"Helping educators and students reduce and manage performance anxieties"

Proceedings of the 21st Annual SLAIHEE Conference on Higher Education in Sri Lanka

organised by

Sri Lanka Association for Improving Higher Education Effectiveness (SLAIHEE)

supported by Informatics Institute of Technology (IIT)

Friday, 25 July 2025

9.00 a.m. to 5.00 p.m.

held at

Informatics Institute of Technology (IIT),

Spencer Building, Colombo 03

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 *Helping educators and students reduce and manage performance anxieties*"

21st SLAIHEE Higher Education Conference

on

"Helping educators and students reduce and manage performance anxieties"

Friday, 25 July 2025, 9.00 a.m. to 5.00 p.m., held at Informatics Institute of Technology**,** School of Computing, Spencer building, Colombo 03

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

A WARM WELCOME TO THE CONFERENCE

This is the twenty first year since Sri Lanka Association for Improving Higher Education Effectiveness (SLAIHEE) was established as a non-profit voluntary organization. Since its establishment in 2005, SLAIHEE has organised an annual conference, taking pleasure in providing 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 Staff Development Centre (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. In the 13th year, it was hosted by the Open University of Sri Lanka and in the 14th year, the host became a private Higher Education Institute (HEI), the Sri Lanka Technological Campus with its newly established Centre of Excellence in Teaching, Learning & Innovation (CETLI). The 15th conference was hosted by the Staff Development Centre, Moratuwa University of Sri Lanka. The 16th, 17th and 18th conferences were held online via Zoom due to the COVID-19 pandemic-related restrictions. From 2023, SLAIHEE resumed the face-to-face format for the annual conference. Since 2023, SLAIHEE conferences have been supported by the Informatics Institute of Technology (IIT), a private Higher Education (HE) provider, by its *Academy for Teaching & Learning Effectiveness* (ATLE).

This conference has become a Community of Practice and the only national conference in Sri Lanka that focuses exclusively on learning and teaching in the HE context (SoTL, Scholarship of Teaching and Learning). This year's conference celebrates the twenty first year of SLAIHEE and it is now over 26 years since the first SDC was established in Sri Lanka (at the University of Colombo). Such a 26-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 in 2017 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, specially with a change in training quality offered at SDC's of many Universities. It is therefore noteworthy that ATLE is progressing with plans to make its courses accredited with the UK Advance Higher Education (Advance HE, formerly: Higher Education Academy).

This year's conference theme, *"Helping educators and students reduce and manage performance anxieties"* (for previous conference themes and proceedings, see:

www.slaihee.org) is relevant because the quality of HE teaching, as well as the quality of training programmes for HE teachers, seem to be severely challenged at present. This year's Conference was preceded by a few training workshops that ATLE conducted to have academics trained to write Action Learning abstracts such as those presented at this Conference and recorded in this Proceedings volume.

The Conference theme on *"...reducing and managing performance anxieties"* arise when "students not engaging" and "students not learning (enough)" are present. It is from this theme that it becomes possible to give both staff and students the confidence and to make their work of teaching and learning effective.

Over their school lives and through university life, most students have experienced classes that have been teacher controlled and teacher-led that have hardly contributed to reducing and managing performance anxieties. Therefore, staff as well as students could be 'programmed" to ignore attempting to manage those anxieties. For those who are now teachers and lecturers, their university courses had most probably been of the teacher-led genre, so that teachers require 'de-programming' training if they are to change lesson delivery they had continuously seen, heard and had experienced.

Therefore, the papers presented on this conference theme are significant to show conference attendees how, when lecturers receive effective targeted training and support, they will rise to the occasion to develop the much-needed anxiety management skill needed to make their teaching and student learning effective.

We take great pleasure in welcoming you, and our Keynote speaker, Professor Hemamalie Gunatilaka, Member of the University Grants Commission and Professor in Business Administration at the Department of Business Administration, Faculty of Management Studies and Commerce, University of Sri Jayewardenepura. The conference is of particular interest to all those with a concern and commitment to the quality and fate of future Higher Education in Sri Lanka, including; lecturers, managers and administrators in Higher Education, educational and staff developers, and policy makers

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

From SLAIHEE – a big thank you;
- for your participation,
- to the presenters for reporting how they have reduced and managed performance anxieties through their teaching learning experience in their classrooms while addressing the challenges faced by both HE teachers and students in the 21st Century,
- to Professor Hemamalie Gunatilaka for the Keynote speech
- to Mr Mohan Fernando, CEO of Informatics Institute of Technology (IIT)
- specially to Professor Suki Ekaratne, for his guidance and services to HE,
- to all the special invitees, and to the reviewers for their speedy reviews with helpful feedback
- to IIT staff for assisting us to hold the Conference at their IIT venue.

Higher Education Research Conference, Friday - 25 July 2025
Conference Theme: **Helping educators & students reduce & manage performance anxieties**
PROGRAMME
Venue: IIT Spencer Building, Floor 7- Academy @ IIT

08:30 – 08:55 a.m.	Registration
Inauguration	
09:00 – 09:05 a.m.	Conference Announcements by Dr Iroja Caldera Past President/ SLAIHEE
09:05 – 09:10	Welcome address by Dr Jinendra Dissanayake President/ SLAIHEE

09:10 – 09:40	**Keynote Address** by Professor Hemamalie Gunatilaka
	        Member, University Grants Commission &
	        Department of Business Administration,
	        Faculty of Management Studies and Commerce,
	        University of Sri Jayewardenepura

09:40 – 09:50	- Introduction to the Dr Shrinika Weerakoon Memorial Award for the Best Paper at 2025 Conference by Professor Suki Ekaratne, Director, Academy @ IIT - Award Presentation – Dr Shrinika Weerakoon Memorial Award for the Best Paper at the 2024 Conference
09:50– 09:55	Announcements & Vote of Thanks by Ms Abarnah Kirupananda, President Elect/ SLAIHEE
10:00 – 10:30	Morning Tea (with Networking in Cafeteria, Floor 8)
10:30 – 10:40	Address by Guest of Honour: Mr Mohan Fernando Group CEO/Informatics Institute of Technology
Research Paper Presentation Sessions with selecting the 'Best Paper' on *Helping educators and students reduce and manage performance anxieties*	

10:45 – 12:45 p.m.
        Session 1:
	Presentations and discussion of peer-reviewed papers (**Session 1**)
	        Chair - Ms Shalini Kaduwela, APIIT

12:50 – 13:50.	LUNCH - Non-Members (Floor 8) LUNCH - Members (after **Annual General Meeting**, Floor 8)

14:00 –16:30
        Session 2:
	Presentations and discussion of peer-reviewed papers (**Session 2**)
	        Chair - Ms Nadeeka Rathnabahu, University of Kelaniya

16:30 – 16:40	**Feedback Form** Completion (online)
16:40 – 17:00.	**Afternoon tea** with conference closure

SLAIHEE Conference, 25th July 2025 - Session Timetable (page #s refer to pages in Conference Proceedings Book)	
Session /venue:	Session I [Venue: **Floor 7,** Auditorium, IIT School of Computing]

Session Chair: Ms Shalini Kaduwela, Asia Pacific Institute of Information Technology

Time	Paper #, Paper Title. author(s), page numbers
10.45– 11.00	Paper # 1.1: The impact of peer collaboration on undergraduates' writing anxiety: A comparative study in formative assessments - U.R.S.R.K. Senarathne (pp. 1-5)
11.00 – 11.15	Paper # 1.2: Reducing presumed mathematics performance anxiety in students using deliberate formative assessment practice: A quantitative study on examination-based practice - B.G.M.S. Sriyananda (pp. 6-9)
11.15 – 11.30	Paper # 1.3: Student perceptions on alleviating large-scale assignment anxiety through stepwise submissions with iterative formative feedback - Janani Harischandra, Asini Silva, U.I. Abeyasinghe & Sanjula Samarasekara (pp. 10-14)
11.30 – 11.45	Paper # 1.4: Use of content chunking and scaffolding in teaching to reduce learning anxieties in students: Students perception - Abarnah Kirupananda (pp. 15-20)
11.45– 12.00	Paper # 1.5: Scaffolding technique to reduce performance anxiety in learning python programming - Asini Silva & Torin Wirasingha (pp. 21-25)
12.00 -12.15	Paper # 1.6: Student perceptions on selected TLAs in reducing programming anxiety among first year computer science students - R.D. Pradeep M. Pallegama (pp. 26-30)
12.15 – 12.30	Paper # 1.7: Reducing peer engagement anxiety and performance anxiety, using mixed ability grouping - Sanjula Samarasekara (pp. 31-35)
12.30 – 12.45	Paper # 1.8: Flipped classroom gamification for anxiety management and learning outcome improvement in Level 1 Ayurveda undergraduates - I.G.P.R. Kulanatha (pp. 36-40)

Session /venue:	Session II [Venue: **Floor 7,** Auditorium, IIT School of Computing]
Session Chair: Ms Nadeeka Rathnabahu, University of Kelaniya	
Time	Paper #, Paper Title. author(s), page numbers
14.00 – 14.15	Paper # 2.1: Student perceptions on the impact of chunking and Bloom's Taxonomy to help reduce student anxieties on examination performance - E.M. Maheema N. Rajapakse (pp. 41-45)
14.15 – 14.30	Paper # 2.2: Impact of changing teaching activities in reducing teacher performance anxiety on student non-engagement behaviour - Thilochana C.K Rangamaarachchi (pp. 46-50)
14.30 – 14.45	Paper # 2.3: Use of Bloom's Taxonomy, problem-centred learning and Think-Pair-Share activities to reduce examination anxiety of students - Shiran Harsha Widanapathirana (pp. 51-55)
14.45 – 15.00	Paper # 2.4: Reducing the anxiety of students' memorization-learning Sanskrit stanzas as first learners - P.A.S.N. Silva & R.M.D.A. Amarasiri (pp. 56-60)
15.00 – 15.15	Paper # 2.5: Reducing anxiety and enhancing student engagement through oscillation teaching and the Tell-Show-Do method to improve academic performance - Sanduni Sathsara (pp. 61-65)
15.15 – 15.30	Paper # 2.6: Student perceptions on incremental teaching activities to mitigate teacher anxiety in information access and communication skills development - Dileeka Alwis (pp. 66-70)
15.30 – 15.45	Paper # 2.7: Student perceptions on collaborative storytelling to help learners overcome second language speaking anxiety - Dumie Dayesha de Zoysa (pp. 71-75)
15.45 – 16.00	Paper # 2.8: Using the More Knowledgeable Other (MKO) strategy to reduce students' anxiety in task completion - P.A. Charani Dineeka (pp. 76-80)
16.00 – 16.15	Paper # 2.9: Progressive reduction of speaking anxiety using online platforms, gamified tasks, and targeted feedback - Azmiya Y Cassim & Rashmi N.A. Abeysekera (pp. 81-87)

Reviewers of papers;

<u>The paper submission and peer-review process</u>: 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 e-printed after a thorough and rigorous double-blind 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 `Full Paper' then underwent a double-refereeing process by two independent reviewers who provided referee reports and supportive feedback to be sent to authors justifying acceptance, improvement or non-acceptability of each submission. A third referee was used whenever the first two referees were in disagreement. The reports of both referees were discussed, collated and this 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 Papers.

Abstracts/ papers plagiarised from others' work, when not acknowledged in the submitted material 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.

