculum was reformed from an annual system to a semester system in 2019. In the annual system, the marks obtained for laboratory reports submitted by students were not counted for final grading, whereas under the new semester system, these marks are included for the final grading. Thus, this assessment required to be restructured for greater reliability, based on assessment principles and marking principles. In the restructured practical assessment method, the Assessment Task (AT) was changed from a full-report (carried out as a take-home assignment) to students having to submit a mini-report (as an in-class assignment) for four experiments out of six. To improve marking reliability and consistency of this laboratory mini-report, a detailed marking scheme was developed, instructors were trained and the lecturer was required to ensure alignment with the marking scheme through random checks on marking. The outcome of the new implementations was evaluated using feedback forms filled by students and instructors. This study reports on a module under the new semester system, recording feedback from 30 students who followed it. This student feedback showed an above-90% agreement that in-class submission of the mini report, as followed in the new semester system, encouraged them to actively engage in the practical class. 100% agreed that in-class submission of the mini report reduced homework load. Feedback from both students and instructors confirmed that the restructured assessment minimised plagiarism and improved the continuous assessment marks by 11%, (from 2017 to 2019). Newly developed assessment method directly and indirectly benefited not only students but also the lecturer, instructors and finally the outcomes of the whole academic program. New assessment task encouraged students to actively engage in practical class, build self-confidence to complete the assessment on their own, minimised plagiarising and reduced homework burden.

### **Background**

Genuine active engagement in practical class work of students in technology education is required, since they have to gain the knowledge and skills to resolve real life problems in industry. The National Diploma in Technology course conducted at the Institute of Technology University of Moratuwa generates qualified technologists. National Diploma in Technology curriculum was reformed from an annual system to a semester system in 2019 to motivate students for active learning engagement in their practical classes supported by effective formative assessment. Thus, about 20 marks out of 40 marks for continuous assessment contribute from marks of the laboratory class assessments which affect the final grading of students in semester system, unlike in the old system.

The previous practice (under 'annual system') with regard to practical work was to submit a full report within one week after every practical session as a take-home assignment. Under these conditions, a high percentage of students plagiarised from peers reports or directly from other references so that laboratory report marks did not reflect actual levels of learning. Students were also not allowed to go through their corrected laboratory work, while the new system provided students the opportunity to look at their corrected work, allowing them to review mistakes before the next submission, helped by constructive feedback for their continuous development. The identification of such drawbacks required the development of a more reliable assessment method, minimising plagiarism and increasing the motivation and active participation of students in practical classes and encouraging students for self-learning through the learning process.

In formative assessments, the results are used to give feedback for improving ongoing student learning (Biggs & Tang, 2007) and are also beneficial for teacher development by knowing how learning is proceeding. It supports the students to identify their strengths, weakness and target areas that need greater work inputs. It supports the teacher to recognise where the students are struggling and enable addressing the problems immediately. Therefore, sufficient opportunities are created for students to perform and receive suggestions for improvement. There are different formative assessment methods such as Impromptu quizzes, One-minute paper on specific subject matter and ask students to create a visualization of what they learnt. But not all such formative assessments are suitable for laboratory class work, therefore careful selection of suitable methods is important in restructuring laboratory class assessment method to achieve the expected outcomes.

Assessment principles have to be followed in an assessment for it to be more effective. Two important assessment principles are validity and reliability. 'Validity' relates to whether the assessment assesses what it should assess. This is achieved through constructive alignment between the learning outcomes and assessment method. However, 'reliability' is whether the assessment results are similar when repeated. The candidate true score may be differing from the observed score due to several factors. Plagiarising is one of the reasons the assessment marks are not reliable nor valid, expressing the level of learning of the student. As part of improved assessment, the marking process of laboratory assessments also has to be made more reliable and consistent. There were some problems identified in the laboratory report marking process as well, such as instructors mark the laboratory reports without following a proper marking scheme, reports of one experiment distributed among few instructors and newly joined instructors are not properly trained for report correction. Therefore, it was required to implement a more reliable and consistent marking process which fairly assessed all students. This could be done following proper criteria in a marking scheme. During the marking, consistency has to be maintained against the criteria provided. Training the assessors ensures all assessments are marked fairly.

In this study, assessment method was restructured to encourage students to actively engage in practical class while the marking process of the laboratory assessments also improved in reliability and consistency.

## Methods

Third semester students who followed Unit operation I module under National Diploma in Technology course was selected for this study. It was a small class of 30 students with 6 practical sessions per semester. Students were grouped in to 6 groups, with 5 per group. Each small group carried out one practical per day. All six practical were carried out on pre-scheduled roster to achieve completion within 6 weeks where each practical class was of three hours per week. In the restructured practical assessment, students had to submit a mini report for four of the six practicals, with these having to be completed within the practical class. Due to this time limitation, each submitted mini-report was required to have only sections under Objectives, Observation, Results, Conclusion and Discussion. However, fuller complete reports had to be written for two practicals, which included large calculations and an analytical component. Due to such reports requiring longer time, these were completed as take-home assignments having sections on Introduction, Objectives, Theory, Apparatus and Reagents, Observation, Results, Conclusion and Discussion. During the practical session clear instructions were given to write the laboratory reports and a hard copy of the guideline on report writing was also distributed to students for reference. Outcome of the in-class practical assessment method was evaluated using student feedback forms. One week after the submission, corrected reports were distributed to students to provide opportunity to look at their own performance, mistakes while constructive feedback were given for improvement.

Under the new implementation, not only the assessment method was restructured, but also an effective marking process was developed. This included following, in detail, marking schemes for report correction with the guidance of the lecturer. Further the lecturer in charge randomly checked the marked reports for further assurance. The outcome of the new implementations carried out using this marking process was evaluated using a feedback forms filled by students and instructors.

## Results

Student perceptions on restructuring of assessment method received via feedback form is as shown in Table 1.

Table 1. Students' perception on restructuring of assessment method received via feedback form

Feedback question	Student response (%)			
	Very Good	Good	Satisfactory	Poor
In-class submission of the mini report was effective for learning than the complete course work submission as a take home assignment	76.7	20.0	3.3	0.0
In-class submission of the mini report reduces home work load	80.0	20.0	0.0	0.0
In-class submission of the mini report encourage students to actively engage in the practical class	83.3	16.7	0.0	0.0
In-class submission of the mini report develops students self-learning capability	70.0	26.7	3.3	0.0
Guidance for the practical and for mini report writing during the class is sufficient	73.3	26.7	0.0	0.0

From the table, it is observable that 83.3 % strongly agree and 16.7% agree with In-class submission of the mini report encourage students to actively engage in the practical class, whereas 100% (altogether) agree that in-class submission of the mini report reduce home work load. The comments written by students indicated , that they prefer in-class submission of mini reports than writing a complete report as a take-home assignment, because of the heavy work load of the semester system. This new system minimised plagiarism in laboratory reports. Plagiarism, as defined by Race (2007), is “unfairly passing off other people’s work as their own”. In some universities, up to 90% of all students plagiarise their work (Walker, 1998). There are several factors identified which causes plagiarism; Easy access through internet where information is freely available and uncertainty on writing skills in English for foreign students who are non-native to English, than trust on their writing skills. Nevertheless, with the time restriction and heavy load of assignments and deadlines, students find easy to copy from sources or other students or download from internet than struggling to do on their own. However, it is required to identify the reasons for plagiarism and prevent it rather than just degrade the students. There are actions suggested to prevent plagiarism by Biggs and Tang (2007) and Race (2007), such as creating a culture that emphasize scholarly values, alerting students to the rules and penalties for infringing them, using assessment tasks that use reflective diaries and personal experiences, using oral, peer and group assessment, checking assignments using software, increased invigilation as a last resort, but widening the range of assessment tasks within that context from the conventional written examination and clarify institutional requirements.

However only 70.0% strongly agreed that the in-class submission of mini report developed their learning and only 73.3% strongly agreed that the guidance for mini report submission was sufficient whereas no students disagreed. The feedback forms did not have any suggestions for further implementations or negative comments.

When students marks were analysed , their 2019 marks had increased by 18.2%, compared to 2017. The average marks were: for 2017 were  $72.0 \pm 4.2\%$  (n= 24) and for 2019, were  $88.7 \pm 4.2\%$  (n= 30).

From feedback from instructors, the detailed marking scheme had been useful for uniform and efficient marking, including saving time and had suggested that these be extended to other modules.

## **Discussion**

Feedback from students and instructors indicated that student plagiarism from peers’ lab reports was high In 2017, with same mistake repeated by many students. After the in-class submission was implemented, students had to do their report writing on their own within the class, with making clarification from lecturers’ or instructor during the class itself. From this reduction in plagiarism and increased student marks , in-class submission of the mini report was effective for learning, compared to the previous take-home assignment submission.

The need for students to complete the assessment task at the end of the class made them to engage in practical class more actively and contribute to building a range of skills. By having to complete the assessment on their own and without plagiarism, develops report writing

skills, serves to build self-confidence and even encourages knowledge sharing, as also building hands-on experience on machineries used in Engineering. By having to make calculations from observations on their own, it develops evaluation capability, critical thinking and confidence to make decisions on their own. If further improved, such skills contribute to building lifelong learners.

Student feedback scores can be used for further improvements where the scores indicated room for improvement, such as providing more guidance in mini report writing or giving the marking criteria to the students before they do the assignment so as to encourage the students to perform better. The increased marks could indicate that students had now improved in achieving the learning outcomes of this module.

## **Conclusion**

The newly developed assessment method is directly and indirectly beneficial for students, lecturer, instructors and the outcomes of the academic program. Though it was implemented for one module of the semester, after further work and its feasibility for classes larger than 30, it can be recommended for adoption in other suitable modules such as modules having a laboratory class component.

## **Acknowledgements**

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## Introduction of Pre-Post-Review Tests with Problem-solving case studies to improve undergraduate performance in a Microprocessor-based automation course

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### Abstract

We have observed, through teaching undergraduates over 18 years, that not all students regularly participate for the day-to-day lectures with adequate preparedness for active Problem Solving. Improving this situation is crucial for Microprocessor theory courses combined with its case study automation lab, particularly for near-graduation years such as years 3 to 4, so as to enable them to find agreeable jobs related to their field of study. However, most of these students (following the Microprocessor and Microcontroller Technology course) usually have a non-effective 'surface learning' attitude, so that they have neither identified, nor practiced, the skills related to this application-oriented course and its laboratory classes. Since we teach an active subject area which can be applied to find creative solutions for real word problems and the fields such as Security, Robotics and Mechatronics, we wanted to develop our students to become active, self-learners after obtaining the lecturer guidance, so that they can further develop themselves with theses self-development skills. To develop students as above and as "Students are driven by assessments" (Gibbs *et al*, 1989, p 23), teaching and assessments were changed by having unannounced Pre-Post Review Tests (PPRT) and Problem-solving case studies in the Laboratory classes, with a mark allocation of 10% (out of 15% continuous assessment marks) contributing to their final grades. After students were exposed to the above teaching and learning practices, student marks improved with number of 'A' grades recording an increase of 26% for the 2019 batch of 23 undergraduates.

