Sri Lanka Institute of Information Technology

PROJECT REGISTRATION FORM

(This form should be completed and uploaded to the Cloud space on or before XXXXXXXXX)

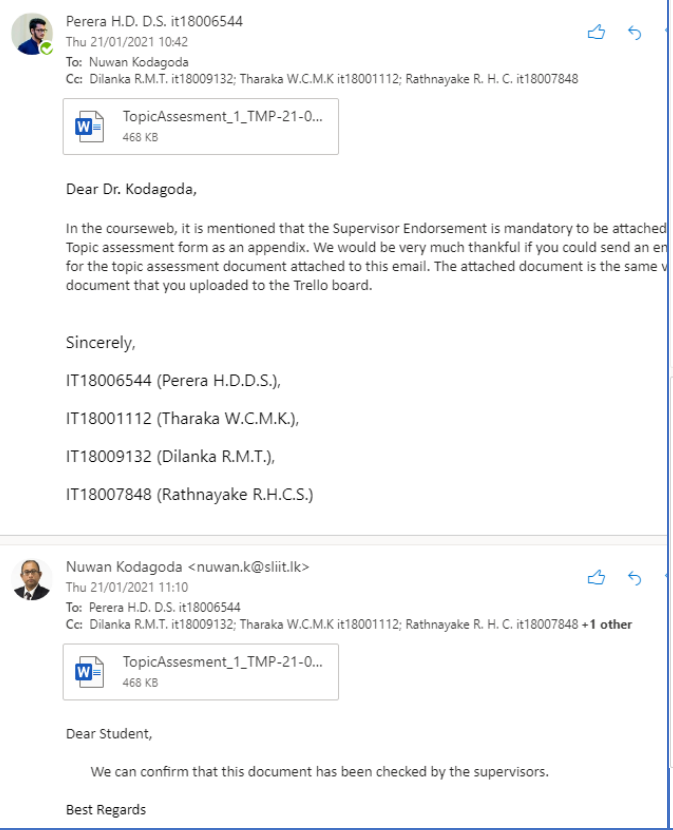
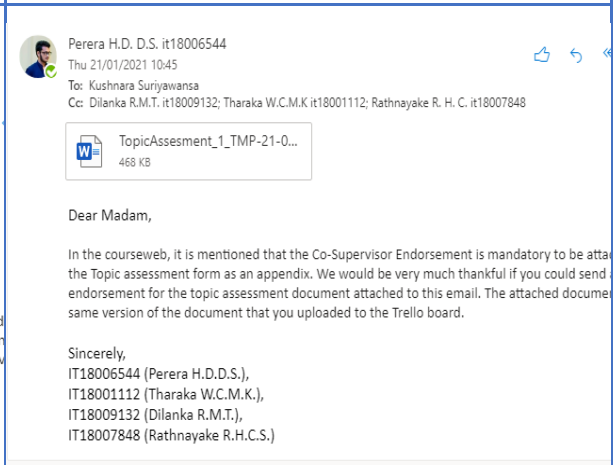
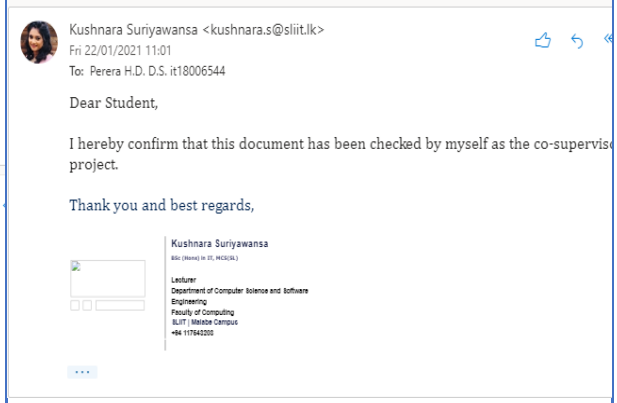
The purpose of this form is to allow final year students of the B.Sc. (Hon) degree program to enlist in the final year project group. Enlisting in a project entails specifying the project title and the details of four members in the group, the internal supervisor (compulsory), external supervisor (may be from the industry) and indicating a brief description of the project. The description of the project entered on this form will not be considered as the formal project proposal. It should however indicate the scope of the project and provide the main potential outcome.