The impact of peer collaboration on undergraduates' writing anxiety: a comparative study in formative assessments

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Abstract

Many students report lower marks on their assessment tests, not solely due to a lack of knowledge but also due to anxiety experienced during the assessments. Previous research has indicated a negative linear relationship between students' anxiety and their performance, attributed to a lack of confidence in constructing written work. Hence, to ascertain whether the use of peer support is implemented to alleviate student anxiety on their writing effectiveness, that affects performance, a collaborative critique session was undertaken. The second professional BAMS batch was selected for the research. Students were informed to study the topic "Visha and Upavisha / Toxic plant material" five days before the activity. Student participants (n=108) were randomly allocated to 12 peer review groups. Each group was given a slip of paper indicating a subtopic related to one toxic plant. Individuals were instructed to write a brief note on their topic under five categories of plant identification, method of purification, therapeutic indications, medicines that can be prepared from it, and antidotes for them. Then, they were given 30 minutes to engage in structured activities to assess each other's work against clear criteria, fostering critical thinking and collaborative skills. Lastly, they had to revise and improve their answers based on the feedback received. Each individual's answers before and after the activity were separately marked and compared using paired t-tests. The mean difference in individual marks earned by the students for each category exhibited significant improvement after the activity ($p < 0.001$). These comparisons demonstrated that fostering a classroom environment where students support each other's learning through group work and peer assessments effectively combats writing anxiety. Peer collaborative group work seamlessly integrates into any educational context, regardless of the subject matter.

Background

Previous studies have revealed that performance anxiety is a universal phenomenon in higher education, especially in assessment situations (Beidel *et al.*, 1999; Kyriacou and Butcher, 1993; Turner *et al.*, 1993). Sarason and Mandler (1952) defined the anxiety response prompted by examinations as test anxiety, highlighting its negative correlation with various intelligence variables (Sarason, 1962). This relationship forms the basis of the cognitive interference model, which explains how anxiety disrupts cognitive processes during academic performance (Cassady and Johnson, 2002; Hembree, 1988; Sarason, 1984; Zeidner, 1998).

Formative assessment has been identified as an essential pedagogical approach for alleviating students' performance anxiety while fostering self-directed learning. William (2025) emphasizes that encouraging meaningful discussion towards a clear task with colleagues in the classroom is an effective strategy that enables students to take greater responsibility for their studies, creating an environment where collaborative learning enhances academic outcomes. This strategy not only combats anxiety but also promotes deeper engagement with

learning materials, reinforcing a growth-oriented mindset. Hence, to investigate the impact of peer collaboration on writing anxiety, a classroom discussion session focused on constructive feedback sharing was organized.

Methodology

The study was conducted among undergraduate students in the second professional Bachelor of Ayurveda Medicine and Surgery (BAMS) at the Faculty of Indigenous Medicine, University of Colombo. All the students (n=154) were informed to prepare a formative assessment test regarding the topic "Visha and Upavisha / Toxic plant material" under the subject Rasa Shastra (Alchemy), five days before the activity, through their Learning Management System of the faculty website (LMS). The students who participated in the classroom activity during the scheduled lecture were selected as the study sample (n=108). Participants were randomly assigned to 12 groups, including nine individuals in each. Coupons, each specifying the name of a different toxic plant, were placed in a tray and randomly drawn by the leaders of each team. This ensured that each group was assigned a distinct plant for their study and discussion. Each student was instructed to write a structured short note on their assigned plant, covering the following five subtopics: A brief introduction on morphology, method of purification (*Shodhana*), therapeutic indications, medicines that can be prepared from the plant, and antidotes for them. Once all responses were collected, participants engaged in structured peer evaluation activities for 30 minutes. This phase involved assessing each other's work based on predefined criteria, encouraging critical thinking, collaborative learning, and analytical skills. Following peer evaluations, students revised and refined their responses based on the feedback. To assess the impact of this activity, individual answers from before and after the peer collaboration session were separately marked and statistically compared using Sigma Stat and Excel software. The percentage score was calculated for each group, followed by the computation of the mean marks for each subtopic. The average marks obtained by students before the classroom discussion and after the peer engagement activity were statistically compared through a paired t-test. Following the activity, students were given an additional open-ended question to explore their emotional background, assessing whether they experienced test anxiety and whether the activity boosted their self-confidence.

Results

The marks obtained by each student at the beginning are shown in Table 1 which illustrates that students achieved a maximum score of 25.4% for the morphology of Godakaduru. Additionally, the average marks for assessment ranged between 18.4% and 25.4%. Table 2 demonstrates that all students performed at a higher level, both individually and as a group. The average marks ranged from 86% to 96%. Figure 1 clearly illustrates that students achieved higher marks following the collaborative discussion activity. The results presented in Table 3 indicate that the data follow a normal distribution. Furthermore, the paired t-test confirms that the difference between the mean values is statistically significant. Table 4 presents a summary of students' feedback provided in response to the open-ended question after the learning activity. Accordingly, approximately 72% of students reported feeling anxious during the initial activity. However, this anxiety noticeably diminished following a peer discussion, which appeared to provide reassurance and foster a more comfortable learning environment.

Table 1. Total Marks Percentage obtained from each group before peer collaboration

| | Students Group | Total Marks Percentage obtained from each group | | | | | | Mean% |
		Morphology	Method of purification	Therapeutic	Medicines	Antidotes	Total marks	
1	Vathsanabha	22	26	18	21	19	106	21.2
2	Kupelu	34	27	19	20	22	122	24.4
3	Arka	18	21	23	16	21	99	19.8
4	Datthura	26	26	24	23	20	119	23.8
5	Snuhi	20	23	18	23	18	102	20.4
6	Bhallathaka	31	21	21	19	24	116	23.2
7	Jayapala	19	20	25	20	19	103	20.6
8	Langali	16	24	19	17	18	94	18.8
9	Ahiphena	27	19	29	29	20	124	24.8
10	Vijaya	31	26	21	28	21	127	25.4
11	Karaveera	18	17	18	20	19	92	18.4
12	Gunja	20	21	23	21	24	109	21.8
	Total Marks	282	271	258	257	245	1313	262.6
	Mean	23.5	22.6	21.5	21.5	20.4	109.4	21.9

Table 2. Total Marks Percentage obtained from each group after peer collaboration

| | Students Group | Total Marks Percentage obtained from each group | | | | | | Mean% |
		Morphology	Method of purification	Therapeutic	Medicines	Antidotes	Total marks	
1	Vathsanabha	89	93	94	86	92	454	90.8
2	Kupelu	91	92	89	89	94	455	91
3	Arka	96	89	92	93	90	460	92
4	Datthura	92	92	89	88	89	450	90
5	Snuhi	87	92	91	94	90	454	90.8
6	Bhallathaka	90	88	89	93	88	448	89.6
7	Jayapala	86	92	91	90	92	451	90.2
8	Langali	91	89	90	89	91	450	90
9	Ahiphena	88	93	94	94	89	458	91.6
10	Vijaya	92	94	95	95	92	468	93.6
11	Karaveera	90	92	90	94	90	456	91.2
12	Gunja	90	95	92	93	94	464	92.8
	Total marks	1082	1101	1096	1098	1091	5468	1093.6
	Average Marks	90.2	91.8	91.3	91.5	90.9	455.7	91.1
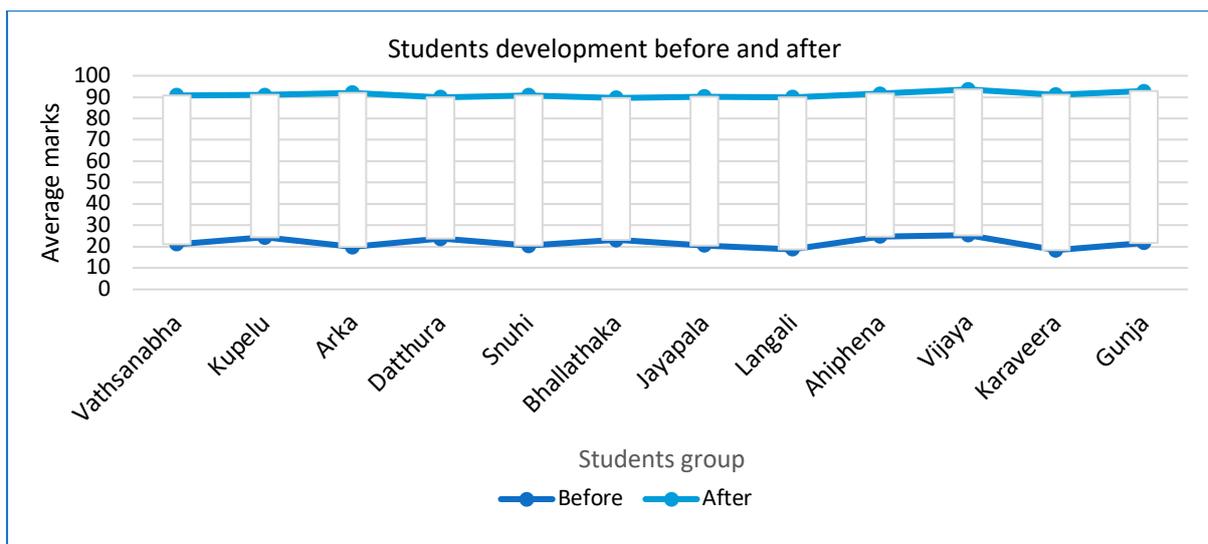
Figure 1. The difference of Average marks before and after peer discussion

Table 3. Results of the paired t-test

Normality Test: Passed (P = 0.305)				
	N=Groups	Mean	Std Dev	SEM
Before discussion	12	21.883	2.392	0.690
After discussion	12	91.133	1.201	0.347
Difference	12	-69.250	2.360	0.681
t = -101.628 with 11 degrees of freedom. (P = <0.001)				
95 percent confidence interval for difference of means: -70.750 to -67.750				
The change that occurred with the treatment is greater than would be expected by chance; there is a statistically significant change (P = <0.001)				
Power of performed test with alpha = 0.050: 1.000				

Table 4. Feedback evaluation

	Summary of students' expressions	Percentage of Reply
1	Initially felt anxiety, but then tolerated	72
2	Feeling reassured and revitalized following the peer discussion	68
3	Enriched Knowledge	55
4	Could do an in-depth analysis of the subject matter	45
5	Engaged with an enjoyable learning experience	84
6	By deviating from their conventional study routines, experienced a reduction in academic pressure	70
7	Requested for the continued implementation of such activities in the future	60

Discussion and Conclusion

According to the data, students tended to score lower on their first attempt but exhibited significantly higher marks after participating in a peer collaborative session. The evaluation summary of the feedback forms revealed that 72% of students initially experienced anxiety

regarding the assessment. However, they reported feeling reassured and revitalized following the peer discussion. Students reported that this activity not only enriched their knowledge but also fostered an engaging and enjoyable learning experience. By deviating from their conventional study routines, they provided a significant reduction in academic pressure. Furthermore, a considerable number of students (60%) expressed a strong preference for the continued implementation of such activities in the future. Both the quantitative and qualitative data indicated that peer collaboration effectively alleviates performance anxiety while fostering knowledge improvement. Furthermore, this approach can be successfully implemented across various academic disciplines, regardless of the subject matter.

References

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Reducing presumed mathematics performance anxiety in students using deliberate formative assessment practice: A quantitative study on examination-based practice

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Abstract

The issue of Mathematics performance anxiety is of utmost concern for learners, especially for those who have set a high-grade target for themselves to secure admission into foreign universities. A large number of learners face underperformance owing to the absence of practical examinations in the syllabus. This results in increased stress levels and a lack of confidence in their capabilities. This research tries to find out if anxiety and lack of confidence can be improved with continuous practice with examination-based questions. This study was conducted among 13 Mathematics students enrolled in September 2024 in the Northern Consortium UK (NCUK) International Foundation Year program. Over six weeks, students were provided with weekly mock examinations under examination conditions during scheduled tutorial sessions. The same mathematics lecturer administered and marked all assessments using a pre-defined marking scheme. A comparative analysis was carried out between the experimental group and the previous year's cohort, which had not undergone this structured practice. The average mock examination score of the experimental group increased from 45% in the first session to 62% in the sixth. These findings revealed that the performance of students improved (63%) with the introduction of examination-style questions over the period of 6 weeks when compared with final examination scores of previous batches (43%). The research showed that students who are given opportunities to practice using mock tests of examination-type questions showed improvement in academic performance. Though it is assumed that their performance anxiety became better managed, the study would have improved if student feedback was obtained on whether the activities reduced anxiety to promote mathematical progress. The results emphasize the need to incorporate informal testing as regular practice tests into the curriculum to prepare students better for high-stakes testing and to develop their performance in mathematics.