**Keywords:** Pre-Post Review Assessment Technique, Problem Solving, Microprocessor-based automation, LMS based assessments in Corona epidemic era

### Background

The Traditional teaching method adopted at Sri Lankan Universities (prior to Corona epidemic) for teaching Techno-Engineering application based subjects such as Microprocessor and Microcontroller Technology, Optoelectronics and fiber based communication systems etc. had not adapted to cater for current Information age and its modern Industrial demands. Also, the learning practices of some earlier batches of students were based on irregular participation for day-to-day lecture discussions and on preparation for their Mid/End semester examinations by studying lecture notes photocopied from the few numbers of regular participants. Moreover, most of the undergraduates at near-graduation years, such as years 3 to 4, usually had a non-effective 'surface learning' attitude.

The result has been that they have neither deeply engaged with learning, nor in practicing, the skills related to the application oriented lecture programme 'Microprocessor and Microcontroller Technology (ELTN 3233) and the allied case study based real automation laboratory lecture programme (ELTN 3241) of the above course (of 3 hours per week).

Also, I and the teaching assistant assigned to conduct the ELTN 3233 tutorial class identified that many of the undergraduates had the attitude of one-to-one copying of tutorial answers (i.e. submit the same answer produced by one or two members) without deep or even doing surface studies for answering the tutorial. Since we teach an active subject area which can be applied to find creative solutions for real word problems and in the fields such as Security, Robotics and Mechatronics, we wanted to develop our students to become active, self-learners who can further develop themselves in the required skills, after obtaining the lecturer guidance.

As the microprocessor based systems that they are going to design and implement to solve real world problems which undergo fetch, decode, execute cycle of digital information, the undergraduate of such active courses need to match their environmental signal awareness, select the proper transducers to acquire such signals while writing proper high level or low level languages that use bug-free coding (i.e. programming) to achieve the desired data flow diagram which lead to successful implementation of the customer required automation. With our teaching experience, we noticed that few students who have the practice of exploring, hardworking and curiosity, not only succeed in Microprocessor based problem solving course, but also participated in competitions and won fame for their university with good prizes. Others with 'cramming' of peer classroom notes, assuming that only tutorials and such classroom assignments matter for getting good results usually fail, and add more numbers yearly to the 'repeat' group of students.

While searching a solution to avoid the inactive surface learning attitude of my students and to improve the students' classroom participation, I thought of introducing an informal 'quick' test - this was to review previous day lecture content as well as to prepare students for the present lecture. So I called the test as a "Spot Test" or "Post-Pre Review Assessment" short questionnaire". I gave these designed tests without prior announcement. Also, for the new formative assessments, I assigned high amount of marks out of the marks that were allocated for overall continuous assessment techniques (i.e., tutorials etc.). This was adopted as otherwise, according to some of the undergraduates' point of view, they would neglect or avoid participation for the tests in this classroom learning process.

## **Methodology**

The teaching methods of unannounced Pre-Post Review Tests (PPRT) and Problem-solving case study simulation and implementation under time constrained laboratory sessions began from the year 2012 (when the first author followed the CTHE teacher training course, Colombo University). Starting these methods was helped also by literature having pointers such as "Students are driven by assessments" (Gibbs *et al*, 1989, p 23). Also supporting this teaching change were the key ideas such as "A key graduate attribute for electronics engineering technology based undergraduates is the design and development of solutions



for real-life problems. Such case studies are enabling undergraduates to grasp electronic engineering design principles and application skills to real world” (Hertzog and Swart, 2016). These key ideas were further supported by literature from other countries such as the US (Brewer and Smith, 2012).

The teaching methods that were started and used from 2012 had to be modified following the Corona epidemic in 2020 in ways that were suitable for LMS based simulation assignments, such as using Team based (A Team Vs a B Team) Automation Problem Solving design and implementation competitions on virtual platforms.

As the teaching changes using Post-Pre review assessment with formal marks allocation were implemented from 2012, data from this initial change-over period (2011 to 2012) have been used to show the resulting improvements in student attendance when this method was first introduced, while data on student grades available from a more recent period have been used to show the examination performance improvement in the students

## Results

In evaluating student attendance, attendance can be compared (Figure 1) before (2010, 2011) and after initiation (2012 year) of the reported teaching method. Here, as the university was closed for some periods of the semesters, data are from the months when students attended lectures. By looking at individual attendance of undergraduates, improvement or increase in their lecture room participation can be observed.

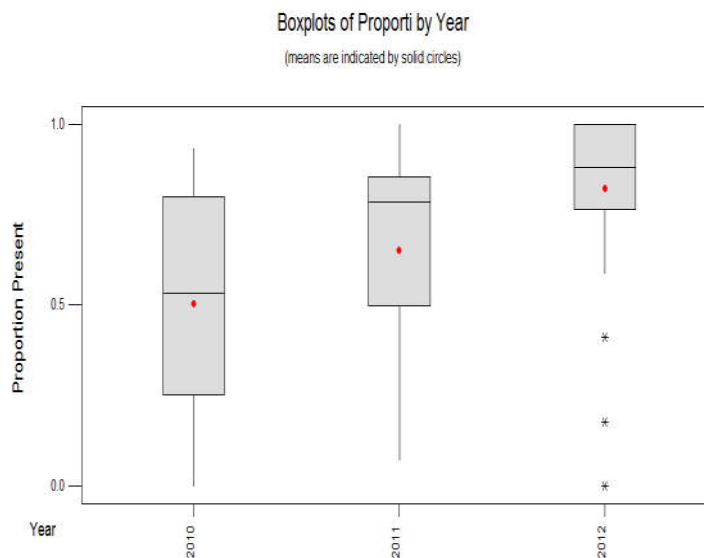


Figure 1. The increase in student lecture attendance at initiation of teaching method in 2012

Figure 2 shows how the performance of students improved in the 3 years that have been compared. It shows that students began to get A grades in 2019, with 26% of students getting A grades that were absent prior to that. The figure also shows that the number of B grades

increased compared to previous years, so that there was an all-round improvement in student performance.

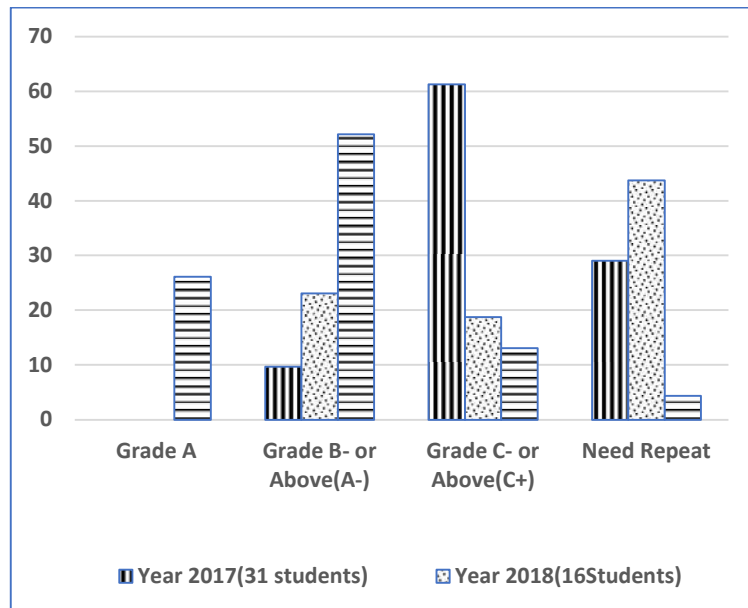


Figure 2. The plot of grade distributions across 3 years, 2017 to 2019

### Discussion and Conclusion

The results support that the new teaching and assessment method, when it was initiated and formally implemented, changed students towards increasing their regular participation and had helped to improve their performance. Although no student surveys were carried out to document the exact causes, our observations noted that students became more engaged and motivated to attend to course work. This change would help to make undergraduates to work as active solution creators and further studies need to be carried out to determine student perceptions and skill improvements in this regard.

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## **Small group activities as a tool to facilitate student-centered active learning in an online platform: Student perceptions and peer observations**

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### **Abstract**

Small Group Activities (SGA) are useful as a teaching strategy to facilitate student – centered learning in an online platform, specially when students have not shown active participation in the lesson. This study examines how the use of SGA can support student- centered learning in an online platform to promote active learning process of students in such a class. This teaching and learning change was applied for the 38 students who followed second-year course unit “DMG 2223 – Demographic Analysis” in their second semester, following Gibbs and Habeshaw (1989), where group learning is recommended to improve learning. The discussion class was divided into several groups by using zoom breakout rooms and given the specific topic related to the lesson. The students were guided to find information by using internet and present as small group presentations. In a student-centered discussion, the students themselves formulate and direct the discussion. One student serves as the facilitator of the discussion, but the discussion flows from student to student. The outcomes of the online SGA were analyzed by using student-feedback and peer online-class observations. At the end of presentation, 80% of students had actively participated in the given student-centered activities and 75% agreed to SGA change as a positive improvement. 60% stated they improved their knowledge of e-learning tool use. 10% faced technical and network issues during the activity. By incorporating peer feedback, this can be an effective teaching method to develop not only student’s knowledge but also their intra- personal and inter- personal (‘soft’) skills. The findings suggest that Small Group Activities on an online platform can be recommended as a tool to improve student-centered and self-regulated learning as well as their skill in use of e-learning tools. This helps to improve active involvement of students.

### **Background**

In the current situation of state university education in Sri Lanka, all academic teaching done through online education due to the COVID -19 pandemic. In student centered active learning process, student becomes the central person so that more self-responsibility skills, including for their own learning, can be developed. Teacher is then only the resource person who guides the students. According to Gibbs and Habeshaw (1989), learning as a group is the best way to learn. With the use of techniques in the concept, small group presentations benefit the students to improve their self-esteem and give them confidence for doing their future work (*Ibid*). Further, Gibbs and Habeshaw have mentioned that small groups when adequately experienced, can operate effectively without a teacher being present since many of the roles which a good facilitator performs in a group can be performed adequately by students if they are clearly briefed (Gibbs & Habeshaw, 1989). The main objective of small group learning is active involvement of the students in the entire learning process so as to achieve an improved academic and skill related goals by the end of the lesson.

The literature reveals the presence of sufficient evidence to suggest that teaching and learning in a small group is an excellent method for developing communication skill, critical thinking, team work ability, decision making capacity, and the retention of knowledge (Dennick & Exley,1998 Meo,2013). Student-centered learning describes ways of thinking about learning and teaching that emphasise student responsibility for such activities as planning learning, interacting with teachers and other students, researching, and assessing learning (Cannon, 2000). Small-group teaching is a distinct mode of teaching and is closely linked to active learning (University College London,2019) The implications of this small group method for teachers are that they place greater importance on what their learners are doing, and why they are doing it, rather than on their own actions and performances as a teacher (Biggs,1999). Through studies and discussions regarding online tools and learning have been increasing, the short time period before the compelled start of virtual education did not permit suitable staff training to be put into place for its effective delivery. According to Singhal, combination of Zoom-based lectures with actively facilitated Zoom breakout room assignments is an effective active learning strategy (Singhal,2020).

As presently practiced, pre-preparation activities that are assigned to be done at home are not done by each and every student. Most students miss doing these activities and so, come to the discussion classes without the necessary prior knowledge. Self-learning is a good practice for every student to improve their knowledge. Once the students enter the second year of their undergraduate life, the teaching is more focused on student-directed learning. As a method of directing them towards self-learning, it is important to provide more self-activities for them. If students - centered learning cannot be achieved individually by students in the university system by them not doing their assigned work. It is better to use collaborative learning methods to improve students-centered learning process and problem - centered learning as well.