PROJECT TITLE (As per the accepted topic assessment form)	Enhancing Online Teaching and Learning Experience by Using Multiuser Virtual Environment.
RESEARCH GROUP **(as per the Topic assessment Form)**	Elearning and Education
PROJECT NUMBER	(will be assigned by the lecture in charge)

PROJECT GROUP MEMBER DETAILS: (Please start with group leader's details)

	STUDENT NAME	STUDENT NO.	CONTACT NO.	EMAIL ADDRESS
1	Perera H.D.D.S	IT18006544	0775356977	It18006544@my.sliit.lk
2	Tharaka W.C.M.K.	IT18001112	0711220916	it18001112@my.sliit.lk
3	Dilanka R.M.T.	IT18009132	0767402535	it18009132@my.sliit.lk
4	Rathnayake R.H.C.S	IT18007848	0774203900	it18007848@my.sliit.lk

SUPERVISOR, CO_ SUPERVISOR Details

SUPERVISOR Name	CO-SUPERVISOR Name
Dr. Nuwan Kodagoda	**Ms. Kushnara Suriyawansa**
Signature	**Signature**
Attach the email as Appendix 1  Perera H.D. D.S. it18006544 Thu 21/01/2021 10:42 To: Nuwan Kodagoda Cc: Dilanka R.M.T. it18009132; Tharaka W.C.M.K it18001112; Rathnayake R. H. C. it18007848 TopicAssesment_1_TMP-21-0... 468 KB Dear Dr. Kodagoda, In the courseweb, it is mentioned that the Supervisor Endorsement is mandatory to be attached Topic assessment form as an appendix. We would be very much thankful if you could send an en for the topic assessment document attached to this email. The attached document is the same v document that you uploaded to the Trello board. Sincerely, IT18006544 (Perera H.D.D.S.), IT18001112 (Tharaka W.C.M.K.), IT18009132 (Dilanka R.M.T.), IT18007848 (Rathnayake R.H.C.S.) Nuwan Kodagoda <nuwan.k@sliit.lk> Thu 21/01/2021 11:10 To: Perera H.D. D.S. it18006544 Cc: Dilanka R.M.T. it18009132; Tharaka W.C.M.K it18001112; Rathnayake R. H. C. it18007848 +1 other TopicAssesment_1_TMP-21-0... 468 KB Dear Student, We can confirm that this document has been checked by the supervisors. Best Regards	 Perera H.D. D.S. it18006544 Thu 21/01/2021 10:45 To: Kushnara Suriyawansa Cc: Dilanka R.M.T. it18009132; Tharaka W.C.M.K it18001112; Rathnayake R. H. C. it18007848 TopicAssesment_1_TMP-21-0... 468 KB Dear Madam, In the courseweb, it is mentioned that the Co-Supervisor Endorsement is mandatory to be atta the Topic assessment form as an appendix. We would be very much thankful if you could send endorsement for the topic assessment document attached to this email. The attached docume same version of the document that you uploaded to the Trello board. Sincerely, IT18006544 (Perera H.D.D.S.), IT18001112 (Tharaka W.C.M.K.), IT18009132 (Dilanka R.M.T.), IT18007848 (Rathnayake R.H.C.S.)  Kushnara Suriyawansa <kushnara.s@sliit.lk> Fri 22/01/2021 11:01 To: Perera H.D. D.S. it18006544 Dear Student, I hereby confirm that this document has been checked by myself as the co-supervis project. Thank you and best regards, Kushnara Suriyawansa Lecturer Department of Computer Science and Software Engineering Faculty of Computing SLIIT | Malabe Campus Attach the email as Appendix 2
2 **2021.02.12**	**2021.02.12**
Date	**Date**

EXTERNAL SUPERVISOR Details (if any, may be from the industry)

				Attach the email as Appendix 3
Name	Affiliation	Contact Address	Contact Numbers	Signature/Date

ACCEPTANCE BY CDAP MEMBER (This part will be filled by the RP team)

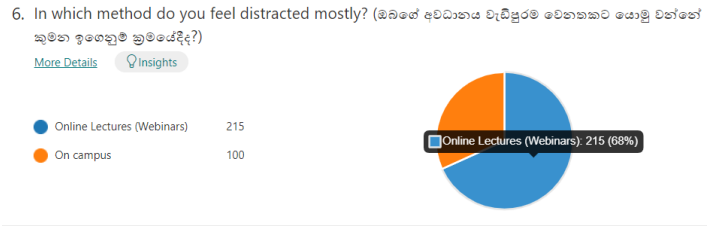
Name	Signature	Date

PROJECT DETAILS

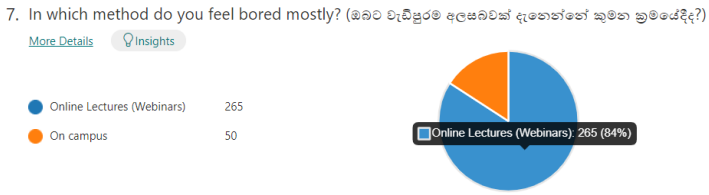
Brief Description of your Research Problem: (extract from the topic assessment form)

The students and the lecturers are facing many inconveniences since there is no proper tool that is intended for online lecture delivery.
Since there is no face-to-face communication [1], the lecturer cannot see the students' live reactions and engagement. Conducting a lecture just in front of a camera would be challenging to the lecturers who were used to conducting lectures in a physical classroom. Most of the students are reluctant to expose their faces and backgrounds to the other attendees during the online lecture.
An online questionnaire was shared among 315 Sri Lankan students to get their opinions regarding the online lecture delivery. From that, it was founded the students feel bored and distracted mostly in the online lectures.