Purpose/Background

Mathematics anxiety is the tension or feeling students experience when they are instructed to complete a mathematics task, and it affects negatively when a student is trying to learn a new mathematics concept. Students who aim for foreign admission for degree programs can be particularly vulnerable, given that their lack of exposure to the examination-type questions can induce stress and weaken their self-esteem. Practice tests and practical simulations are often restricted for these final examinations, and students may not be able to prepare psychologically to handle the high-stress testing situations. This study explores how deliberate practice with examination-type questions as a form of formative assessment can improve confidence in students, reducing anxiety, thereby improving performance.

Prior research demonstrated that there is a negative relationship between math anxiety and performance (Zhang *et al*., 2019). Anxiety can affect the working memory, which is a cognitive

resource needed for problem solving and can lead to underperformance (Zhang *et al.*, 2019). Studies on education have shown that formative feedback and testing promote learning (Núñez-Peña *et al.*, 2015) and have found a positive relationship between feedback sessions and performance grades, and that feedback seems to mitigate against the detrimental impact of math anxiety on achievement. More recently, Wang (2024) found that early formative assessment has the potential to establish a more supportive classroom climate in which the influence of anxiety and students engagement and effort can be lessened. Similarly, Yusefzadeh *et al.*, (2024) found significant reductions in test anxiety and increasing exam scores via a study preparation intervention in undergraduate.

Despite these findings, a limited number of studies have actually assessed a possible direct effect of extensive examination-like practice on math anxiety. This work fills the gap with a quantitative study. To answer the research question, "Can regular mock exams throughout the year reduce test anxiety and boost student mathematics performance?" I hypothesized that practice in test-taking situations and with test problems would produce more familiarity, in turn, enhanced self-confidence, and therefore higher scores (i.e., lower anxiety on transfer tests at the end of the semester).

Methodology

Thirteen students who enrolled in the mathematics section of the September 2024 NCUK International Foundation Year were included in this intervention. The students who participated in this intervention faced two written examinations as the only evaluation method. Students are expected to face the End of Semester 1 (EoS1) exam in the 15th week, which is worth 30% of their final examination, and in the 30th week, which is worth 70% of their final grade. During EoS1, they have to complete 13 questions within 2 hours and 10 minutes, and the final examination is to solve 15 questions of various lengths within 2 hours and 40 minutes.

For six weeks, each student faced a 30-minute mock mathematics test once a week at the set tutorial time, with the idea being to make it a practice for real examinations. The papers consisted of 3 or 4 questions of previous past papers. Examination conditions were simulated under the mock examinations, which reflected the final exam conditions and method of marking (time limits, questioning types, marking scheme). Under consistent conditions, the same lecturer conducted both the teaching, examination, and evaluation. Answer scripts were graded against one pre-set marking scheme.

No parallel control group was possible within that term; instead, outcomes were compared to a set of students from the previous year who did not receive this structured daily practice. Weekly scores were recorded for the experimental group, and the average final exam score for the experimental group was compared with the average final score from the prior cohort. Descriptive statistics and comparative analyses were used when assessing changes in scores through time and differences between groups, with the main dependent variable being a percentage score on the exams.

Results

Table 1 depicts the experimental group's means in weekly practice or mock examinations and makes comparisons regarding the performance of the experimental group in the final examination against that of the previous cohort. The average means of the sittings show an increase in performance over a period of six weeks. Mean scores were 45% in Week 1 (corresponding to this first mock exam) and 62% in Week 6. The average final exam score for the experimental group stood at 63%, much higher than the 43% recorded for the previous cohort. These results show that students who engaged in regular examination practice and exposure saw a substantial improvement in their mathematics scores.

Table 1. Mean mathematics examination scores (%) for the experimental group (weekly mock exams) and final exams (experimental group vs. previous cohort)

Session	Experimental (n=13)	Previous Cohort (n=11)
Week 1 (mock exam)	45%	–
Week 2 (mock exam)	50%	–
Week 3 (mock exam)	55%	–
Week 4 (mock exam)	58%	–
Week 5 (mock exam)	60%	–
Week 6 (mock exam)	62%	–
Final Examination	63%	43%

The statistics show a consistent upward pattern in the scores of the experimental group, with an overall gain of 18 percentage points from the first to the last mock test. The experimental group's final examination mean (63%) was close to 20 points higher than the previous year's students. Although I did not give a standardized test anxiety questionnaire, students' verbal feedback confirmed that they were less anxious, and the improvements I noted are compatible with reduced test anxiety (students likely felt more confident and less nervous after repeated practice attempts). Overall, the strategic formative assessment process yielded higher attainment compared to the previous norm.

Discussion and Conclusion

The findings support the idea that frequent, exam-style practice can improve mathematics performance and potentially alleviate test anxiety. The steady score gains mirror results from other educational interventions. For instance, Zhang *et al*. (2019) showed that structured study-preparation activities significantly reduced test anxiety and boosted exam scores in college students.

Our improvement trend also accords with cognitive theory: providing repeated exposure to testing situations can serve as a form of "exposure therapy," desensitizing students to exam

stress. Several limitations require caution. This was a small sample from a single programme, and did not have a concurrent comparison group. Importantly, I did not measure anxiety directly – future research might employ standard math anxiety scales (e.g., MARS) or ask students about confidence to verify that anxiety was reduced. It would also be interesting to study long-term retention (are these performance increases maintained in follow-up courses?) and the need for the study to be repeated in other settings or with different student populations. In conclusion, the positive effects on performance of students support that regular low-stakes practice testing in the curriculum can prepare students for high-stakes tests.

Familiarity/endurance by getting students to practice exam-style questions regularly, educators can ensure they are comfortable with the format, and that they do not experience anxiety when they come to take the real thing. This kind of purposeful practice is consistent with principles of formative assessment and can help to redesign how evaluation is implemented. I propose that mathematics programs should include weekly quizzes or practice exams. Not only does this method enhance learning performance, but it also seems to reduce students' performance anxiety, leading to more successful math learning over time.

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Student perceptions on alleviating large-scale assignment anxiety through stepwise submissions with iterative formative feedback

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Abstract

In the Web Technology module, we observed that a significant number of first-year BSc Artificial Intelligence and Data Science students (n = 109) raised numerous questions regarding the recent modification to the assignment structure, which required them to undertake a larger task. We deployed a questionnaire to assess the impact of these changes on student anxiety. The findings, though in two separate questions, indicated that 68% of students reported experiencing significant anxiety concerning the large assignment requirements, while 50.5% expressed moderate confidence in adapting to these changes. This research examines strategies to mitigate performance anxiety associated with the new assessment structure by testing out whether a stepwise submission process that integrates personalized formative feedback at each stage could reduce the above-stated student anxiety. Around semester commencement (Week 3), students were instructed to finalize and submit topics for their website portfolios. The large-scale assignment was structured into three progressive submission stages in Weeks 5, 7, and 11. During the first two stages, each student received personalized formative feedback on the submitted work, evaluation based on four key design aspects. The final submission was comprised of the incrementally developed submissions accompanied by a comprehensive report documenting the evolution of user interfaces, integrating mentor feedback both before and after implementation. To assess student perceptions of the implemented intervention, an online questionnaire was administered, that had a response rate of 83%. Results showed that 84.8% reported that submitting work incrementally alleviated anxiety associated with the large assignment. Furthermore, 96.7% of them stated that breaking down assignments into stepwise submissions made the workload feel more manageable. Additionally, 84.8% of students mentioned that personalized formative feedback at each stage was beneficial for timely assignment completion. Thematic analysis of general comments highlighted supportiveness, effectiveness and confidence as predominant themes. It is evident that stepwise submissions incorporated with iterative formative feedback evaluation have demonstrated a significant positive impact on mitigating performance anxiety among Artificial Intelligence and Data Science students.

Background

Academic anxiety is a persistent concern among university students, particularly in STEM disciplines (Wang, 2024). Factors such as cognitively demanding assessments, rapid technological developments, and the complexity of coursework contribute significantly to elevated stress levels (Laksmiwati and Tondok, 2023). In technical fields like artificial intelligence and data science, these challenges are amplified, especially for first-year students facing large-scale, multifaceted assignments (Rani, 2024). Anxiety related to assessments has

been associated with low academic self-efficacy and limited access to supportive peer networks (Laksmiwati and Tondok, 2023; McCloud *et al.*, 2023). Hardy's Catastrophe Theory (1990) further signifies high cognitive anxiety can cause a sudden drop in the performance of learners. Three recurring factors in the literature help explain the heightened anxiety around assessments. First, students tend to underestimate their capacity to manage complex tasks (Rani, 2024). Second, delays in formative feedback contribute to anxiety during developmental phases (Feiss *et al.*, 2019). Third, technical students often face difficulties in decomposing tasks and engaging in problem-solving without structured guidance (Rani, 2024). Several studies have investigated strategies to alleviate such stressors. Cardozo *et al.* (2020) report that combining active learning with formative assessments enhances student confidence and reduces stress around summative tasks. Similarly, Piroozmanesh and Imanipour (2018) highlight the value of formative evaluation in managing test anxiety.

This study emerged from informal feedback and multiple student inquiries from first-year BSc Artificial Intelligence and Data Science cohorts, many of whom reported feeling overwhelmed by the complexity and scale of major project requirements. To validate these observations, we deployed a structured questionnaire across introductory modules. With a response rate of 68% of students reported significant anxiety related to large assignments, and 50.5% indicated difficulty concentrating, particularly during key project phases. These results pointed to a clear trend of assessment-related anxiety. The Generalized Anxiety Disorder 7 (GAD-7) Scale items were adapted to identify triggers associated with extensive project work, such as perceived workload and complexity as it has been reported to have strong psychometric reliability in academic contexts (Doi *et al.*, 2018). Prior research suggested that anxiety can be mitigated more effectively through incremental task structuring than through generalized support strategies (Feiss *et al.*, 2019). This study examined whether restructuring large-scale assessments into staged submissions with personalized formative feedback reduced anxiety and improved academic confidence among first-year students in AI and Data Science.

Methodology

The large-scale assignment was structured into three progressive submission stages. In Week 3 of the semester, students were required to finalize and submit their selected topics for the website portfolio. Subsequent components of the assignment were submitted in Weeks 5, 7, and 11. A key feature of this structure was the provision of personalized formative feedback following the first two submission stages (Weeks 5 and 7). This feedback, focused on four core design aspects, was intended to guide students, support their learning, and enable iterative refinement of their work. The final submission comprised the incrementally developed submission. This was accompanied by a comprehensive report documenting the evolution of the user interface and the integration of mentor feedback provided both before and after implementation. To assess the impact of these structural changes on student anxiety, we administered a questionnaire to evaluate students' anxiety levels and their perceptions of the assignment and feedback process yielding a response rate of 83% to measure the effectiveness of the intervention.