## **Methodology**

This study is situated in a qualitative and quantitative mixed research design. The data were collected from 38 second -year students who had followed 'Demographic Analysis' in their second semester course unit. This small group activity was designed by following Gibbs and Habeshaw (1989). Although the COVID - 19 outbreak compelled universities to switch to online lesson delivery, on the online platform students do not participated actively in the discussion classes, unlike in face-to-face classroom discussion classes. Due to this and making online class-room some a non-threatening place for students would make them from cooperative learning, zoom video teleconferencing platform was used to divide students into small groups. As facilitator, students were guided by giving technical guidelines about features of the zoom breakout rooms. After that, students were given the specific topic related to the lesson.

Demographic Analysis is a technical subject that is compulsory for students who are doing Demography as their special subject. Within this area and using Zoom Breakout rooms, it was possible to give them a related problem-centred topic to discuss with their assigned group members. The students were guided to find information by using internet and present findings as small group presentations. Students shared their screen with their group members and they were able to continue their discussion successfully. In a student-centered discussion,

the students themselves formulate and direct the discussion. One student served as facilitator of the discussion, with the discussion flowing from student to student. For obtaining student's feedback, a small questionnaire was given to students at the end of the particular activity. For peer feedback, peers were invited to join zoom meeting during student' presentations.

## Results

Table 1, gives an analysis of student feedback. It shows that, more than 85 % of students were satisfied with small group activity via zoom platform. The table also shows that nearly 6 % of students were dissatisfied with this small group activity. When considering reasons for dissatisfaction the main reason was network coverage and stability issue. Due to the network failures and bad weather conditions, students had faced difficulties when they log in to the zoom meeting. Students were unable to join discussion class continuously. Taken as a whole, the overall feedback can be seen as positive for the implemented small group activity.

Table 1. Student feedback results

Satisfaction Level	Frequency	Percentage (%)
Strongly Satisfied	23	60
Satisfied	10	26
Neither Satisfied nor Dissatisfied	03	8
Dissatisfied	01	3
Most Dissatisfied	01	3
Total	38	100

Student perceptions based on feedback (Figure 1) revealed that the planned small group activities helped students to participate actively in the discussions. In discussions, approximately, 80 % of students were observed participating actively. In undergraduate learning process, students centered learning process is very important to improve their academic knowledge and other skills. But in an online platform it is difficult to observe student'-s active participation in this learning process. In such a situation, this zoom breakout room feature helps facilitator to observe student'-s involvement in the lesson. 75 % students had identified small group activities as a positive improvement. Also, a large group of students (70 %) said that they are able to improve their subject knowledge through this activity. Basically, this small group activity was coupled as problem-centred learning activity. Hence, 65 % of students had stated that they felt able to improve problem solving skills from this small group activity. 40 % of students had recognized that they need to improve their e-learning knowledge. Out of total students, 60 % students had sufficient knowledge regarding the e-learning methods and tools. The other important point is a considerable group of students (65 %) responded that they felt to have improved their collaborative learning skills.

In this online education most students had faced difficulties with individual learning due to them missing their colleagues and group learning. As a result of that, it should be noted that this implementation gives many positive feedback in current COVID -19 pandemic situation.

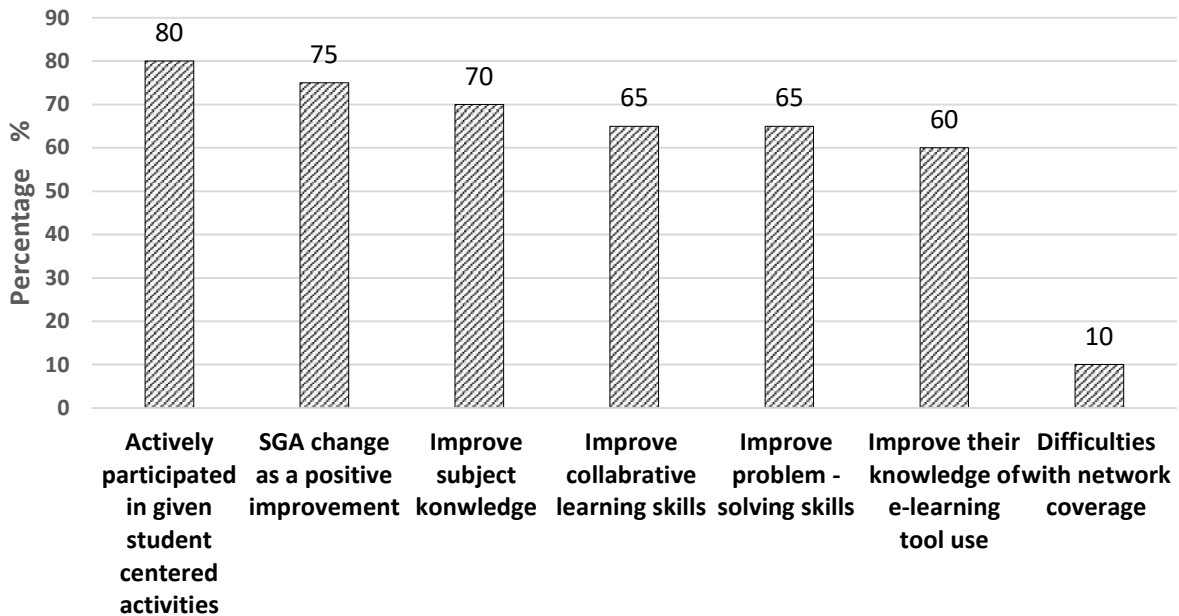


Figure 1. Student perceptions based on feedback

### Discussion and Conclusion

The findings suggest that small group activities is a tool to facilitate student-centred active learning in an online platform. With this approach, responsibility for learning is placed upon the students and they gain more knowledge through collaborative learning. When tutorial classes use small group activities in this way to engage students in planned TLAs in class, students develop better learning and their skills of learning. Also, such small group activities help students to interact with their colleagues and share knowledge with them. Most teachers have considered online platform not as a good tool for teaching students. But the problem is that most teachers do not use online platform in ways that make it as both a useful and a comfortable place to students. In COVID -19 outbreak teachers have to use this online platform in such ways. Hence it is better to use these kinds of tools to not only improve student's knowledge and skills but also to make students willing to learn.

Incorporating peer feedback, can be an effective teaching method to develop not only student's knowledge but also their soft skills. Also, they suggested that this was one successful method for improve student's cooperative learning skills on an online platform. Likewise, they pointed out that, those who are not having proper internet connection and other equipment had been disadvantaged by these kinds of online activities. They noted recordings can be used to minimize such kind of situations. Hence it is suggested that it is better to make recording during students presentations in the zoom meeting and share recording with students. Then students can use the recording as a learning material.

Further, peer feedback had emphasized that improvement of e-learning skills in a positive manner.

The responses of the participants displayed a wide range of positive perspectives toward the student-centered learning that was made possible by using small group activities in an online platform. Overall, the study revealed that while it was beneficial in specific ways for many students, the small group activity method was motivating to effectively impact most participants of this tutorial class. As a summary, findings suggest that small group activities on an online platform can be recommended as a tool to improve student-centered and self-regulated learning as well as their skill in use of e-learning tools. This helps to improve student's active involvement in the lesson and enhance students collaborative learning.

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## Use of bichronous online learning to enhance students' virtual learning experience

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### Abstract

Virtual synchronous lectures were conducted replicating the same face-to-face teaching done in a physical classroom due to the pandemic situation. This method of teaching has been a challenge for the students as they were facing internet connectivity, logistic and computer hardware issues which has affected student learning and performance. While reflecting on the concept of blended learning it was decided to adapt bichronous online learning which is a blend of synchronous and asynchronous e-learning as a solution. Students were given a pre-recorded lecture and material (approximately 2hr student learning) for their week 7 lecture on "Online Business and Technology" to be viewed at their convenience prior to a deadline. This was followed by a synchronous discussion. The students were given a mock test at the end of the discussion and feedback was obtained. Marks and participation were compared with the previous weeks' mock test results and participation after the synchronous lecture. The number of views of the pre-recorded lecture was analysed prior to the synchronous discussion. A 100% of views were achieved out of which 75% had viewed the recording in full. For the synchronous discussion, 100% student attendance was recorded out of which 5% have left the session in less than 30 mins which is less compared to the 20% of the previous week. For the mock test, 65% of the students had obtained a mark above 65% which is greater than the mark obtained (45%) in the previous week. Further, the post-session student feedback too revealed that the intervention had a positive impact towards student virtual learning. The study shows that bichronous online learning has improved student virtual learning and performance. The method of giving an asynchronous component encourages self-learning which in turn makes time for a quality synchronous discussion while improving student performance and the virtual learning experience.

### Background

Blended Learning or Hybrid learning is the integration of face-to-face and online learning (Dziuban *et al.*, 2008). This method is widely used by many universities in the world where students are expected to follow part of the classes on campus and the rest online. Blended learning improves learning and enables students to learn at their own pace. In response to the COVID 19 pandemic all universities and schools in Sri Lanka shifted to blended learning. As it was a challenge to conduct face-to-face classroom learning the author had to use face-to-face (live) virtual learning with the use of a collaborative platform.

A steady internet connection with adequate bandwidth and computing hardware is essential for virtual learning. In addition, a peaceful and quiet environment is fundamental. With these prerequisites the author noticed that most of the students were facing difficulties in following and in participating in the synchronous face-to-face teaching sessions. This situation worsens towards the end of the month when the internet data capacity has been utilized to the



maximum and most of the students are unable to follow/attend the session. During the week prior to the intervention which was the last week of the month it was observed that 20% of the students left the session in less than 30 minutes of a two-hour session and did not follow the lecture. This was a disadvantage for the students, and it was causing stress and demotivation amongst the students as they were unable to engage in learning. This challenge motivated the author to research on online teaching methods.

Bichronous online learning is a blend of synchronous (live) and asynchronous (on-demand) e-learning (Martin *et al.*, 2020). Asynchronous e-learning is facilitated by media such as email and discussion boards while supporting work relations among teachers and learners even when students cannot be online at the same time (Hrastinski, 2008). This supports flexible e-learning while allowing the students to follow the course of study at their convenience. Synchronous e-learning is supported by media such as video conferencing and chat, this ensures the students learn real time and avoids isolation (Hrastinski, 2008).

With the given condition and the challenge of getting the students to engage during the synchronised session, bichronous online learning was considered as the remedial action. The main objective of this study was to assess the effect of bichronous online learning on improvement of student attendance and participation during virtual learning sessions and most importantly the progress in their performance.

## **Methodology**

The study was conducted on a first-year module with 40 students. The weekly lecture was conducted as an asynchronous component and the tutorial as a synchronous component. A relatively less complex topic was selected to test the change which was on *Online Business and Technology*. Initially, the students were informed on the new method of teaching via the LMS (Blackboard) announcements, and this was done three days prior to the session. The reason for the change was clearly mentioned and the students were given clear instructions to be followed (*refer figure 1*). The lecture handout and a video (approximately 80 mins student learning) was made available three days prior to the synchronous session and a discussion forum was opened on the LMS (Blackboard) to raise queries. Next, a pre-recorded lecture (approximately 40 mins student learning) was made available two days prior to the tutorial and the students were requested to view the recording at their convenience prior to the tutorial. The students were requested to make notes as usual and add any doubts to the discussion forum to be clarified. They were also informed to bring in their doubts to the tutorial to be further clarified. The time given was limited as the student attendance had to be monitored as per the university regulations.