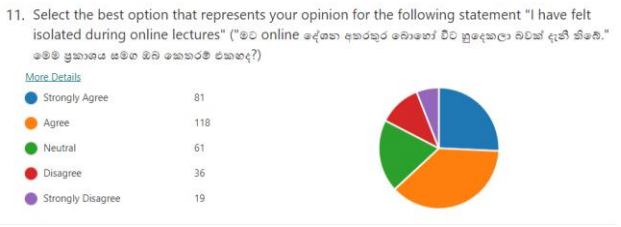
215 students were said they feel more distraction in the online lecture delivery.



265 students were said they feel more boredom in the online lecture delivery.



It is a known fact if students are bored, distracted they cannot get the maximum outcome from the lecture since the students' concentration is not in the right direction.
Furthermore, in a typical lecture delivery, there might be some pausing time or quick breaks. During that time, the students connect with others and discuss anything they want. That automatically becomes a stress releasing technique [2]. However, the situation is different in the online lecture delivery. Students feel isolated [1]. Not only during the breaks but also overall, 199 students were agreed that the online lecture delivery makes them feel isolated.



Besides, when students having on-campus lectures, they are getting together and do the studies with the friends, which leads to Collaborative learning, which is a learning method that has a considerable level of positive impact on students [3]. However, there are no proper solutions in existing conferencing tools to help with collaborative learning. Students do not feel they are doing the actual Collaborative learning with just video conferencing since there are no such facilities in the existing conferencing tools.

[1] "Disadvantages of E-Learning," 2019. [Online]. Available: https://e-student.org/disadvantages-of-e-learning. [Accessed Jan. 06 2021].

[2] N. H. S. England, "10 stress busters," 2018. [Online]. Available: https://www.nhs.uk/conditions/stress-anxiety-depression/reduce-stress/. [Accessed Jan. 06, 2021].

[3] M. Laal and S. M. Ghodsi, "Benefits of collaborative learning," in *Procedia - Social and Behavioral Sciences*, Jan. 2012, vol. 31, pp. 486–490, doi: 10.1016/j.sbspro.2011.12.091.

[4] D. Preuveneers and W. Joosen, "Edge-Based and Privacy-Preserving Multi-Modal Monitoring of Student Engagement in Online Learning Environments," *Proc. - 2019 IEEE Int. Conf. Edge Comput. EDGE 2019 - Part 2019 IEEE World Congr. Serv.*, pp. 18–20, 2019, doi: 10.1109/EDGE.2019.00017.

[5] B. M. Booth, A. M. Ali, S. S. Narayanan, I. Bennett, and A. A. Farag, "Toward active and unobtrusive engagement assessment of distance learners," *2017 7th Int. Conf. Affect. Comput. Intell. Interact. ACII 2017*, vol. 2018-Janua, pp. 470–476, 2018, doi: 10.1109/ACII.2017.8273641.

[6] J. Peng, W. Tan, and G. Liu, "Virtual Experiment in Distance Education: Based on 3D Virtual Learning Environment," *Proc. - 2015 Int. Conf. Educ. Innov. Through Technol. EITT 2015*, pp. 81–84, 2016, doi: 10.1109/EITT.2015.24.

Description of the Solution: (extract from the topic assessment form)

Since the students' lack of live reactions, conducting a lecture just in front of a camera would be challenging to the lecturers used to conduct lectures in a classroom, and most of the students are reluctant to expose their faces and backgrounds to the public during the online lecture. The proposing system provides a real-time classroom view with the 3D model representing the attended students' live reactions and behaviours to the lecturer.

Moreover, knowing how many students actively engage with the lecture and how many students understand the concept described would aid achieve the lecture's objective. Students' attentiveness to lectures will be analyzed based on their facial expression, student presence and behavior during the lecture. Furthermore, the background sound will also be analyzed to find out whether it is a distraction for the student when participating in the lecture behavior. After the analysis, the student will be notified periodically about his focus level on the lecture, On the other hand, the lecturer will also be notified about the overall student attentiveness and will also get a piece of analyzed information about the conducted lecture. Here the emotion detection analysis will be done at the edge (edge computing), therefore the captured image of the student will not be sent to the cloud hence privacy of the student will be protected. And if most of the students are confused at some point, prompt notification sends to the lecturer. The system also provides an analytical report to the lecturer, including unclear points, the points that make the students more engaged.