Results

The analysis of the results of the post intervention showed that the new assignment structure made an impact on about 77.4% to perform well in the class. Notably, 90.4% of participants indicated that they actively sought guidance from peers and instructors to address challenging aspects of the assignment.
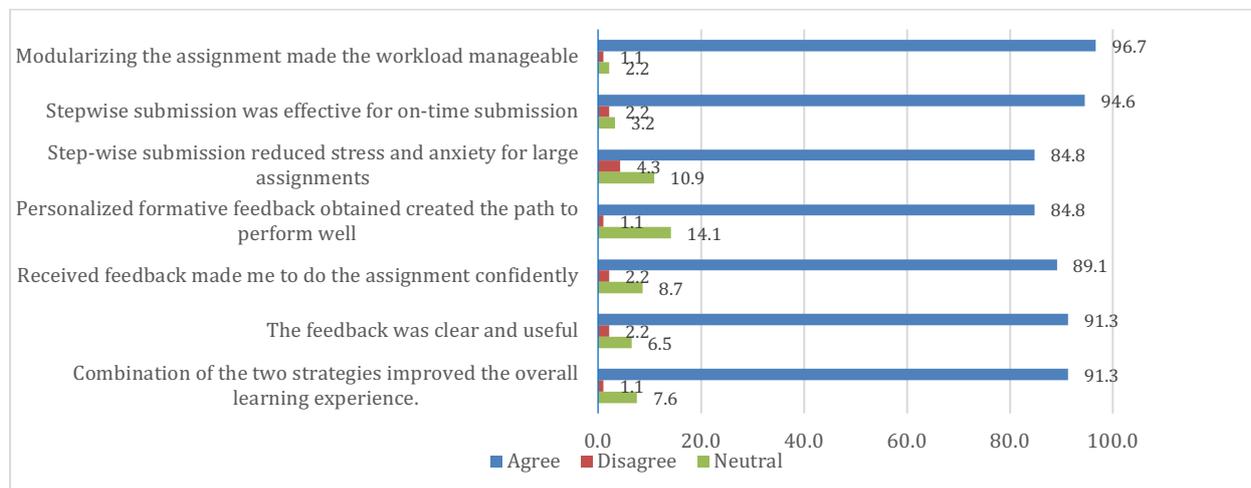

Figure 1. Student perceptions on overall experience

As illustrated in Figure 1 above, a substantial majority (96.7%) agreed or strongly agreed that dividing the assignment into stepwise submissions made the workload more manageable, while 94.6% reported that the structured timeline enabled them to meet deadlines more effectively. In terms of emotional impact, 84.8% of students acknowledged a reduction in stress and anxiety associated with large-scale assignments as a result of the staged submission process. The same proportion (84.8%) agreed that the quality of their submissions improved due to the personalized formative feedback received. Furthermore, 89.1% reported increased confidence in their work as a direct result of the feedback provided. Feedback clarity and relevance were also highly rated, with 91.3% of students agreeing that the comments they received were clear and specifically tailored to their individual learning needs. Encouragingly, 91.3% of participants believed that the combination of stepwise submission and targeted feedback had a positive influence on their overall academic performance. Supportiveness, effectiveness and confidence were the major keywords identified through thematic analysis applied in the general comments received.

Discussion and Conclusion

The findings of this study indicate that stepwise submission of assessments, combined with interactive formative feedback, contributed to higher-quality student work. A significant proportion of students (84.8%) reported that formative assessment helped them refine their work—a benefit also highlighted by Prashanti *et al*. (2019), who noted that such assessments aid in identifying both strengths and areas for improvement. Cardozo *et al*. (2020) similarly found that incorporating active learning methods with formative assessment reduced stress levels, as evidenced by biological markers such as cortisol and alpha amylase. While overall student feedback was positive, some participants expressed a desire for summative feedback on intermediate submissions and more detailed formative feedback. Implementing

12

supportive learning environments, however, presents challenges. Danchikov *et al*. (2021) and Ferri *et al*. (2020) highlighted that technical constraints and insufficient teacher training can hinder the effectiveness of such interventions. Nevertheless, 84.8% of students indicated that the stepwise submission format reduced stress and improved the quality of their work. This supports findings by Seli *et al*. (2009) and Cavanaugh *et al*. (2003), who demonstrated that incremental tasks and goal setting enhance academic performance and reduce anxiety. However, this study is subject to several notable limitations. Variability in tutor implementation of feedback may have influenced the consistency of the intervention. Additionally, perceptions of anxiety and feedback effectiveness were based on self-reported data, which are inherently subjective and susceptible to bias. Furthermore, student anxiety may have been shaped by personal, social, or other academic factors beyond the assignment structure, making it challenging to attribute changes in anxiety solely to intervention.

For future iterations of this activity, we intend to integrate student peer feedback and brief sessions on feedback literacy which could further support students' ability to act on tutor feedback and enhance their self-reflection in final reports. This approach may also be applied to other large-scale assignments by introducing smaller, mandatory milestones, as prior evidence suggests such strategies effectively alleviate student stress. However, facilitators should adapt interventions based on student behavior and module-specific needs, as a one-size-fits-all approach may not be effective. Where necessary, alternative methods should be employed to monitor and address student anxiety. Overall, the study confirms that structured stepwise submissions, paired with iterative formative feedback, positively impact performance anxiety among Artificial Intelligence and Data Science students.

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Use of content chunking and scaffolding in teaching to reduce learning anxieties in students: Students perception

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Abstract

Students often experience anxiety due to fear of failure, difficulty in learning the subject at appropriate levels, and a lack of confidence. This is common among first-year students who are new to the university system and, in many cases, unfamiliar with their chosen field and subjects. As educators, it is our responsibility to help students overcome these challenges and create a better learning experience. To address this issue, I introduced an intervention in my Business Computing module for first-year BSc Business Data Analytics and BSc Business Information Systems students, aiming to reduce anxiety and create a more comfortable classroom environment. On the first day of lectures, I provided students with a Padlet space and asked them to share what makes them feel anxious in the classroom. The majority mentioned that covering large amounts of content in a two-hour lecture and the fear of not being able to answer questions posed by the lecturer were their biggest concerns. To address these challenges, I researched ways to manage content overload and discovered scaffolding and content chunking as effective techniques. I implemented these strategies by breaking down the two-hour lecture into smaller, manageable sections, focusing on core concepts in each session. I also adjusted the schedule by reducing revision sessions and the student engagement week break, allowing for a more structured and gradual learning process. After seven weeks of this intervention, I conducted a student survey. There were 77 students in the class and 40 of them responded to the survey. 60% of the class responded, with 52.5% stating that they now felt less anxious in class. Additionally, 97.5% mentioned that they enjoy the module. To further support students who still experience anxiety, I continue to encourage peer group work and paired activities. I have also used scaffolded formative submission for assessment to reduce anxiety. Using scaffolding and content chunking has proven effective in reinforcing fundamental concepts, as reflected in student feedback.

Background

The generation of students we teach today is known as Generation Z, born between 1997 and 2012. Research has shown that this generation experiences significantly high levels of mental illness, such as anxiety, stress, and depression, due to several reasons. It is also highlighted that the heavy use of social media, fast-paced technological advancement, and excessive content consumption are some of the reasons for this situation (Kumari, 2024). I was able to relate this with the observations I have made in my first-year students, who also belong to Generation Z. The first-year students were very anxious and stressed in class, and they found it very difficult to focus and learn. Knowing that this is a common issue, I wanted to help my students overcome it.

This year, when I started teaching Business Computing for BSc Business Data Analytics (BDA) students and BSc Business Information Systems (BIS) students, I wanted to help them reduce their anxiety and learn better in class. In order to identify the reasons for their stress, I asked the students to let me know what makes them feel stressed. The majority of them mentioned that the large amount of content they needed to learn and absorb during a two-hour lecture made them feel anxious. Furthermore, many also mentioned that not being able to answer a question asked by a lecturer made them feel anxious. I was determined to address these issues to help students overcome their anxiety and learn better in class.

I researched techniques that could be used to reduce content overload and came across content chunking with scaffolding as an effective method. Research has shown that information overload has not always helped students to learn. It has, in fact, often ruined their learning experience. Content chunking involves breaking the content into smaller, logically connected sections and teaching them in smaller parts. This helps students reduce cognitive load, improve memory retention, and engage better in class (Gerard, 2025). In addition, it has also been proven to increase learners' intrinsic motivation and consolidate their learning (Martínez-Huamán *et al.,* 2023). Furthermore, when chunking is done in a scaffolded manner, it also helps reduce the cognitive load of students (van Nooijen *et al*., 2024). Hence, I decided to use content chunking and deliver it in a scaffolded manner to support the learners in my class.

Methodology

I conducted this action research to support the learning of first-year BSc Business Data Analytics and BSc Business Information Systems students who followed the Business Computing module. There were 80 students enrolled in the course. My focus was to reduce the content delivered in a two-hour lecture so that the students' cognitive load could be minimized. In order to identify the factors that caused stress, I first conducted a short survey. I shared a Padlet link with the students and asked them to list what made them feel stressed in class. The majority of them responded that the amount of content covered and the large volume of data they needed to consume and remember made them feel anxious in class. Furthermore, when the lecturer asked a question and they were unable to answer, it also made them feel stressed. To address these issues, I realized that I needed to redesign the curriculum using backward design and constructive alignment (Biggs, 1996). I first reviewed the intended learning outcomes of the module and identified what students should be able to do after completing it. Then I examined how the assessment aligned with these outcomes. With these two aspects in mind, I aligned the content to be delivered each week. I found repetitive content and some simple topics being taught over more than a week. I realized that students should gain more in-depth knowledge about working with data frames and series, as these are heavily used in data analytics. I rearranged the weekly content to avoid overloading. I merged topics that were simple and easy to comprehend. I split the lectures on working with data frames and series into multiple sessions. In the lectures, I also included activities every 20 minutes so students could refresh and regain their attention. I used the mid-semester break week and the final revision week to teach remaining content and used tutorial sessions for revision. In this way, I was able to cover the syllabus while chunking it in a scaffolded manner.

To make students feel less pressured in class, I included different kinds of activities. I introduced them to think-pair-share, where they first discussed topics with their peers. Often, the person seated next to them was a friend, which made them feel comfortable sharing their ideas. Then gradually, I moved to group discussions, where they shared thoughts and ideas within a larger group. As they became familiar with the content, I introduced the flipped classroom approach (Ozdamli and Asiksoy, 2016). I shared the relevant content in advance and provided a worksheet during class. Students were then given the opportunity to discuss the worksheet questions. I randomly checked students' answers and began inviting them to the board. Although many were initially reluctant, they gradually showed interest when they saw the support being provided. When one student wrote an answer, the rest of the class collectively supported refining or correcting it. Through this process, I gradually built their confidence, which helped them become more comfortable answering questions in class.