In the tutorial, time was allocated to clarify doubts which arose from the lecture. Tools such as padlet and Blackboard collaborate breakout groups were used to enrich the discussion and encourage student participation. An online mock test was conducted on the LMS (Blackboard) to assess the students' knowledge gained from the lecture at the end of the discussion.

Subsequently feedback was collected via a google form to analyse the student perspective. The mock test results and student attendance were compared with the previous weeks' data which was purely conducted as a synchronous session.

Course Announcements  
Lecture 7 ( FT and PT Y1 Students) 4th November 2020

Dear FT and PT Y1 students,

I do understand that following a class virtually needs much effort and focus and do need a change once in a while.

Therefore, I have decided to make a slight change to this week's Lecture. This will give you the option to follow the lecture at your convenience within the day. This is how the lecture will be done.

Step 1. I will be uploading a recorded lecture and you will follow it **at any time tomorrow**.  
 Step 2. You will take down notes and highlight any unclear/gray areas  
 Step 3. Include your doubts on the discussion forum created under week 7  
 Step 4. I will be clarifying your doubts through the discussion forum and during your tutorial  
 Step 5: I will be having a quiz during the tutorial to assess your progress.

**Please note that the responsibility of learning this week's lecture is in your hands.** I have also uploaded a video and the handout for you

Attendance of tomorrows session will be monitored using student views on the video and the percentage watched.

The tutorials will take place as usual and will be a live session.

Hope you would like this change and will be refreshed for Next week's Lecture.

- Week 7
  - Visible to students
  - What is SEO?
    - Visible to students
  - Lecture 7
    - Visible to students
  - Lecture 7- Q&A
    - Visible to students
  - Lecture 7 Recording
    - Visible to students

Figure 3. Blackboard announcement and material

## Results

The views of the pre-recorded lecture were analysed prior to the tutorial session as given in figure 2. 100% of the students had viewed the pre-recorded lecture out of which 75% of the students had viewed the lecture in full. The views had declined after the 10<sup>th</sup> minute and 25% of the students have not followed the core section of the lecture. This could be due to the lecture handout been provided beforehand and requires further research.

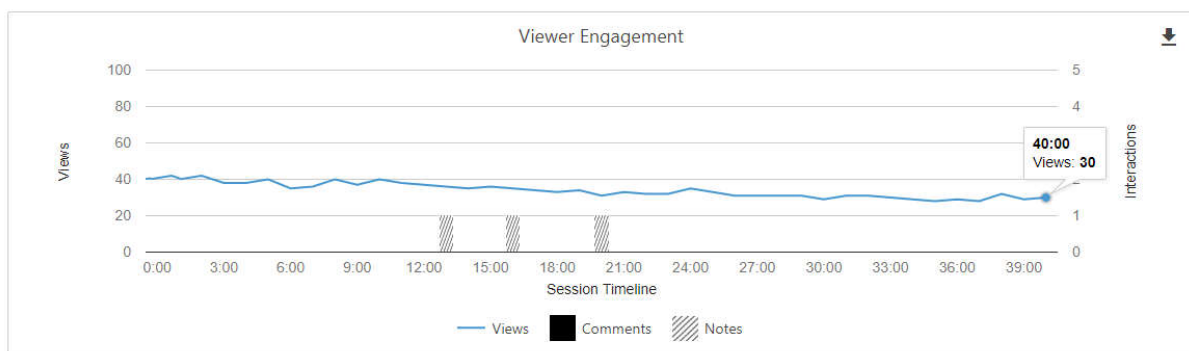


Figure 2. Viewer's engagement of the pre-recorded lecture

Table 1 summarizes the progress of the students in terms of attendance and mock test marks based on the mode of teaching. The bichronous learning session has shown better results in the mock test and the synchronous component of the bichronous session shows improved attendance in terms of students leaving in less than 30 minutes. The post-session student feedback had a positive outcome where 79% of the students mentioned that they liked this

method of teaching as illustrated in figure 3(a). Even though 79% of the students mentioned that they liked this method of teaching, as illustrated in figure 3(b) 71% had mentioned that it should not be made regular because the students are unable to clarify doubts immediately and has less interactions with peers.

Table 1. Comparison of attendance and mock test marks based on the mode of teaching

Week	Mode of teaching	Attendance	Students left in less than 30 mins	Mock Test marks > 65
6	Synchronous	100%	20% (8 students)	45% (18 students)
7	Bichronous (Synchronous component)	100%	5% (2 students)	65% (26 students)

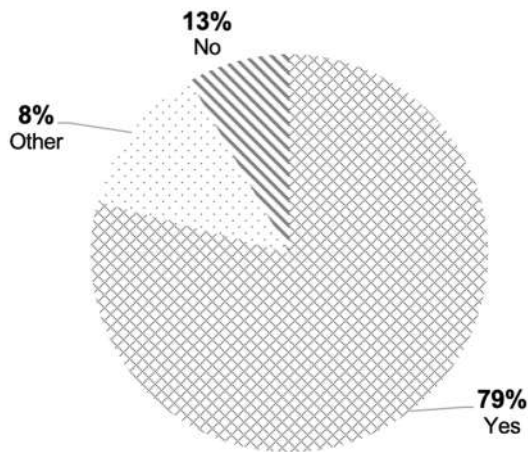


Figure 3(a). Like/dislike on method of learning

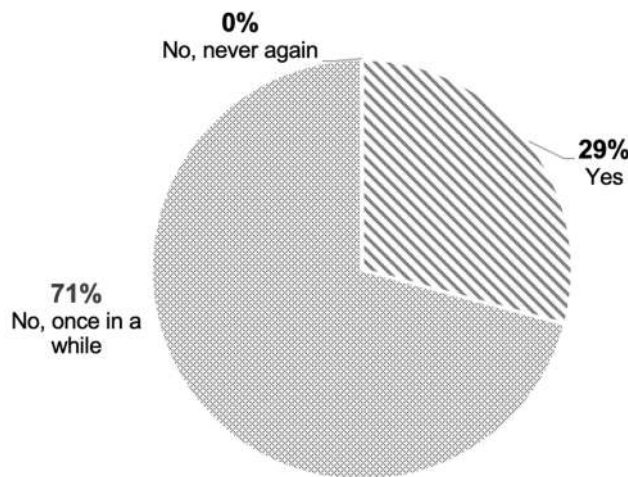


Figure 3(b). Should the teaching method be made regular?

### Discussion and Conclusion

Teaching in a blended form has been a challenge as the students in Sri Lanka are not geared for it. The spoon-feeding culture makes it even more difficult for a student to transform

themselves as self-learners. In order for blended learning to be successful a student must be trained to self-learn and the author has taken measures to inculcate this practice in the students while using bichronous online learning. Therefore, while reflecting on the feedback of the students, this method of learning could be used on weeks where students are facing bad internet connectivity which are mostly towards the end of the month and on days of adverse weather. While reflecting on the results it is quite evident that the student performance has improved by including an asynchronous component to their learning. It has also given the student the flexibility to learn at their convenience which in turn helps them to absorb better. This is justified by the student feedback in figure 4.

I personally think that listening to the lecture recording was very efficient, I was able to pause the recording for a while and I googled the terms I wasn't aware of, thereby i got a good understanding of everything while miss was teaching, and it was very easy for me to take down my notes clearly and properly, overall I prefer this method a lot as it is very efficient to me.

i was able to understand better, as i watched the lecture at a moment when i was relaxed. felt that it sunk in better:)

This is actually good, it allowed me to focus much better and just go back and questions certain concepts which helped me better learn overall.

Figure 4. Student feedback

Furthermore, while encouraging students to self-learn a certain portion of the concept it allocates more time for a quality discussion during the synchronous session which improves student engagement and participation and eliminate student boredom. This would reduce the time needed for synchronous learning and will take off the burden of poor internet connectivity issues and not being able to engage in learning.

The study discussed the use of bichronous online learning and confirms that this method of teaching improves student performance and attendance in contrast to pure synchronous teaching. This method also transforms a student into a self-learner which is crucial for blended learning and lifelong learning.

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## **Sustaining Continued Concentration in Class with Blended Learning: Student Perceptions**

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Conducting two-hour lectures on a Monday morning or immediately after lunch used to be one of the biggest challenges I faced as a lecturer. The restless look on students' faces after around 30 minutes of the lecture lowered my confidence as a lecturer. Initially I used to give my students a 5-minute break every half an hour to handle this. However, I was in a dilemma whether these short breaks distracted them from the learning process. I came up with an intervention to actively engage students in the learning process even during breaks to overcome this challenge. I utilized theories of pause theory, blended learning and active learning to conceptualize my intervention. At the beginning of the semester, I divided the class (65) into 'class participation activity' groups. Next, they were informed that a 10 minute break would be given every half an hour. During the 10-minute break the students participated in a quiz related to the subject on Mentimeter. I planned 10 quiz rounds and each carried 01 mark. I used this as an alternative for the 10 marks given for attendance. The success of the intervention was evaluated based on students' feedback survey with both closed and open ended questions. However, I realized that I had to be mindful about the time and other existing resources such having a classroom with a projector and internet facilities. Nearly 75% mentioned that the quizzes were helpful to retrieve their knowledge. Majority (91%) found the blended learning platform to be the best component and that it increased their interest. However, some (14%) were of the opinion that I should have allowed them to select their own groups. This study indicates that appropriate designing and blended learning can be effectively used to overcome the issue of maintaining continuous concentration in class.

### **Background**

I used to conduct a two hours lecture on Monday mornings for my Social Research class. It was a technical lesson and that might have been a new experience for students who follow Sociology. However, after about 40 minutes, I realized that the facial expressions of students started changing. There were frequent yawning and distractions, talking to each other and restlessness. These reactions made me realize that something was wrong. Even though this class was in the morning hours, being on Monday mornings meant that some students would have reached the university after travelling a long distance from home. This made me realize that I would be speaking for 40 minutes at a stretch and they deserved a break. Therefore, I gave them a 10 minute break every 40 minutes. The faces changed into cheer. When the breaks continued, I felt that teaching and learning was more effective and students' concentration was not hindered in between. This made me happy about the process and the reactions of the students definitely gave me a positive vibe.

Gibbs and Habeshaw (2001) discuss how students' attention is limited. They point out that any person will have an issue of carrying out a passive task such as listening to lectures or reading a textbook without losing attention. They further point out that students' performance and psychological arousal are lowered 15 minutes into a lecture. In practical

terms, they would record fewer notes with less accuracy. However, this could also depend on other factors such as time of the day and room temperature. According to Gibbs and Habeshaw (2001), this attention curve is a universal phenomenon.

Given that I was compelled to use the break technique in class, it always made me think whether it actually disturbs the learning process of the students. Given that Gibbs and Habeshaw (2001) recognize that giving a break in between is a good technique to sustain the attention of students, I thought of planning out an activity to keep them involved during the break. To plan out the intervention, I utilized the following theoretical orientations:

1. Active learning – Process of involving students in the learning process through more than just listening. Active learning techniques can be reading, writing, discussing and engaging in problem solving (Bonwell & Eison, 1991).
2. Pause procedure – this is an effective teaching strategy to maintain attention. Pause Procedure is a simple active learning strategy in which an instructor gives strategic pauses during each lecture (Chowdhury, 2016).
3. Blended learning - use of technologies in learning opportunities in campus based courses (Fry, Ketteridge & Marshall, 2009).