When students plan and discuss their assignments and projects, they want to conduct brainstorming and mind mapping sessions to make the discussion successful because the planning phase is crucial. Moreover, these sessions should be in nature that all members should be able to participate and express their ideas not only by speaking but also by editing the drafts or the illustrations used for brainstorming or mind mapping. A multiuser virtual learning environment that can address the above difficulties will be added as a deliverable of the proposed solution. In fact, as mentioned previously, Collaborative learning is an effective learning method. Therefore, in some lectures, there are group activities while the lecture is going on. The above-mentioned virtual learning environment can be used to form student groups to do students' group activities collaboratively, which will improve the effectiveness of learning.

In a typical lecture delivery, there might be some pausing time or quick breaks. If the delivery method is online, during break times, students are isolated. By providing a feature to enable voice communication with friends, the student can have a conversation with a couple of friends like in the on-campus lecture. This conversation will be helped in reducing the isolation level of the students. In addition, this feature will be helped in situations like when a student does not understand some point while the lecturer explaining, the student can have a small discussion with friends to get a clearer idea about the unclear point. In fact, the voice communication will be limited to friends only. Other students in the online session will not be disturbed.

Moreover, its information depicts that a considerable number of students are not taking notes while in the online lectures. Therefore, it is planning to provide them a lecture note including important visual and text figures of the conducted lecture.

Main expected outcomes of the project: (extract from the topic assessment form)

Main Objective:
Enhancing Online Teaching and Learning Experience.

Sub Objective 1:
Analyzing the students' attentiveness to the lecture and help them to keep their attention.

Sub Objective 2:
Reducing students' isolation during online lectures and enabling the collaborative learning using multiuser virtual learning environment.

Sub Objective 3:
Providing a near-real time, simulated student behavioural view of the students.

Sub Objective 4:
Help students with providing a summarized lecture note.

WORKLOAD ALLOCATION (**extract from the topic assessment form after correcting the suggestions given by the topic assessment panel.**)

(Please provide a brief description about the workload allocation)

MEMBER 1	IT18006544 - Perera H.D.D.S

- Capture students' emotion (facial expression) while the student is attending the lecture.
- Analyze the emotions that were captured over a period of time.
- Object detection and Student availability (presence in front of lecture) checking.
- Student will receive feedback about their focus level periodically.

MEMBER 2	IT18001112 – Tharaka W.C.M.K.

- Build a multiuser virtual learning environment where students can study their lessons together (Collaborative learning). In addition, this environment is built in such a way, that the students can plan and discuss their assignments and projects. Also, this option will help students to do brainstorming and illustrate mind mapping. All group members can engage in editing the illustrations collaboratively while discussing about it.
- Also, the same virtual learning environment can be used to enable the student group formation and doing the group activities in the lectures, which are the lectures that the lecturer gives time to do the group activities. (Lectures such as ITP in the second year)
- Enabling a separate voice communication channel with a few of the friends in the virtual learning environment in order to reduce the student's isolation while the lecture is going on.

MEMBER 3	IT18009132 - Dilanka R.M.T.

- Build a virtual classroom environment with the representation of attendees along with their real time expressions and behaviors.
- Capturing the hand gestures to provide the hand-raising and applauding feature to simulate the students' natural behavior.

MEMBER 4	IT18007848 - Rathnayake R.H.C.S

- Train a machine learning model to analyze the lecture slides to identify the lecture content.
- Generate a summarization of the lecture (remove humorous talks, little talks) as a lecture note with related figures and visual elements.

DECLARATION (Students should add the Digital Signature)

"We declare that the project would involve material prepared by the Group members and that it would not fully or partially incorporate any material prepared by other persons for a fee or free of charge or that it would include material previously submitted by a candidate for a Degree or Diploma in any other University or Institute of Higher Learning and that, to the best of our knowledge and belief, it would not incorporate any material previously published or written by another person in relation to another project except with prior written approval from the supervisor and/or the coordinator of such project and that such unauthorized reproductions will construe offences punishable under the SLIIT Regulations.

We are aware, that if we are found guilty for the above mentioned offences or any project related plagiarism, the SLIIT has right to suspend the project at any time and or to suspend us from the examination and or from the Institution for minimum period of one year".

	STUDENT NAME	**STUDENT NO.**	**Signature**
1	Perera H.D.D.S	IT18006544	
2	Tharaka W.C.M.K.	IT18001112	
3	Dilanka R.M.T.	IT18009132	
4	Rathnayake R.H.C.S	IT18007848