Results

After carrying out this intervention, I conducted a survey again with the students to identify their perceptions and views regarding the intervention. I shared an online questionnaire using Google Forms to collect their responses [https://forms.gle/Sh2PVwmpQaxDPH418]. Out of the 80 students, only 40 students (50%) responded to the survey. Of these respondents, 55% were from the BSc BDA batch, and 40% were from the BSc BIS batch. As shown in Figure 1, 97.5% of the students mentioned that the intervention helped them learn better.
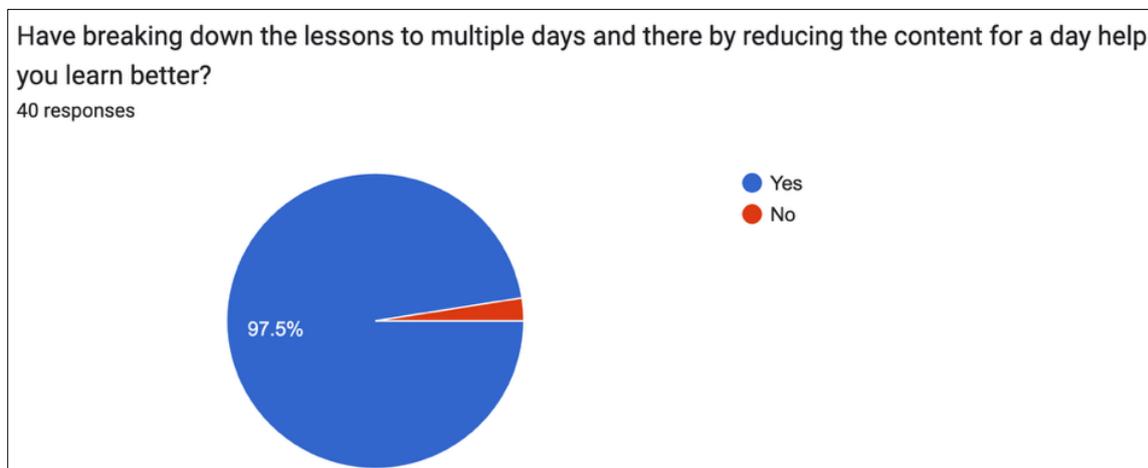

Figure 1. Identifying factors helped to learn better

Figure 2 illustrates that the stress levels of the students gradually decreased. Furthermore, Figures 3 and 4 present students' comments on what had helped them overcome stress. While the results show that the majority have managed to reduce their anxiety in class, it is still evident that close to 20% of the students are still struggling. A follow-up survey should be conducted to further analyse this and to provide additional support for this group of students.
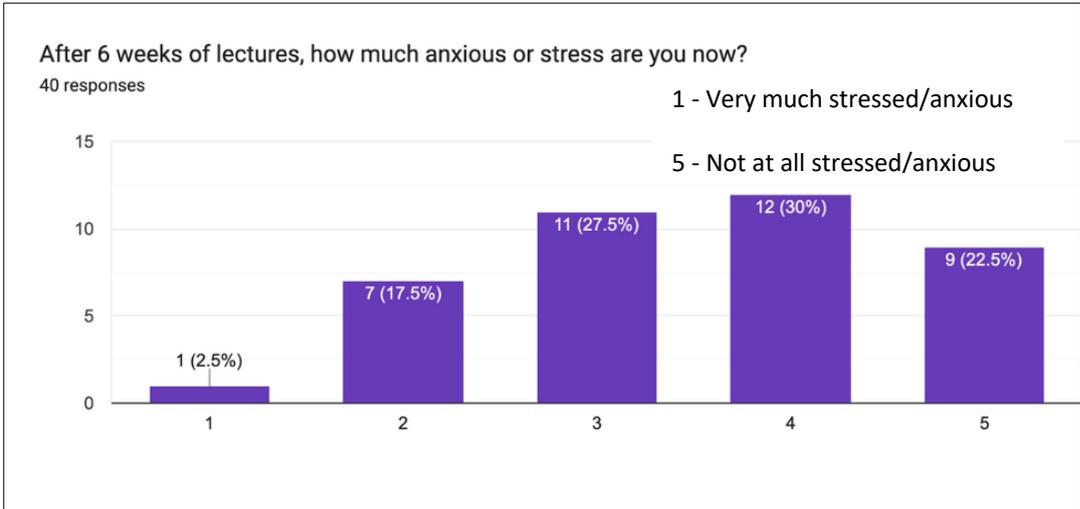
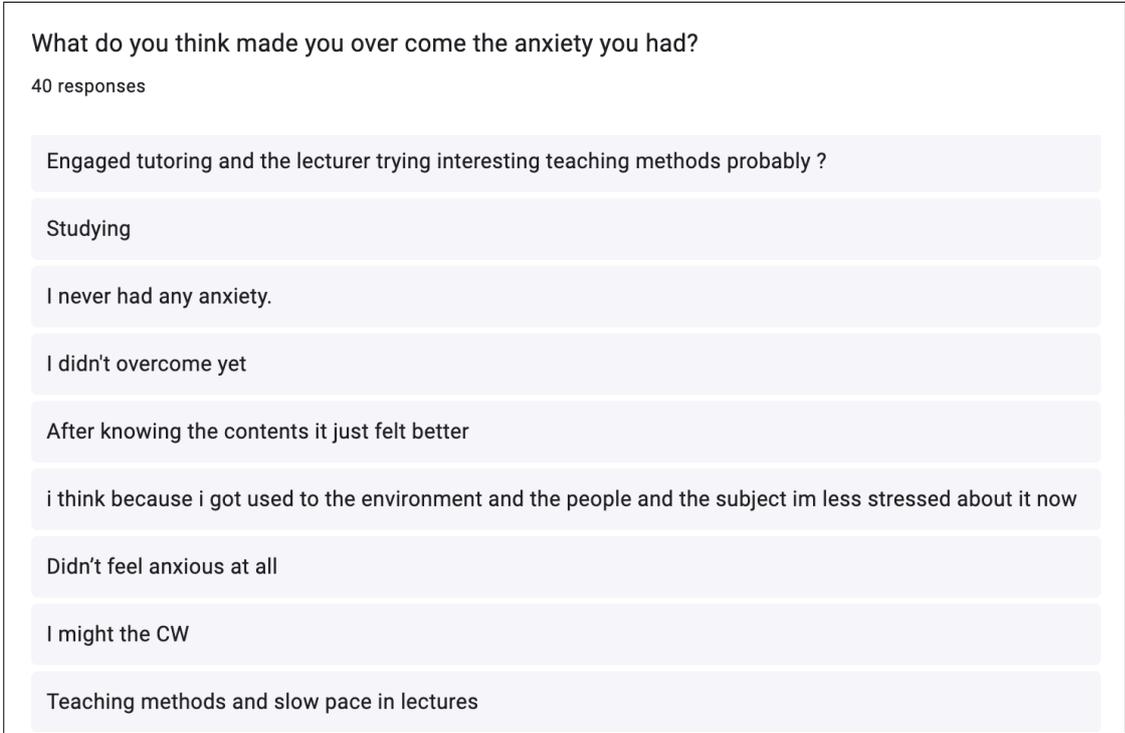Figure 2. Identifying improvement after intervention

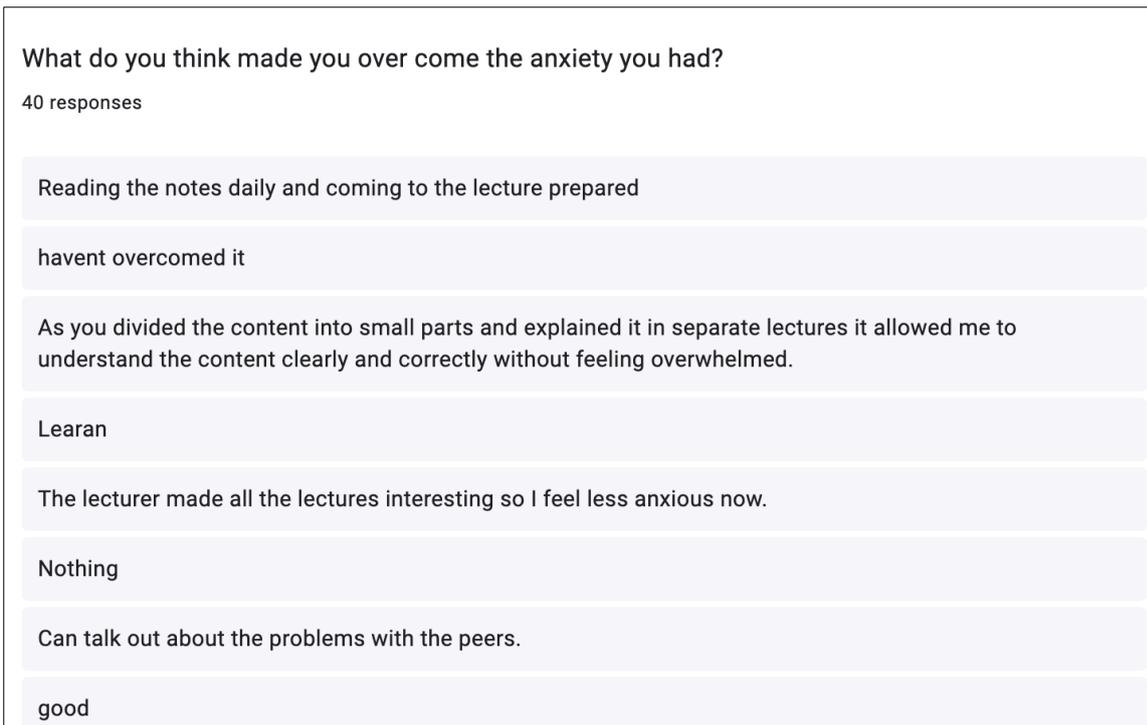Figure 3. General feedback regarding the intervention – 1

What do you think made you over come the anxiety you had?

40 responses

Reading the notes daily and coming to the lecture prepared

havent overcomed it

As you divided the content into small parts and explained it in separate lectures it allowed me to understand the content clearly and correctly without feeling overwhelmed.

Learan

The lecturer made all the lectures interesting so I feel less anxious now.

Nothing

Can talk out about the problems with the peers.

good

Figure 4. General feedback regarding the intervention - 2

Discussion and Conclusion

The findings of this research show that chunking the content and delivering it in a scaffolded manner helped reduce students' anxiety in class. By helping students reduce anxiety, it is possible to develop their interest in the module, which can eventually lead to greater passion for the subject and improved learning outcomes. When redesigning the curriculum, it is essential to clearly identify the intended learning outcomes, and the content should be carefully structured and delivered accordingly. If this alignment does not take place, it may create additional stress for students when facing examinations and attempting coursework.

As this method effectively reduced content overload and, in turn, decreased students' stress levels, I wanted to experiment with applying it to assessments as well. Another area I identified for further research was improving student attendance during assessment periods. I have observed that students often skip classes when they have exams or assessment submissions, as they tend to work on assessments at the last minute. This is another factor contributing to increased stress levels. I would like to implement chunking and scaffolding in a way that supports assessments, encouraging students to work periodically rather than waiting until the last minute. Since this intervention involved students from two different courses, it is evident that the approach can be applied across disciplines. To ensure its effectiveness, the intervention should be repeated across multiple courses and modules. This approach will not only help reduce anxiety among students but also foster better learning habits and support the development of lifelong learners.

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Scaffolding technique to reduce performance anxiety in learning python programming

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Abstract

Introductory programming courses often induce performance anxiety among students due to the complexity of learning fundamental concepts. This study, conducted in the Software Development 1 module at the Informatics Institute of Technology with 36 first-year students, explored how structured teaching strategies, such as Survey, Question, Read, Recite, Review and Reflect (SQ4R) and Think-Pair-Share, can address challenges in grasping programming concepts and engaging students. The research investigated how these methods can enhance students' performance and self-confidence in programming. This study assessed a structured five-step intervention utilizing the SQ4R method along with quizzes and the Think-Pair-Share technique to reduce performance anxiety and improve student comprehension. First-year students completed an initial quiz to assess prior knowledge, followed by scaffolded learning using SQ4R. A second quiz evaluated improvements and Think-Pair-Share facilitated peer discussion and refinement of short notes. Success was measured through quiz performance and self-reported anxiety levels, assessing both cognitive gains and perceived confidence. This intervention led to notable improvements in both performance and confidence. The average quiz score increased from 73.11% to 75.69%, while the median score rose from 74% to 80%. Students' individual performance also improved, with 24 out of 36 students (66.67%) showing an average improvement of 12.63%, demonstrating a positive trend in Python programming proficiency. This scaffolding technique helps reduce performance anxiety by offering structured learning support and opportunities for collaboration. Personalized feedback, interactive learning activities, and continuous formative assessments were key to building academic resilience. However, the findings are subject to certain limitations. The analysis was based on a subset of 36 students, which may affect the generalisability of the results to a broader population. Additionally, the study showed short-term gains, but their long-term retention and sustainability require further exploration. Future research should explore the integration of technology-driven interventions to enhance student engagement further and mitigate stress in programming education across diverse learning contexts.