## **Methodology**

Since I had already utilized the break technique in class, I decided to continue these breaks and to develop a group based pop up quiz that could be utilized during these breaks based on the lessons that they learn in class. As per the literature discussed above, I felt that this would be a good way of upholding the concentration of students and to gain feedback on whether they have gathered the necessary knowledge or not. I further considered two main elements to sustain the interest of the students when planning this intervention.

The first element was the summative assessment. The usual assessment structure of the Faculty is 60% for the final examination, 30% for the mid-semester examination and 10% for class participation. I incorporated this 10% of class participation to this intervention. Then, I divided the class (of 65 students) into 10 'class participation activity' groups and prepared 10 quiz rounds of 10 minutes to be conducted throughout the semester. Each quiz round consisted of one (01) mark and completion of the full quiz rounds eventually awarded them 10 marks. Before awarding the said mark for each member of the group, each student was asked to handover a daily lesson reaction form based on the lesson which the quiz covered at the end of the lecture. There was no scrutiny of this reaction form and this was simply a strategy that was employed to avoid free riders as explained by Brooks and Ammons (2003). The second element was to make the activity more interactive using blended learning. Rather than having usual quizzes, I thought of conducting the quiz on the Mentimeter platform. That is because, on this e-learning platform, the answers are anonymous and the students did not have to worry when answering and it was an intriguing prospect to see how fast they would answer.

In the execution, I explained my plan of using class breaks to the class as explained above. Baratta (2010) has pointed out that Visual Learning is one of the most exciting and stimulating

learning methods. Hence, I showed my class how to use Mentimeter through a video. Given that this class had no visually impaired students, this was an effective way compared to teaching them about using Mentimeter.

The first day was the day of trial and it took some time for the class to get used to this procedure, many somehow managed. With time, I used various types of questions such as open ended, multiple choice and yes or no. It was very interesting to see the enthusiasm of the students. The success of this intervention was measured with a feedback form questionnaire which had both closed and open-ended questions.

## Results

The students liked this intervention mainly due to the blended learning element. Majority (91%) of the students claimed that they found the intervention interesting since Mentimeter was used. Further, 80% were also of the opinion that they liked the anonymity of the interface of the platform and that they were not worried about the accuracy of their answers. Nearly 20% suggested that it would have been better if anonymity was not an option so that competition could have been created among groups. About 95% were thankful about the decision of executing this on blended learning platform as it enhanced their knowledge on using such tools through their smart phones. On the other hand, 75% were also of the opinion that such blended learning platforms should be utilized more often in teaching and learning activities.

As I have mentioned earlier, the main objective of this intervention was to sustain concentration in class. Majority (96%) mentioned that this strategy was helpful for them to maintain continuous attention in class. Majority (53%) were also of the opinion that they prefer such activities instead of short breaks. Considerable amount (20%) further added that just breaks with no activity make them totally distracted from the learning process and it is difficult to get back to a learning mood. Hence, they believed this strategy was more suitable to continue their concentration in class. On the contrary, 8% was of the opinion that this activity was overwhelming and that it was hard for them to resume their learning mode following the activity. Majority (75%) also mentioned that this was a good way of retrieving their knowledge from previous lessons. It was interesting to see 46% pointing out that they never cared about going through the previous lesson before entering the class and this activity changed their whole approach in this regard. Hence, they were of the opinion that this was a good revision strategy for them.

Turning my classroom into an active classroom was also one of the main objectives of this intervention. In this attempt, I saw a positive change in my classroom. The nature of this intervention was such that it made students go beyond the boundaries of being a mere listener. Majority (89%) also claimed that they liked working in groups. They said that this helped them to develop certain skills such as people skills, negotiation skills and leadership skills. However, 14% were of the opinion that I should have allowed them to select their own groups as they found it hard to work with a set of unfamiliar classmates.

The following challenges were faced when executing this intervention. It was not as easy as it seemed. Even though our Faculty has wifi, the lecture hall where I conducted lectures had an

issue with wifi access and I had to make sure that it was sorted before the implementation. However, at the very beginning executing this intervention was time consuming because, students wanted time to get used to Mentimeter. Sometimes, the allocation of 10 minutes ended in 20 minutes. On the other hand, at the beginning I also felt that no matter how interesting this initiative was, I had a double workload as I had to prepare lectures as well as the quizzes on Mentimeter.

## **Discussion**

The findings prove that this method of sustaining students' concentration through blended learning was satisfactory. These attempts of making the task very interesting (through blended learning) and important (through aligning it with summative assessment) made this intervention more successful in sustaining the performance of students in class as pointed out by Gibbs and Habeshaw (2001). This further confirms the opinion of Biggs and Tang (2011), who point that it is important to change the ongoing learning activity to maintain continuous attention. The application of pause procedure as pointed out by Chowdhury (2016) in the form of a class break was the other highlight. However Chowdhury (2016) states that the lengths of intervals for pauses have no consensus. I utilized the 10 minute pause following Ruhl, Hughes and Schloss (1987) who utilized 12-18 minute intervals. Further, following the definition of Bonwell and Eison (1991), this activity made students to participate more than being mere listeners within the class. They were made to actively get involved in the quiz session using their phones, one of the e-learning devices as recognized by Fry, Ketteridge, and Marshall (2009).

However, I believe that it would have been better if I had followed a more organized mechanism of providing feedback after each quiz session. It would have been better if a systematic feedback format had been utilized in giving feedback as explained by Fry, Ketteridge, and Marshall (2009). I did not utilize an adequate platform for feedback specifically for the short open-ended questions. I was just expecting them to participate in the activity rather than having a discussion on the question due to the time constraints. I am looking forward to developing this further by keeping these drawbacks in mind. On the other hand, with the prevailing circumstances of the COVID-19 pandemic, I am looking forward to exploring the possibilities of utilizing this intervention on e-learning platforms such as Zoom. On the other hand, when considering whether the general applicability of this intervention in various teaching contexts, breaks are something we all consider as teachers. This is an intervention that will take teacher one step forward in making their class active and reap the benefits of blended learning.

## **Conclusion**

In conclusion, this attempt of sustaining student concentration through blended learning, gave me a lot of confidence that such changes can actually benefit my classroom. It made me see how silent students can be converted into active participants in class and how they sustain their attention in the class throughout. This was also an eye opener about how blended learning could be used with careful thought and be planned in order to ensure that the necessary intended learning outcomes are achieved.



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## **Adopting distance learning in Fashion Design education: collaborative learning approach during Covid-19 pandemic**

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### **Abstract**

There is an ongoing debate regarding the best approach to educate undergraduates in arts and design (AD) subjects through online mode due to the Covid-19 pandemic. AD students are predominantly learning through experimental and reflective learning, hence facilitating teaching, learning and assessment (TLA) activities in an online platform and maintaining an active learning environment were the identified issues of the study. The outcomes of this study will be beneficial for academia, undergraduates and service providers of online education platforms.

This study targeted level two, term three undergraduates of the Bachelor of Design (Hons), Fashion Design and Product Development degree course as a group project, according to the learning outcomes defined in the curriculum. Outcomes were analyzed through mixed methodology while it was evaluated through the observations of the two examiners and post project feedback collected by students for qualitative data analysis. Quantitative analysis was done with the results obtained from summative and formative assessments of the sample of 51 students (in 12 groups).

It was evident that 100% of participants were able to adapt to the online learning while the majority (90%) could virtually interact with group members in order to engage in active learning with real-time connectivity. Students' feedback revealed that the virtual factory visits and online guest lectures were able to fill the knowledge gaps of the industry-linked project. Results of the summative assessments evidenced 8.3% of A+s while B+ has recorded as the lowest result gained by a group.

In conclusion, it was observed that the possibilities of adopting the online approach were overweighing the challenges and limitations encountered as the overall results of the students are higher than the previous academic year which was conducted physically. The experimental learning was limited due to lack of materials and technical resources however it was overcome through peer group learning. Furthermore, the study has revealed that the need of TLA is to be adhering in relation to constructive alignment considering the pros and cons of distance mode teaching.

### **Background**

With the Covid-19 pandemic announced by WHO, the world started moving to online base working platforms in many industries. This has impacted on every field including business, careers and personal lifestyles of people. In this context considering the higher education system there is an ongoing debate regarding the best approach to educate undergraduates in arts and design (AD) subjects due to the Covid-19 pandemic, as the said subjects are mainly based on hands-on work and experimental learning approaches. The change and the

transformation was based on the technology of communications while being the way forward with online teaching and learning as a replacement for the traditional teaching and learning practices (Dilma, 2020).

Mednick (1962) explained that designers are learning through experiments and reflections. Bachelor of Design (Hons), Fashion Design and Product Development (FD&PD) degree is encouraging students towards self-regulated learning mainly focusing on experimental learning and reflective practices while creating a student-centered learning approach. According to Moxey (1998), the most effective and suitable analysing on creative practices is experiment based and morphological analysis. This will help creative people to easily go through these higher order thinking skills based on physical experimentations as analysis, evaluate and plan appropriate methods in an active learning approach (Moxey, 1998; Goodsell, Maher, & Vincent, 1992).

In order to achieve above expectations in AD education students need to reflect on their own knowledge and experience gathered through experimentations while they will be able to get a deep learning approach through field visits in order to identify learning as a combination of experiments with techniques and procedures (Race, 1998; Bailey, 2002). On the other hand Cooper, Bottomley, and Gordon (2004) claimed as cited Lee (2008) by that industry based experiential learning assignments afford students opportunity for deeper levels of learning and application of classroom learning which is challenging in online teaching and learning platforms (Lee, 2008). However, facilitation for critically reflective learning is a lecturer's responsibility to scaffold student learning (Brockbank & McGill, 2000).

Furthermore, in the general group learning practice students evolve into cohesive learning teams and enable to achieve a common goal through peer learning. However, throughout the literature in comparing the face-to-face education and distance education, it can be identified that the positive or negative impact depends on the subject area (Dilma, 2020).

In this context it was evident that there is a gap in between the previous practice and the new online approach to be taken in teaching, Learning and Assessment (TLA) activities in AD subjects in higher education. Therefore, the main objective of this study was to propose and evaluate a distance mode TLA strategy for design and other AD subjects, while the study focused on sub objectives such as analysing students' approachability and adaptability to online learning platform, plan and evaluate the effectiveness of collaborative learning in order to overcome the knowledge gaps in learning, compare the outcomes of the term and evaluate students' perceptions on online learning during Covid-19 pandemic.

## **Methodology**

This study was done targeting level two, term three undergraduates (sample of 51 students in 12 groups) of the FD&PD degree course as a group project, according to the learning outcomes defined in the curricula. Student groups formed by random grouping technique while it was used "learn-zoom" as the main online teaching and learning platform. Moreover, it was used as an online document management system (moodle) to upload learning materials

including video recorded zoom sessions and for assignment submission purposes. Students were facilitated through “zoom breakout room” option for online group discussions during the official self-directed study times to interact with their peer groups. Moreover the “zoom” web application was used to do group discussions, share peer work (digital sketchbook) and do peer evaluations through screen sharing option. Meanwhile google sheets were used to track individual group’s working progress through online updated group meeting minutes.

Throughout the term students stayed at home and engaged in TLA activities through the above platforms. Further the lecturers have facilitated online group tutorials, lectures, learning materials as references, guest lectures from industry experts and virtual factory visits from commercial apparel industry to support students working progress of the project from concept development stage to the end of range development stage.

Outcomes of the study were analysed through mixed methodology while it was evaluated through the observations of the two examiners, external evaluators (industrial experts) and post project feedback collected by students for qualitative data analysis. Students’ feedback collected through an online questionnaire which had circulated at the end of the term and post lecture discussions. Quantitative analysis was done with the assessment results obtained from summative and formative assessments of the term. For the formative assessments students presented their working progress through verbal and PowerPoint presentations through zoom to lecturers and industrial experts who took part as external evaluators.

## Results

Throughout the study, it was evident that 48 students out of 51 had real-time connectivity to each zoom session as an average. According to the students given feedback and lecturers observations, students’ adaptability to the online working platform was 100% as all the students were able to create their virtual sketchbook and timely complete given formative and summative assessment tasks. The results revealed that the higher majority (82%) of students found that the online group working strategy was helpful for them in order to scaffold their level of learning as individuals while only seven (7) students have an opposite perception on that (Figure 1). Moreover, results of the study highlighted that the online guest lectures and the virtual factory visits helped students to enhance the level of outcome of their final design range, as 78% of them (representing all groups) strongly agreed to that (Figure 2).

Considering the group wise results of the summative assessments evident 8.3% of A+s while B+ has recorded as the lowest result gain by a group. Table 1, showcases a comparison of the summative assessment results of this study (online in 2020) and the results of physically progressed term in year 2019 which used the same project brief, assessment requirements and assessment rubric (appendix 01) followed by the same learning outcomes of the relevant term where the same examiners involved in TLA activities.

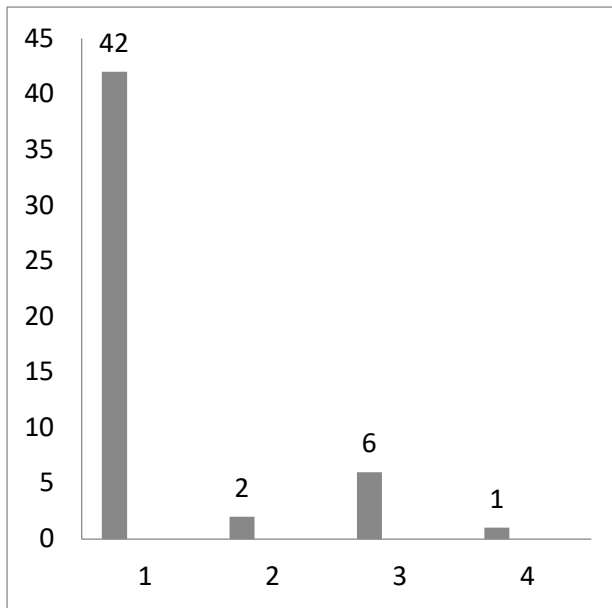


Figure 1. Students' feedback on team working approach for online learning

- 1- It really helpful for me
- 2- It was somewhat helpful
- 3- I prefer to work individually
- 4- It was not helpful at all

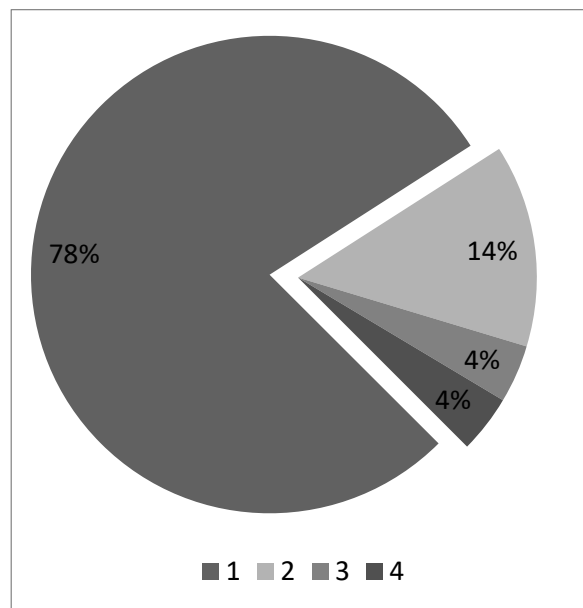


Figure 2. Students' feedback on the effectiveness of online guest lectures and virtual factory visit

- 1- Strongly agree
- 2- Somewhat agree
- 3- Not sure on this
- 4- Not agree

Table 1. Comparison of results between physical (2019) and online (2020) assessments

	A+ (85-100)	A (75-84)	A- (70-74)	B+ (65-69)
2019	2	6	2	2
2020 (Online)	1	8	2	1

## Discussion

Focusing on the results obtained in the study it was evident that students and the lecturers were able to quickly adapt to the online TL platforms as all students have mentioned that they were able to actively engage in academic work during the term. However, it was noticed that students were not performing well at the initial strategy development period as they were new to the platform by that time. As an important fact it was visible that the transition to distance education was rapid and this situation was difficult due to the lack of experience of using the distance education system, but then they were able to overcome this difficulty. When the literature is analyzed, it is revealed that students have negative attitudes and views towards distance education for similar reasons and some other reasons such as they get bored with distance mode learning (Dilma, 2020).

On the other hand, students have highlighted some positive factors such as learning in a comfortable and familiar environment and time effectiveness. The literature revealed the same fact that distance education does not have a time and place limit, that they can reach more examples and resources due to their technological infrastructure (Dilma, 2020). Based on the results of the study it was visible that group working strategy has helped students to

learn online as they were able to share resources, assess past lectures (recordings) and reflect on them while discussing in peer groups whenever they needed.

In addition to that there was a significant improvement in students' computer aided design (CAD) skills when they submitted their online portfolios/ sketch books for the final evaluation. Miller & Smith (2009) have explained that in any mode of learning students adopt the required skills for the relevant mode of learning. Proving the fact that these students were able to acquire CAD skills where the other students were able to develop their own illustration style in the previous (face to face) learning method. Moreover, considering the final assessment results and the comparison of results between year 2019 and 2020 it was evident that results following online TLA are equally good as those obtained from face-to-face mode. Furthermore, students were able to improve additional certain skills such as presentation skills, peer evaluations and cooperative learning which are essential for their future career development as a designer. The study further highlighted easy reachability to lecturers' and peers' feedback as some other advantage which has been highlighted in the literature as an improvement of interaction and collaborative learning approach through distance mode learning (Saromines-Ganne & Leong, 2014).

## **Conclusion**

In conclusion, possibilities of adopting the online approach were outweighing the challenges and limitations encountered as the overall results of the students were higher than the previous academic year which was conducted physically. However, as a major drawback, the experimental learning opportunities were limited due to lack of accessing the materials and technical resources. Though the online factory visits and guest lectures were able to overcome some of the learning gaps it was evident that hands-on work experience and physical engagement is still expected from the students' perception. Finally, the researcher can suggest studying on the constructive alignment of TLA according to the curricular as it can be seen that the mode of delivery effects on different expected learning outcomes in different TLA levels.

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**Appendix 1 – Assessment rubric which has used for the final/ summative assessment**

<b>Unit Title: Industry Linked Team Project in Fashion</b>											
<b>Learning Points:</b>		<b>Value:</b>			<b>Unit:</b>						
<b>Examiners:</b>											
<b>Group No:</b>											
<b>Learning Outcome Assessed</b>	<b>Fail 0-29</b>	<b>30-39</b>	<b>3<sup>rd</sup> 40-44</b>	<b>3<sup>rd</sup> 45-49</b>	<b>3<sup>rd</sup> 50-54</b>	<b>2.2 55-59</b>	<b>2.2 60-64</b>	<b>2.2 65-69</b>	<b>2.1 70-74</b>	<b>2.1 75-84</b>	<b>1<sup>st</sup> 85-100</b>
	F	D	C-	C	C+	B -	B	B +	A -	A	A+
Comments											
Ability to analyze and evaluate research findings from a breadth of sources and apply to the problem-solving process											
Ability to make a formal presentation, (within a team) with supporting evidence of your proposed product presented in a professional manner											

## **Adaptation of Jigsaw technique to virtual classroom at COVID-19 onset and its effect on student learning experience**

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### **Abstract**

With the prevailing global pandemic situation, physical classroom education has been disturbed and online instruction has taken prominence. In this inevitable global shift, teachers have been challenged with the task of keeping students engaged while creating positive learning experiences. Jigsaw technique is a widely accepted cooperative learning technique for the physical classroom. In this study, it is explored how Jigsaw technique was adapted to virtual classroom to reap the benefits of student engagement and collaborative learning. The study spanned across two consecutive batches of second semester Engineering Technology students studying yarn manufacture module. Physical Jigsaw classroom session was conducted with the first batch of students (54 students) on the topic “Ring Spinning process flow”, concluding with a poster presentation. Same activity was carried out with the second batch of students (51 students) via Zoom online platform utilising its breakout rooms facility to create Home groups and Expert groups. Here, poster presentations were converted to collaborative PowerPoint presentations via Zoom. In both environments, student attainment was assessed through lecturer’s observations on the presentations and student learning experience was evaluated through a Likert scale questionnaire. t-test analysis of all the four questions showed that there was no significant difference between the knowledge sharing and learning experience gained by the students in physical classroom compared to the virtual classroom. However, lecturer’s observations on the presentations showed that student attainment was lower in the virtual classroom. This may be due to communication issues and lecturer not being able to make direct and prompt interventions. This study shows that with proper tools and design, Jigsaw technique can be adapted with some success to virtual classroom compared to the physical classroom. Though student learning experience seemed similar, attainment is not the same as in a physical classroom and hence further research is needed to explore this.

### **Background**

With the onset of the COVID-19 global pandemic, traditional physical classroom learning has been crippled and there is a global shift towards online education in response to the social distancing norms and travel restrictions. Higher educational institutions in Sri Lanka also had to follow this approach to continue academic activities during difficult times of COVID-19 outbreak in the country. Lanka Education and Research Network (LEARN) facilitated this through their onsite Moodle and Zoom software platforms. To further strengthen this initiative, internet service providers in Sri Lanka provided toll free access to these LEARN platforms increasing the accessibility and affordability of learning opportunities to all the students around the country (Hayashi *et al.*, 2020). However, with online instruction, despite



the availability and access to technology, teachers have been challenged with the task of keeping students active and engaged while creating positive learning experiences. Recent research conducted in India and Romania have identified a number of issues in online education which hit the mainstream in a very short time due to the pandemic (Coman *et al.*, 2020; Kumar *et al.*, 2020). Major issue that the researchers have identified was poor technical readiness of the teachers and the students, and improper adaptation of teaching style to the online environment. (Coman *et al.*, 2020; Kumar *et al.*, 2020). Therefore, in order to support the student learning during this pandemic, conventional teaching and learning activities must be improvised or new strategies need to be explored and adopted. Published literature on this aspect with respect to the Sri Lankan higher education was not found at the time of this publication.