Background

In the Software Development 1 module at the Informatics Institute of Technology, many first-year students struggle to retain foundational programming concepts, especially those in specific tutorial groups. The Information and Communication Technology (ICT) exam, the first component of their assessment, revealed an average mark of 46.5%, with students demonstrating less familiarity with theoretical foundations. This lack of conceptual clarity negatively impacts their confidence, recall ability, and the practical application of their learning. Without a solid grasp of the fundamentals, students often struggle to engage with the module content and may underperform in assessments. Learning programming skills is increasingly recognized as essential in today's technology-driven world, given the pervasive

role of software development across industries. However, educators worldwide acknowledge the challenges and complexities of teaching introductory programming courses to novice students with little to no prior knowledge of computer programming during their first year in degree programs (Singh, 2022). Introductory programming courses are notoriously challenging, with failure and dropout rates reported to reach up to 50% in some contexts, underscoring the difficulty students face in mastering foundational concepts early in their academic journeys (Margulieux *et al.*, 2020). These challenges are often linked to the abstract nature of programming concepts, complex syntax, and the need for logical thinking and problem-solving skills, which many novice learners struggle to develop without sufficient support (Singh, 2022; Olipas *et al.*, 2021)

Research consistently shows that these obstacles can lead to increased anxiety and decreased engagement, further compounding students' difficulties in retaining and applying programming knowledge (Yusuf *et al.*, 2018). As a result, there is increasing emphasis on adopting innovative, student-centred instructional strategies, such as the SQ4R method and Think-Pair-Share, that foster engagement, build confidence, and promote deeper learning through peer collaboration and reflection. The SQ4R method (Survey, Question, Read, Recite, Reflect, Review) provides a systematic approach to learning that encourages curiosity, critical thinking, and deeper processing of material, leading to improved learning outcomes and knowledge retention across various subjects (Churat *et al.*, 2022). Similarly, Think-Pair-Share promotes active participation and peer-to-peer interaction, which has increased students' academic performance, critical thinking, and self-confidence (Utami and Rusdarti, 2021). Together, these approaches are valuable tools for addressing persistent challenges in introductory programming education, as they create supportive and interactive learning environments that help students overcome anxiety and master complex concepts. Utilizing the integration of the SQ4R method and Think-Pair-Share strategy, this study focuses on three research questions:

1. How does integrating the SQ4R method and Think-Pair-Share strategy impact students' retention and grasp of foundational programming concepts?
2. To what extent do structured teaching interventions reduce performance anxiety among first-year students in an introductory programming course?
3. What are the potential long-term effects of scaffolded learning interventions on students' programming proficiency and academic resilience?

Based on this background, this paper will present the adopted methodology, analyze the results, and conclude with a discussion of the key findings and their implications.

Methodology

The study was initiated in response to the low ICT exam performance of students in tutorial groups 24 and 25, both conducted by the same lecturers. The students fall within the 18 to 24 age range. The intervention aims to improve their coursework marks, which form the next assessment component. This study employed a quasi-experimental design using a pre- and post-intervention assessment framework to evaluate the effectiveness of the SQ4R method and the Think-Pair-Share strategy in enhancing programming comprehension and reducing

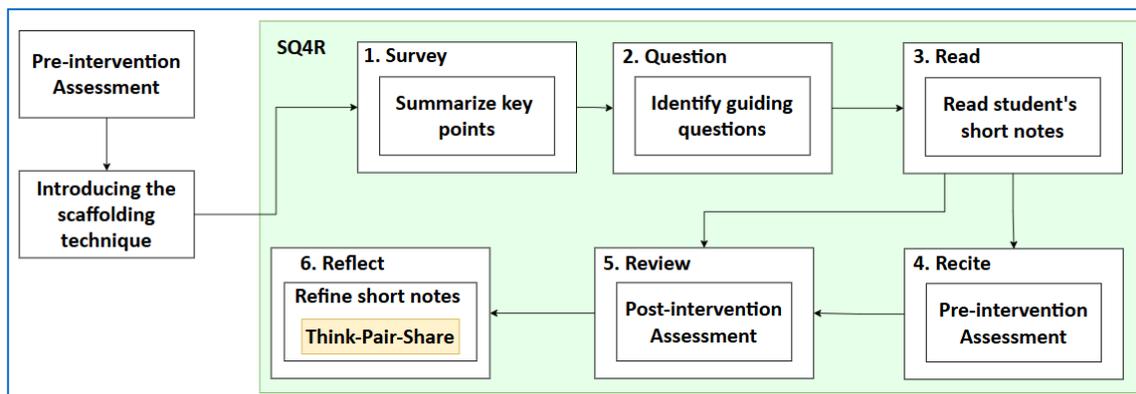anxiety among first-year students or a 12-week period (Figure 1).

Figure 1. Methodology

The study included 36 first-year students enrolled in the Software Development 1 module at the Informatics Institute of Technology, specifically targeting tutorial groups 24 and 25. Participants had no formal programming experience prior to the study. The study utilized a structured five-step process incorporating the SQ4R method, quizzes, and Think-Pair-Share activities. The initial step involved administering a quiz to assess the students' existing knowledge of the subject matter. The quiz was conducted without prior notice to assess the students' baseline knowledge of the material. Following the initial quiz, students were introduced to the SQ4R method, a reading strategy designed to enhance comprehension and retention of learning materials. The SQ4R method involves the following steps: Survey, Question, Read, Recite, Review, and Reflect.

In the "Survey" phase, students were asked to quickly scan the lecture material to get an overview of the topics. They were instructed to create short notes summarizing the key points from the material. These questions were intended to guide their note-taking process, helping them focus on the most important aspects of the lecture within the "Question" phase. During the "Read" phase of the SQ4R method, students were given dedicated time to review their short notes and reinforce their grasp of the key points covered in the lecture material. In the "Recite" phase, students completed a second quiz to assess their grasp of the material. In the "Review" phase, students reviewed their answers from the second quiz and identified any concepts they had missed while preparing their short notes. Then individually, they reflected on their quiz results and updated their notes to address any gaps in their knowledge. During the "Reflect" phase, students paired up with a peer to share their notes and provide constructive feedback on each other's work. Students discussed their findings, identified areas for improvement, and shared their revised notes with the class, aligning with the "Share" stage of the Think-Pair-Share method. After the intervention, the authors analyzed the ICT assessment marks alongside the coursework marks to showcase how this intervention helps to reduce anxiety related to learning programming.

Results

The analysis included 36 students who completed both pre-assessment and post-assessment. The average score for the pre-assessment, which was conducted within the tutorials, was 73.11%, with a median of 74.0%. For post-assessment, the average score increased to 75.69%,

and the median rose to 80.0%, indicating an overall improvement in student performance between the two assessments (Figure 2). A notable number of students who took both quizzes improved their scores. Specifically, 24 students improved their scores with an average improvement of 12.63%. The highest improvement observed was 36%, while the lowest was 1%. In contrast, 11 students exhibited a decrease in their scores. The average decline was 19.09%, with the maximum decrease recorded at 39% and the minimum at 2%. Additionally, one student's performance remained unchanged between the two quizzes.
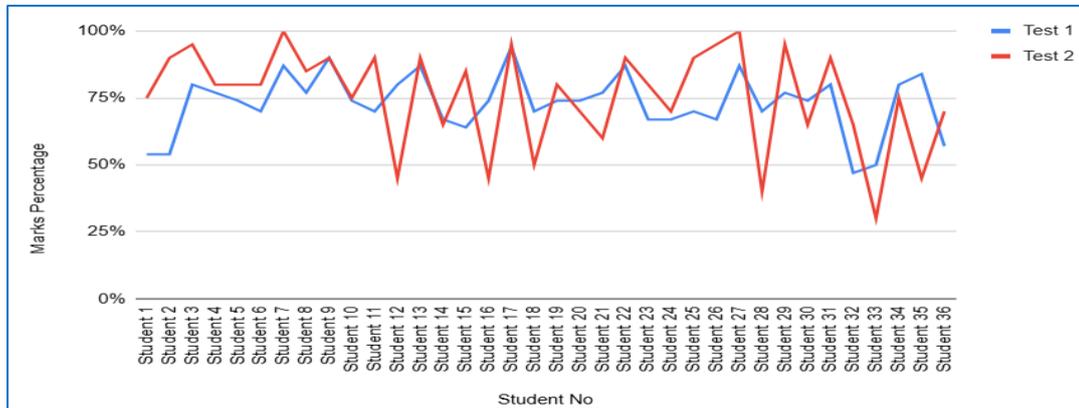
Figure 2. Pre-Assessment marks vs. Post-Assessment marks

The study aimed to enhance students' coursework marks in light of their previously low performance in ICT, where the average mark stood at 46.5%. Following the implementation of the SQ4R and Think-Pair-Share methods, the students raised their average marks to 64.1%, reflecting an improvement in their programming skills (Figure 3).
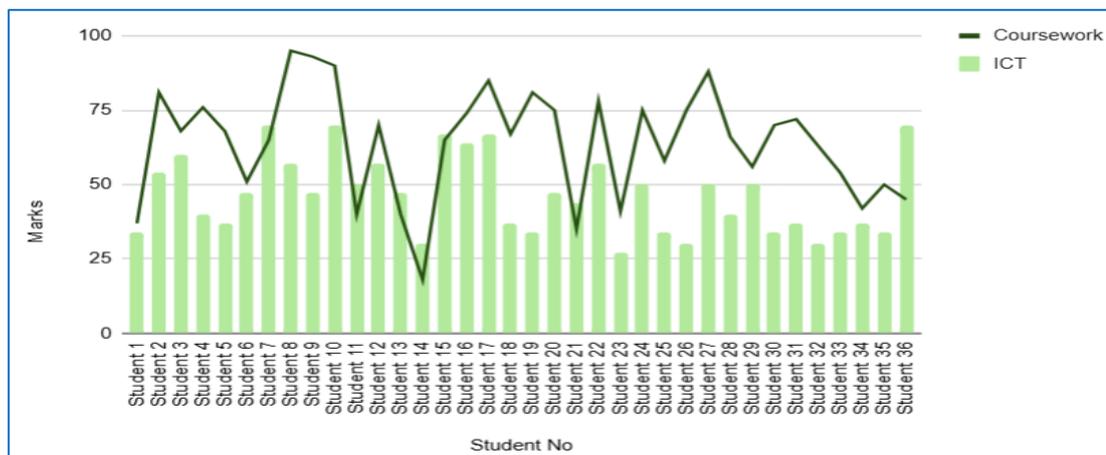

Figure 3. ICT marks vs Coursework marks

Student performance in ICT coursework improved by 17.58%, with engagement in collaborative activities suggesting reduced anxiety due to the supportive environment created by the SQ4R and Think-Pair-Share strategies.

Discussion and Conclusion

The study examined the impact of combining the SQ4R method with the Think-Pair-Share strategy on students' learning outcomes and anxiety in an introductory programming course.

Results showed that this approach improved comprehension and retention, with quiz scores rising from an average of 73.11% to 75.69% and the median increasing from 74% to 80%. Notably, 24 out of 36 students (66.67%) improved their scores by an average of 12.63%, indicating that the structured strategies enhanced their grasp of essential programming concepts. The study aimed to reduce performance anxiety in learning Python programming, which was reflected in the improved coursework marks, average scores rose from 46.5% to 64.1%, and the median improved from 47% to 67.5%. This study shows that scaffolded learning approaches promote long-term academic resilience. By encouraging reflective note-taking, active engagement, and peer learning, students develop transferable strategies that can enhance performance in advanced courses and foster a mindset for continuous learning. These findings also demonstrate that the intervention effectively reduced performance anxiety in learning Python programming, as evidenced by improved coursework marks and increased student participation in collaborative activities. Future work should provide targeted support, such as personalized feedback and additional practice, for students struggling with advanced concepts. Expanding interactive strategies and exploring scalable implementations can enhance engagement and ensure broader impact across diverse educational settings.