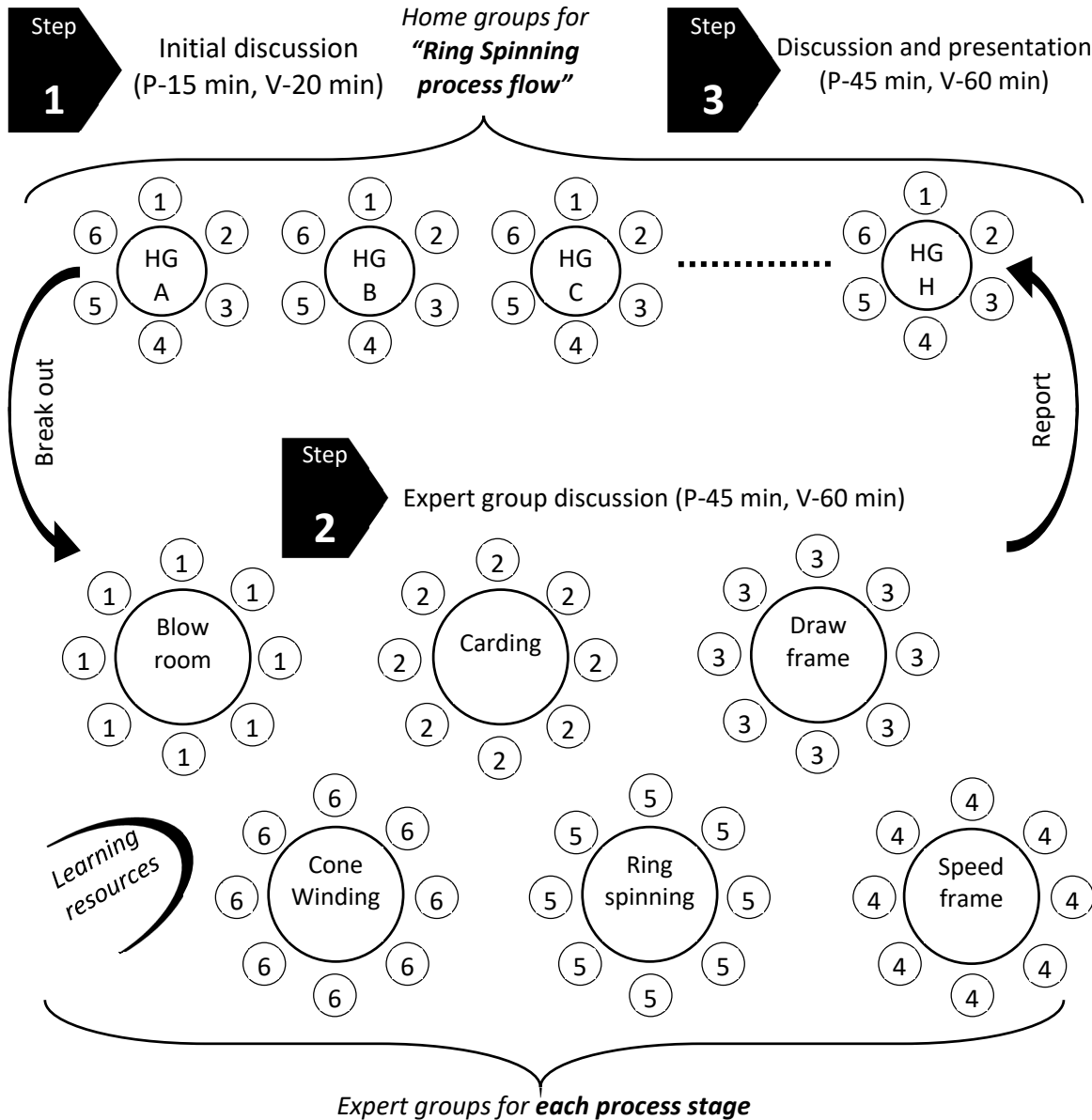
Jigsaw technique (Social Psychology Network, n.d.) is a widely accepted cooperative learning technique for the physical classroom. It aids the development of collaboration and communication skills in students through group working (Cahyani *et al.*, 2021) which are identified as 21<sup>st</sup> century learner skills. Mind mapping, summarizing, visualization or process flow building can be used in the final step of the Jigsaw learning activity to evaluate the students and to develop another set of skills in the students. However, with the COVID-19 pandemic situation, this physical classroom activity was not feasible. If the classroom interactions could be facilitated remotely via technology while following the concept behind the Jigsaw technique, it may be possible to replicate this learning experience to a certain extent in the virtual learning environment. Thus, in this study, it is explored how Jigsaw technique was adapted to virtual classroom to reap the benefits of student engagement and collaborative learning.

## Methodology

This study spanned across two consecutive batches of second semester Engineering Technology diploma students studying Yarn Manufacture module. The learning activity was implemented on the study topic “Ring Spinning process flow” with both batches of students. This topic is an overview to stages of a process flow that students will be studying in-depth throughout their semester. First batch (2018/2019) of 54 students underwent a Jigsaw learning activity in the physical classroom and the second batch (2019/2020) of 51 students underwent a Jigsaw learning activity improvised for the virtual classroom. Figure 1 illustrates the design of the Jigsaw learning activity. When home group sizes were not equal, two students were allocated to the same stage in the process flow to make the activity feasible.

In the physical classroom, students were allocated to Home Groups with each group member being responsible for one stage of the process flow. Afterwards, students who got the same process stage had to breakout to Expert Groups to learn and later had to report back to their Home Group to discuss and compile a group poster and present the “Ring Spinning process flow”. Resource materials were provided to the Expert groups at the Resource Room and access to internet was provided for further study. Lecturer was available throughout the session to support the students as needed. Same activity was implemented with the second batch using the Zoom online platform. Compared to the physical session, the implantation was different, and the session spanned for two days. A prior guideline was given to the

students explaining the use of Zoom software features. Home Groups and Expert Groups were created in Zoom session by utilising its breakout rooms facility. Inside these breakout rooms, students could talk, chat with each other, share materials and share their screens. Further, using the “Ask for help” option in Zoom breakout rooms, students could also ask for support from the lecturer.



HG – Home Group; P – Physical session; V – Virtual session

Figure 1. Illustration of Jigsaw learning activity for Ring Spinning process flow

After starting the virtual class, students were assigned to Home Groups and they were asked to rename themselves with the Home Group letter as a prefix. Using this identification, they were moved to the Zoom Home Group breakout rooms. After students divided process stages among themselves inside the Home Group, they were again asked to rename themselves with both Home Group and process stage number as the prefix. Using this identification, students were moved into Zoom Expert Group breakout rooms. Resource materials were shared to

these expert groups in electronic format by the lecturer and the first day's session concluded with this Expert Group discussions. On the second day's session, students had to use the previous day Zoom name and accordingly they were put back to their Home Groups to discuss and compile a group poster as a collaborative PowerPoint presentation and to present it. On both days, lecturer took rounds to interact with the Home Group or Expert Group breakout rooms and to support the students.

From both first and second batches, student feedback was collected after the learning activity through a 5-point Likert scale questionnaire with "5" being Strongly Agree and "1" being Strongly Disagree. The questionnaire had four questions to rate the student learning experience and both batches got the same questionnaire. Students' feedback questionnaire ratings for each question from the physical classroom activity and the virtual classroom activity were analysed for statistical significance with an independent t-test. The results of the four t-tests are tabulated in Table 1. In both physical and virtual classroom sessions, student attainment was assessed through lecturer's observations on the presentations.

## Results

According to Table 1, the significant probability value ( $p$ ) is higher than the critical value  $\alpha = 0.05$  for all the questions in the questionnaire ( $p > 0.05$ ). Accordingly, Null Hypothesis was not rejected for all four t-tests. Therefore, from the student's perspective, there is no significant difference between the physical session and virtual session with respect to the knowledge gain and learning experience. According to lecturer's observations both physical and virtual Jigsaw classrooms showed active student engagement. Furthermore, it was observed that the number of students who asked questions during the physical session was higher than in the virtual session. Observations on the physical classroom poster presentations showed perfect grasp of the subject matter and good creativity. However, in contrast, observations on the online PowerPoint poster presentations showed slightly lower attainment.

Table 1. Analysis of student feedback on physical session and virtual session

Method of delivery	Physical session (54 responses)		Virtual session (51 responses)		p-value
	Mean	Std Deviation	Mean	Std Deviation	
Questions					
After the activity, I know what will be covered during the semester ahead	4.02	0.66	4.08	0.66	0.717
I think the activity will guide me to achieve my best level of learning during the semester	4.11	0.66	4.00	0.63	0.455
Sharing the knowledge, I got from the expert group with the home group, helped me to develop my learning and presenting skills	4.35	0.65	3.98	0.68	0.064
Today's activity could be recommended as good for learning/distance learning	4.48	0.67	3.73	0.72	0.786

[rating scale used: "5" = Strongly Agree; "4" = Agree; "3" = Neither Agree nor Disagree; "2" = Disagree; "1" = Strongly Disagree]

## Discussion and Conclusion

According to the results from the hypothesis testing, students have rated the physical Jigsaw classroom learning and the virtual Jigsaw classroom learning to be similarly effective. This indicates that the student perception on the Jigsaw learning activity is not significantly different with the change of the interaction platform. Active student interactions and questioning observed in both platforms further supports this finding. It was also observed that some Home Groups had started collaborating on the PowerPoint poster presentation prior to formal second day session which was a very positive sign. However, lecturer observations on slightly lower attainment of the students in the virtual session needs to be explored. It could be due to communication issues and lecturer not being able to make direct and prompt interventions with the students as the student engagement was not observable to the lecturer. Further, according to many researchers, student feedback does not completely represent the actual students' attainment in learning (Uttl *et al.*, 2017; Jimaa, 2013). Therefore, though student perception on their learning was similar in both scenarios, similarity in learning may not have taken place as intended. In the virtual session, students were a slightly reluctant to ask questions and lesser number of questions were asked, even though more time was allocated for the same than the physical session. This could very well be due to the lack of social relationships with the peers and the lecturer as this second batch of students never had the opportunity for any physical encounters or relationship building activities. This aspect also could have contributed to the lower attainment of the students in the virtual session.

Online instruction appears to be a monotonous teacher centred instruction platform. However, this study shows that with proper tools and design, Jigsaw technique can be adapted with some success to the virtual classroom compared to the physical classroom so as to have an interactive and collaborative learning experience. Further research is recommended in order to explore the observed difference in student attainment in the two platforms and student learning behaviour in the virtual classroom.

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## **Facilitating self-regulation to improve a required memorising practice in Ayurveda Learning by perception change and blended learning**

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### **Abstract**

Memorising authentic stanzas is used as a prelude to acquiring Ayurveda clinical skills as it helps reduce cognitive load. However, this has not been properly incorporated into teaching. Using translated text in undergraduate teaching and learning (UTL) has been the practice throughout ninety years of Ayurveda higher education. This has resulted in errors of transferring knowledge as original authentic texts are in Sanskrit. Founders' recommendations in learning Ayurveda theories are: memorizing, comprehending, analysing and applying the contents of stanzas. This vital part of Ayurveda UTL is threatened to go into disuse due to the negative mind set generated when memorising and recitation (M&R) is projected as rather 'primitive', and needs to be urgently addressed. Therefore, the blended learning strategy was used and tested. Acting on this, students were repeatedly reminded of lifetime application aspects of memorised information and the resulting impossibility and inefficiency in avoiding M&R. Their distaste continued when sessions were initiated under the new professional scheme and the self-rated questionnaire showed a low preference (of  $\leq 20\%$ , n=120). It was also observed that the male students were the larger displeased group. Lecture presentations included demonstration of authentic chanting segments alongside theoretical explanation of stanzas. Students were asked to participate in the next session after having listened through their own devices, with these changes made available through the LMS. Such provision, as blended learning, facilitated self-regulated student learning in the form of repeated listening at times and places of their own choosing. After Vedic stanzas were practiced by this method, over 75% of students showed relaxed attitudes and elevated engagement according to the self-rating questionnaire. Enhancing the calibre of methodical learning compared with traditional lectures was  $\geq 50\%$ . Expectation for continuation was  $\geq 85\%$ . Male students still not being on par with female students remains to be addressed. This change encouraged students to actively engage in TL. This level of preparation is of paramount importance to improve quality Ayurveda education.

Keywords: Memorising practice, Recitation, stanzas, Authentic Chanting segments

### **Background**

Learning scriptures in Ayurveda is based on cognising facts through sensory experiences in lieu of information-based methods used in conventional classroom education. A student is considered highly proficient in Ayurveda when concepts learnt from the teacher are repeatedly studied, recited and applied in a clinical environment. Teaching and Learning (T&L) in the Bachelor of Ayurveda Medicine and Surgery (B.A.M.S.) programme is a scripture based fixed orality of a definitive text. This strategy of memorizing and reciting (M&R) equips students to move into B.A.M.S. program settings where they encounter large volumes of

reading, and helps organise memory in order to reduce cognitive load. Also, the M&R is followed by grammatical comprehension to decode all information encoded within the stanza, essentially mastering the text. The active learning M&R component of Sanskrit verses in teaching and learning of the Ayurveda B.A.M.S Program is usually identified as rather novel to a standard student enrolled from any social setting.

In the coursework, as a separate entity, M&R has not been properly evaluated in accordance with T&L of Ayurveda scriptures throughout the ninety years of Ayurveda higher education. This has resulted in errors of transferring knowledge as original authentic texts are in Sanskrit. Similarly, the benefit of M&R not having been identified, it tends towards less marks in oral examination. This important process in Ayurveda T&L is quietly being pushed out of use, due to a commonly held attitude of considering memorization as 'primitive', and needs to be urgently explored and addressed. Hence a blended learning strategy was used and tested among a newly enrolled student group in a new professional curriculum. This study aimed at effecting change in perceptions, personal abilities and performance of students, through the use of blended learning.

In the literature, Ayurveda is documented as giving voice to an ageless, unchanging soundscape passed down generations with its origins over 5000 years ago. The major components of T&L, i.e., learning, teaching and discussion (*Adyayana*, *Adyapana* and *Sambhasha*) are deemed vital to become a well-versed Ayurveda physician. Ayurveda scriptures are composed of prose and verse. Verses are concise medical concepts which are constructed, accorded with *Aksara* (Unit of time/snap), *Matra* (length of a syllable), *Gati* (composition of the stanza), and *Yati* (Rhythmic Phrase). Scriptural recitation rules maintain the concerned cognitive effects (Panja, 2016). This style of learning drives a student to use two tools of comprehension i.e., language and concepts. Therefore, Ayurveda stanzas constitute scientific meaning, aesthetic appeal and literary grandeur. Thus, the M&R reinforces active learning. Student teacher relationship establishes the oral tradition of Ayurveda learning which flows through generations to protect the purity and the originality of this life science of Ayurveda. This is best explained in the age-old simile of how a pure water pond serves beings until it is protected and conserved.

Proper phonation of the student is examined by the teacher by means of prescribed facial features in lips, tips of teeth, eyes, straight nasal bridge and other moral and behavioural attributes (Sharma, 1999) deemed vital to properly generate sound as well as silence with appropriate metres (*Chandas*) and avoid misinterpretation. This share of the oral tradition can only be rendered through a competent teacher. A competent teacher must first have the aforementioned physical attributes to maintain the pace, gestures, expression, etc (Sharma & Dash, 2003) and be able to enlighten the students.

In phonation, the consonants of speech are articulated by bilabials, nasal and dental sites. Thus, 'P' and 'b' are labials, 't' and 'd' are dentals while 'n' and 'm' are nasals. Sounds (and silences) shape emotional and intellectual perception and increase cognitive function. This causes deepening of the semantic meanings of texts, as well as imparting non-semantic, affective meanings to them. Thus, rhythmic recitation of accurate phonation (*Svara* and *Varna*) adds the aesthetic experience with relaxed feeling and an added sense of spirituality.

(Ayur)vedaic chanting are combinations of transcendental sounds, and is considered as one technique-focussed attention meditation (FAM). FAM produces sounds of semantic or non-semantic meanings by inner and outer resonance and vibrations which transform potential energy (Dudeja, 2017). FAM induces a narrow attentional focus increasing attention, This state of restful alertness would be achieved because it is in a natural resonant vibration which causes synchronization of the left and right hemispheres of the brain, brain oxygenation, heart rate and blood pressure reduction, calm brain wave patterns and thereby releases the mind from anxieties resulted by the increasing cognitive activity. Vedic recitations follow nasal sounds (*Anuswara*), which produces vibrations that soothe the mind. The changes latently contain the essence of music and life sustaining energy. Nasal sounds of humming boost the production of Nitric Oxide (NO) in the body (Lundberg & Weitzberg, 1999). NO is an important regulator and mediator of numerous processes in the nervous, immune and cardiovascular systems, vascular smooth muscle relaxation etc.

Reformation of curriculum and T&L has produced blended learning (BL). With BL, online and face-to-face class activities can be integrated in a planned, pedagogically valuable manner (Teach Thought Staff *updated in 2020*). Therefore, almost all objectives of self-practice can be easily utilised. The age-old practice of T&L explained in Ayurveda is easily incorporated with new methods of T&L. Accordingly correct phonation, prescribed rhythm, repetitions, selecting a comfortable time etc are facilitated by BL.

Also, recitation and memorization complete Kolb's experiential learning style. This continues through experiencing, observing, conceptualizing and applying while a student and extend even into their professional career. During the phase of exposure to the recitation, the student feels and observes the Vedic recitation and composed language rules, phonation guidance, etc. This can make them to become imaginative and artistic and to be more thoughtful of the recitation, content learning with grammatical elaboration along with its practical application. Thereby the developed perception is put forth to active experimentation (Saul McLeod, 2017).

## **Methodology**

27 male and 93 female students (120 total) aged 21-23 years, who were all native Sinhala speakers and in their first semester B.A.M.S. programme, participated in this study for evaluating the two methods of learning stanzas (i.e., standard reading with memorising, followed by BL). Before and after each learning method, a 8-10 minute anonymous questionnaire was used to evaluate each method. This questionnaire consisted of 5 dichotomous questions, 2-3 quantitative 5-point Likert scale questions and 5 unstructured questions. The sample was aware and unaware in equal proportions that memorization and recitation(R&M) of stanzas were a co-component in the program.

Students were first introduced to the Sanskrit stanzas with a handout that included transliterated Sanskrit stanzas to introduce proper phonation. Their feedback perceptions on M&R were then gathered using the questionnaire. In the next session students were introduced to the rhythmic chanting, assisted by teaching assistants and teaching aids. For the BL method, this chanting was made available through the LMS for students to use on their own (i.e., self-regulate). After one week, their feedback perceptions on BL were gathered



with the same questionnaire. The response rate was 100%.

## Results and discussion

The preferability for R&M stanzas had a more positive skew in the post-activity evaluation. Number of students who considered R&M preferability as 'moderate' went down to 27 from 45 while students who felt 'unpleasant' went down to 2 from 28, and 'very unpleasant' to zero from 29. Students who considered R&M 'pleasant' and 'very pleasant' went up to 55 and 36 from 18 and zero, respectively. Before the introduction of BL, a majority of the students (numbering 88) considered reading stanzas as 'difficult/troublesome', which went down to 13 after the BL activity. Also, 97 students marked that they were feeling less pressure in studying the stanzas after the BL activity. 57 student numbers who marked that they were embarrassed at the fact that they have to study/recite the stanzas, went down to 20 after the BL exercise, 12 and eight students chose to not answer this question in pre- and post-questionnaires respectively. Thus, the BL activity has positively impacted the perception of students by alleviating anxiousness in R&M.

Students were also asked to mark the difficulty of reading stanzas on a Likert scale with 1 for 'Very Difficult' ranging up to 5 for 'Very Easy'. Three students marked 'very difficult', which went down to two on the post-BL evaluation. 22 Students marked 'difficult' went down to 3, i.e., down roughly to 1/7<sup>th</sup>. Further, 75 Students who marked 'moderate' (difficulty) in the pre activity questionnaire went down to 50 in the post activity questionnaire. The number of students who marked reading stanzas in Sinhala as 'easy' increased fivefold, from 10 to 50. The four students who marked 'Very easy' doubled to eight. This demonstrates that the guided reading in BL positively impacted the students. Students were able to more efficiently and quickly practice reciting and studying the stanzas. This is evident in the pre- and post-activity) data collected on time aspects. Number of students who studied for 1-2 hours reduced by 45%, from 22 to 12. Similarly, students who studied for 30 minutes to 1 hour increased by 9%, from 33 to 36. Students who studied for less than 30 minutes had also increased by approximately 42%, from 47 to 67. 18 and 5 students did not answer this question pre- and post-activity, respectively. The time of day in which the students practice memorising stanzas was also inquired. Students who study in the evening or at night went down by a negligible 3, to 44. Number of students who study in the early hours of the morning went down by 25%, from 45 to 34. However, there was an increase of 50% of students who studied while commuting. This clearly shows that the activity helped students to study while commuting and has helped reduce the stress in studying. Also, it would be an effective use of assigned notional hours of T&L. Towards the end of the post-activity questionnaire students were inquired on how they utilise the resources provided and whether they use self-recordings to supplement the BL activity. Eight students marked that they use both a self-recording and the provided recording, 97 students marked that they only use the provided recording and one student stated that they only use the self-recording. 14 students chose not to answer this question. Also, towards the end of the BL activity students were asked whether they had a plan to continue using a similar practice for other stanza-related study modules in the BAMS program. To this, 104 (>85%) students answered 'yes'.

Upon further observation of the data, it was observed that, statistically, male students were

not on par with their female counterparts. This remains an issue to be addressed.

## Conclusion

The study explored the use of a blended teaching and learning method to help preserve an important practice of learning in Ayurveda in relation to stanzas. These stanzas in Ayurveda are a prime resource in comprehending Ayurveda theory and its application to different practical situations so that exploring and developing less stressful study methods, including the introduction of an entertaining aspect, will help students to master and use Ayurveda theory. The study showed a clear trend that the amount of time in studying stanzas had reduced considerably after the introduction of the blended learning method and that by impacting positively on student perception on the recitation of stanzas, students began experiencing significantly less stress regarding memorising stanzas.

This study showed that the introduction of blended learning had a clear positive effect on student learning of stanzas through M&R methods, along with indications that students began to self-regulate themselves with regard to the choice of time and place of their learning activities. It provides an example as to how similar BL methods can be utilised in teaching other relevant modules in the Ayurveda coursework.

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