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Student perceptions on selected TLAs in reducing programming anxiety among first year computer science students

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Abstract

In a Software Development and Application Designing (SDAM) class (n=36) and in a Web Development and Operating Systems (WDOS) (n=24) class, in two different batches, I have observed that majority of students experienced programming anxiety due to the complexity of programming logic and syntax memorization. Literature shows Chunking, Scaffolding, Live Coding, and Active Learning with Bloom's Taxonomy help to overcome programming anxiety. This study reports on how I selected and used some of these Teaching Learning Activities (TLA's) to help reduce this student anxiety. In the above classes, I used the mentioned TLAs, dividing the session into three parts. Each began with the foundational theory, followed sequentially by a think-pair-share activity, group work, and a problem-centered learning activity, ending with a summary. In this sequential manner, I was able to align active learning with Bloom's Taxonomy. Scaffolding methods, including "Tell-Show-Do," live coding, and documented coding activities, were applied. A mixed-method approach, using structured questionnaires with a 5-point Likert scale and observations, evaluated the effectiveness of these TLA's in reducing programming anxiety, as judged by measures of how students' felt that TLA's had helped improve their own programming effectiveness. Student feedback showed that 91.3% found the Tell-Show-Do method effective. 87% agreed chunking helped identify complex concepts. 91.3% agreed live coding improved programming interpretation. 65.21% felt scaffolding boosted their programming confidence. 73.91% noted decreased programming anxiety as the course progressed with TLAs. Additionally, classroom observation showed active engagement during live coding by asking questions and seeking assistance with coding errors. Programming anxiety is a common concern among programming students. Findings indicate that TLAs help enhance programming concept identification, improve interpretation, and boost programming confidence, ultimately reducing programming anxiety in first-year undergraduates.

Purpose/Background

The rising demand for IT professionals has increased computer science enrolments, yet many students struggle with programming due to logic, abstraction, cognitive load, and syntax challenges, contributing to anxiety (Chang *et al.*, 2024; Yildirim and Ozdener, 2022). Globally, 28% of students fail computer science courses (Bennedsen and Caspersen, 2019). Programming anxiety is a psychological state linked to negative experiences or expectations in coding (Connolly *et al.*, 2009). It can hinder cognitive processes and critical thinking, causing fear of failure, poor concentration, and loss of interest (Yildirim and Ozdener, 2022). This anxiety often arises early in computer science courses due to limited experience and unfamiliarity, reducing student participation and increasing failure rates. While research has documented programming anxiety and its impact on student performance, little is known about how combined teaching approaches can address this issue. Most studies focus on

individual methods rather than their combined effects. This study aims to fill that gap by implementing and evaluating an integrated set of teaching activities to reduce programming anxiety and improve student outcomes in two distinct programming contexts.

Through observation, I found that first-year students in the Software Development and Application Designing (SDAM) and Web Development and Operating Systems (WDOS) classes struggled with programming concepts, showed poor concentration and lost interest, as signs of possible programming anxiety. In response, the Teaching and Learning Activities (TLAs) were revised to incorporate scaffolding (Tell-Show-Do, chunking, live coding) and active learning methods (think-pair-share, group work, and problem-centered learning) aligned with Bloom's Taxonomy. This study examines how these TLAs help reduce programming anxiety among students.

Scaffolding strategies such as chunking, 'Tell-Show-Do,' live coding, and documented materials promote learner motivation, improve learning outcomes, and reduce anxiety (Hou *et al*., 2023). Chunking enables students to process complex material and improve retention. Rubin (2013) showed that scaffolding with live coding boosts preparation for programming tasks and improves grades. Active learning methods like think-pair-share, group work, and problem-centered learning encourage students in hands-on programming while encouraging real-world problem-solving, and student-centered learning (Ebert, 2017; Sobral, 2021). Srinivasan and Centea (2019) found that live coding, group debugging, and weekly problem-centered tasks improve concept retention and assessment performance. Bilonozhko *et al*. (2023) found that Bloom's Taxonomy-based questions enhance critical thinking and reduce anxiety. Structuring learning activities by increasing difficulty, as outlined in Bloom's Taxonomy, can also build confidence, particularly among weaker programming students.

Research Problem

First-year students in SDAM and WDOS courses experience programming anxiety, demonstrated by difficulties in learning concepts, poor concentration, and reduced interest. Traditional teaching methods often fail to address the cognitive challenges faced by novice programmers, leaving this anxiety unaddressed. Addressing this gap, I evaluated whether integrated TLAs can effectively reduce programming anxiety.

To address this problem, the study explores the following questions:

- R1: How do scaffolding techniques impact programming confidence and anxiety levels among first-year computer science students?
- R2: To what extent does active learning approaches combined with Bloom's Taxonomy enhance students' ability to recognize, interpret and apply programming concepts?
- R3: What is the overall effectiveness of integrated TLAs in reducing programming anxiety?

Methodology

I employed an action research framework with a mixed-methods approach to assess structured TLAs in reducing programming anxiety. I conducted the intervention in two courses: SDAM (n=36) and WDOS (n=24). As shown in Figure 1, I designed each session to

follow a structured four-phase design: (1) theoretical foundation with motivational elements and think-pair-share activities, (2) second theory session followed by group work, (3) final theory session followed by problem-centered learning, and (4) a concluding summary.
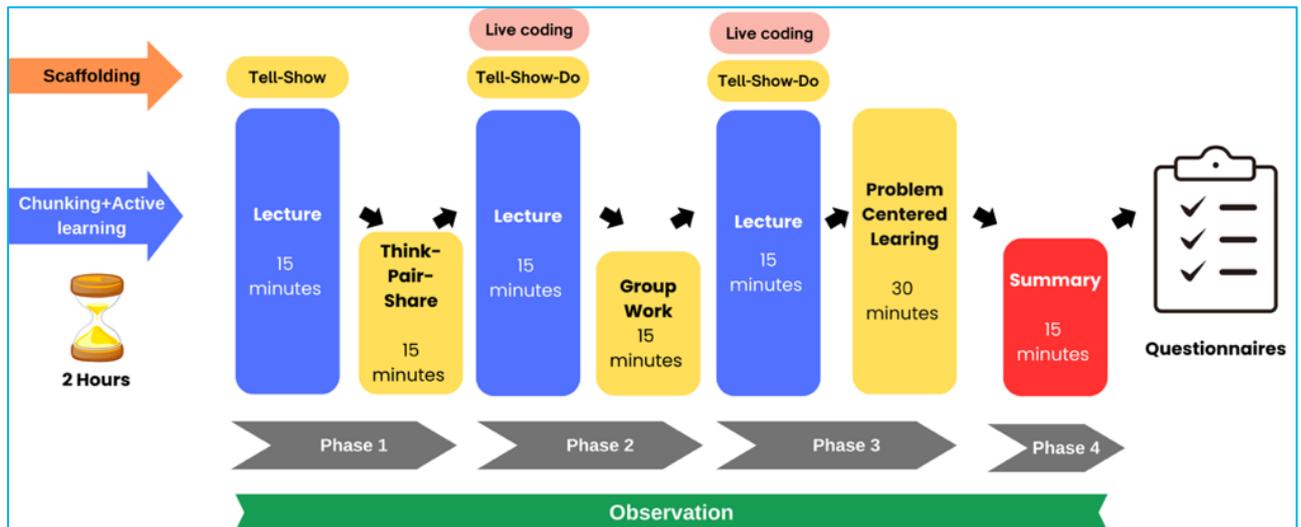

Figure 1. Research Methodology Framework

I aligned this sequential design with Bloom's Taxonomy, progressing from remembering to applying/analyzing to evaluating/creating. Scaffolding methods, including "Tell-Show-Do" and live coding demonstrations, were implemented with supporting materials provided via the LMS. I collected data through 5-point Likert scale questionnaires and classroom observations.

Results:

A total of 23 out of 60 enrolled students participated in the survey (10 from SDAM and 13 from WDOS). The data revealed strong positive perceptions of the implemented teaching methodologies.

- R1: Scaffolding Techniques' Impact on Programming Confidence—87% of students agreed that chunking improved the manageability of learning, while 91.3% agreed or strongly agreed that live coding and the Tell-Show-Do method helped them better identify programming concepts. Overall, 65.2% reported that scaffolding boosted their programming confidence.
- R2: Active Learning and Bloom's Taxonomy on Concept Interpretation/Application— 73.9% agreed that think-pair-share and group work improved content recognition, and every respondent agreed (17% strongly agreed, 95% agreed) that problem-centered learning enhanced their problem-solving skills.
- R3: Structured TLAs' Effectiveness in Reducing Programming Anxiety— 95.6% reported that the TLAs increased their programming confidence, and 73.9% noted a decrease in anxiety as the course progressed with the adapted TLAs.

According to classroom observations, I noticed that students demonstrated no signs of in-class engagement at the beginning. Most students did not complete the first activity within the given time in both subjects. However, I noted that the atmosphere changed significantly with live coding, as all students engaged and started writing the same code on their PCs. During my observations of live coding sessions, students actively engaged by asking questions and seeking assistance with coding errors.

Discussion and Conclusion:

This study demonstrated that structured TLAs significantly improved programming comprehension, boosted student confidence, and reduced programming anxiety among first-year computer science students. Notably, scaffolding techniques increased confidence in 65.2% of students, while problem-centered learning, proved highly effective in enhancing problem-solving skills. Similar findings were also suggested by Margulieux *et al*. (2016), where subgoal labelled work (similar chunking method) reduce cognitive load in introductory programming which leads to reduce anxiety. The high effectiveness of live coding in my study (91.3% agreement) finds validation in Rubin's (2013) controlled experiment, where similarly high rates (90%) of students favoured live coding demonstrations over conventional slide presentations. This consistency across different research contexts strengthens the evidence base for live coding as an effective TLA for reducing programming anxiety. Classroom observations further confirmed higher engagement following the TLA implementation. These findings suggest that integrated TLAs can effectively reduce programming anxiety and promote deeper learning. This is consistent with prior research by Rubin (2013), Margulieux *et al*. (2016), Porter *et al*. (2013), and Schankula *et al*. (2024), all of which support these conclusions.

A key limitation is that the approach was tested in only one session per subject, with feedback from about half the class. To strengthen and generalise the findings, future research should apply these TLAs across multiple sessions. While others can adopt these strategies in similar contexts, further evaluation is needed in larger class settings. I plan to extend this work to explore its broader impact and scalability in future.

Acknowledgement

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Reducing peer engagement anxiety and performance anxiety, using mixed ability grouping

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Abstract

Peer engagement and product-focused performance are crucial in the field of software engineering. However, students often experience anxiety related to peer engagement and lack of performance-targeted motivation due to fear of judgment and competition, resulting in low tutorial attendance and poor quiz performance. This study investigated if mixed-ability grouping, along with selected Teaching-Learning Activities (TLA), can improve weekly tutorial attendance, student performance, and reduce anxiety in Advanced Software Development tutorials (of 30 students). An initial quiz, at the commencement of my 2-hour tutorials, evaluated students' levels of performance abilities (as outcomes), enabling the formation of mixed-ability groups while maintaining confidentiality to minimize performance anxiety. Next, I employed a tell-show-do TLA to introduce key concepts, followed by facilitated group discussions and problem-solving TLAs, and randomly selected students for white-board work, while providing continuous guidance and encouragement. At the end of my second tutorial session, my observations and short quizzes evaluated the effectiveness of this TLA approach, by comparing results with pre-TLA levels. Initial tutorial attendance was 77%. At the second tutorial, attendance rose to 93%. Peer interactions were low initially (in 69% of students) and increased to 100%. At the initial quiz, 20% of students obtained only the lowest possible performance score (60%). After TLAs, performance quiz results of all students increased to above 80%, except for those who were absent for all TLAs, who obtained only the minimum score. This study suggests that mixed-ability group work can potentially reduce anxiety to motivate tutorial attendance, peer interactivity and improve student performance. By fostering a supportive inclusive learning environment with collaborative learning, this approach may reduce anxiety related to peer engagement and motivate students to perform well. These findings encourage further investigation into the benefits of mixed-ability grouping for promoting student well-being and academic success.

Background

Peer engagement and product-focused performance are crucial in the field of software engineering (Sommerville, 2020). In software development, students are usually required to work on projects in groups, exchange ideas, and present their work, making peer interaction essential (Fincher *et al*., 2013). Being able to perform in tasks and assessments is critical for students' academic progress and future careers in this field. However, students often experience anxiety related to peer engagement and a lack of performance-targeted motivation due to fear of judgment and competition (Hong *et al*., 2022), resulting in low tutorial attendance and poor quiz performance. Anxiety in education is like feeling worried or uneasy about academic situations, and it can make it hard to think and learn (Hayes, 2024). Anxiety can render the students unable to participate actively in group activities, share their ideas, and display what they have learned (Warner *et al*., 2018). This can create a negative learning environment and inhibit their progress. The fear of being judged by peers or

performing below standards can lead to decreased motivation and engagement in learning activities. When it comes to the education of software engineering, where performance as well as collaboration is a key, such anxiety can become particularly debilitating (Shahkhajeh, 2025).

This study investigated whether mixed-ability grouping, along with selected Teaching-Learning Activities (TLAs), can improve weekly tutorial attendance, enhance student performance, and reduce anxiety in Advanced Software Development tutorials (of 30 students). Mixed-ability grouping is a strategy that involves placing students with varying levels of academic achievement and ability into the same learning groups. The goal of mixed-ability grouping is to foster collaboration, peer support, and mutual learning, which may help them reducing anxiety and improving motivation. TLAs are instructional strategies designed to facilitate student learning and engagement. When appropriately designed and implemented TLAs can create a more supportive and inclusive learning environment that addresses student anxieties and enhance academic performance. The objective of this study was to investigate the effects of mixed-ability grouping, combined with selected TLAs, can reduce performance anxiety, improve peer engagement and tutorial attendance, and enhance student performance in Advanced Software Development tutorials.

It was hypothesized that the implementation of mixed-ability grouping and TLAs will lead to a decrease in student anxiety, an increase in tutorial attendance, and enhancement of student performance. This research also seeks to contribute to the development of effective pedagogical strategies that improve a learning environment that is more supportive and inclusive for advanced software engineering students, enhancing their well-being and academic performance.

Methodology

The study involved 30 students and was structured in clearly defined phases: Pre-TLA steps, implementation, and evaluation. In the initial phase, a quiz was conducted to assess students' existing knowledge of key concepts. Prior to this, students were assured that the quiz was solely a tool to gauge their current knowledge and that the results would not contribute to formal grading. This reassurance was intended to reduce potential anxiety related to assessment. Based on the quiz results, approximately 30% of students who achieved high marks, 40% with medium-range marks, and 30% with low marks were distributed across the mixed-ability groups. This specific balancing strategy was employed to prevent an undue concentration of lower-scoring students in any single group, a situation that could potentially impact the time management of other team members. To ensure confidentiality throughout this process, participants' initial quiz marks were never revealed to their peers or used beyond group formation. These quizzes were administered via Google Forms, which inherently prevents participants from viewing each other's submissions and prevents individuals from re-accessing their own submissions after completion. During the implementation phase, clear ground rules were established to create a positive and supportive learning environment. A "Tell-Show-Do" strategy was used to explain key concepts: students first heard the information, then observed practical demonstrations and finally engaged in hands-on practice by themselves. Group discussions and problem-solving activities further encouraged collaboration and peer learning. During these activities, the classroom environment was

explicitly declared as a "mistake-permitting environment", encouraging students to actively participate and engage in discussions without fear of judgment and a random selection process was used to choose students to work on problems at the board. However, this selection was purposefully designed to initially feature students who had already demonstrated a grasp of the key concepts. This approach aimed to build confidence in others, showing them that there was nothing to fear when it came to participating actively in the learning process. Throughout these activities, full support was provided to any student who showed signs of struggling at the board. Furthermore, every student who participated in the board activity received positive feedback and encouragement, regardless of how far they progressed in solving the problem. This approach aimed to give value to effort and decrease potential anxiety surrounding the participation, fostering a growth mindset and motivating students to continue improving. Applause was used to celebrate every student's contribution. To see how things were going, students were carefully monitored through active observation and a short quiz at the end of each tutorial session. Specifically, quiz scores tracked student progress on the module content. Observations of student communication, collaboration, and knowledge sharing within groups evaluated peer interactions, Quiz scores also provided information about individual learning in relation to peer interactions, and attendance records assessed student attendance, to assess the overall impact of the mixed-ability grouping strategy.

Results

Initial tutorial attendance was 77%. At the second tutorial, attendance rose to 93%. As specified in the methodology, attendance records were used to assess student attendance. Peer interactions were low initially (in 69% of students) and increased to 100%. As detailed previously, observations of student communication, collaboration, and knowledge sharing within groups were used to evaluate peer interactions. At the initial quiz, 20% of students obtained only the lowest possible performance score (60%). After TLAs, performance quiz results of all students increased to above 80%, except for those who were absent for all TLAs, who obtained only the minimum score (Figure 1). It is worth noting that the improvement in quiz scores may suggest increased peer interaction, as students may have shared knowledge and learned from each other during group activities. But the primary measure of peer interaction was the observation of student behaviors.
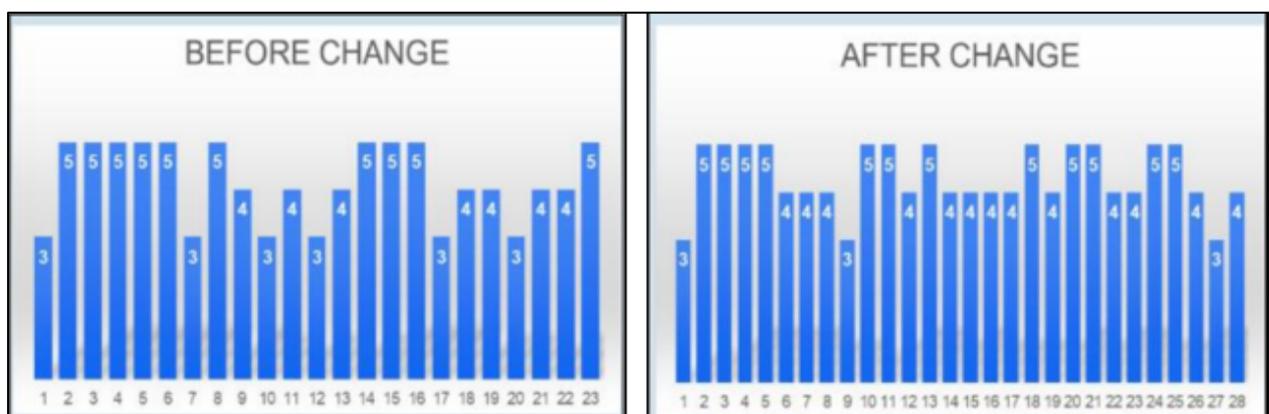

Figure 1. Quiz Scores out of 5 marks (Before & After the change)

Additionally, to ensure honest and unbiased responses, anonymous written feedback was collected from students at the end of the second tutorial session, allowing them to share their experiences and perceptions of the learning activities without fear of identification (Figure 2).
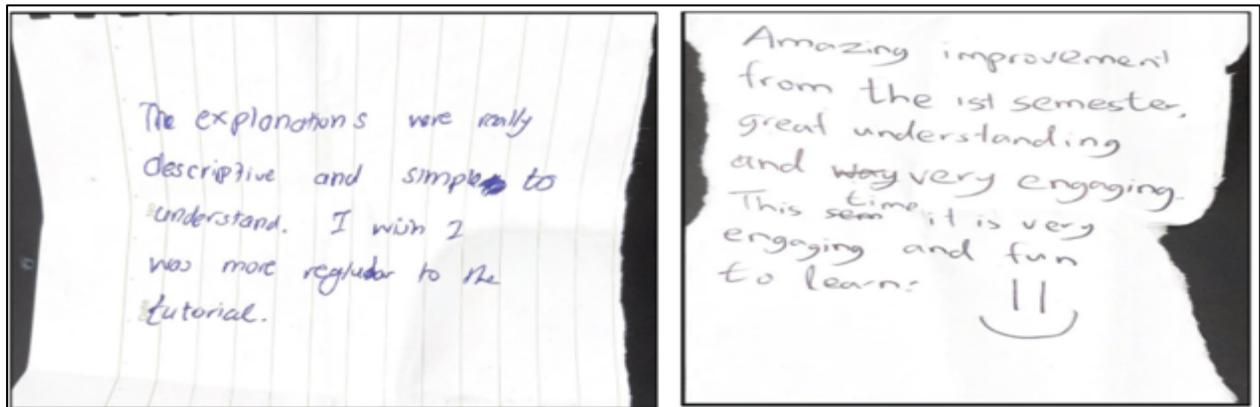

Figure 2. Anonymous written feedback that was collected from students

Discussion and Conclusion

The study initially identified that students often experienced anxiety related to peer engagement and a lack of performance-targeted motivation due to fear of judgment and competition, which can lead to low tutorial attendance and poor quiz performance. The implementation of mixed-ability group work, combined with selected TLAs, sought to address these challenges. The results showed some positive impact. Tutorial attendance increased from 77% to 93%, and observations showed an increase in peer interaction, from low initial levels in 69% of students to 100%. This suggests a reduction in anxiety related to peer engagement. Also, at the start, 20% of students achieved only the lowest possible performance score (60%) in the initial quiz, post-TLA quiz results showed that all students, except those absent for all TLAs, scored above 80%. This improvement points towards a decrease in anxiety related to a lack of performance-targeted motivation and fear of judgment. The strategy of purposefully initiating activities with students who demonstrated a grasp of key concepts appears to have contributed to building confidence and reducing performance anxiety. This appeared to give other students confidence, showing them that it was all right to take part and not be afraid of making mistakes. What students said in their feedback also supports these approaches. They talked about the tutorial room feeling more inclusive, with reduced anxiety around peer engagement and performance. For instance, one student mentioned that he wished he had come to tutorials more often before, which suggests the new approach helped them worry less about attending, and another said that learning was "fun", which suggests they were less stressed. In conclusion, using mixed-ability group work with selected TLAs approach shows potential for reducing anxiety related to peer engagement and performance-targeted motivation, positively influencing tutorial attendance, peer interaction, and student performance. This study suggests that creating a supportive and collaborative learning environment can address student anxieties and foster a more engaging and effective learning experience. However, this study has limitations, including a small sample size (30 students) affecting generalizability and the absence of a control group, which limits definitive attribution of improvements to the intervention. Initial

challenges in group formation due to students wanting to work with friends were managed by emphasizing professional adaptability. Future research should expand this approach to other modules and lecture settings, utilizing larger samples to improve generalizability.

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Flipped classroom gamification for anxiety management and learning outcome improvement in Level 1 Ayurveda undergraduates

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Abstract

Anxiety and stress are common where Constructive Alignment (CA) is lacking in education. CA is needed more when learning is driven by the complex concepts inherent in Ayurveda studies. Over-reliance on extrinsic motivators (e.g., reward focus, examination shortcuts) demotivates struggling students and undermines intrinsic motivation, leading to challenge avoidance, hindering participation and clinical performance. This study investigated whether specific Teaching Learning Activities (TLAs) could mitigate performance anxiety and enhance learning outcomes by addressing both extrinsic and intrinsic motivators, particularly for struggling learners. Therefore, this research sought to answer: If an Ayurveda curriculum integrates diverse teaching strategies catering to both extrinsic and intrinsic motivators and provides targeted support for students with learning difficulties, will it lead to (a) reduced self-reported performance anxiety and (b) increased student engagement in group activities, indicating a more inclusive learning environment? This study evaluated a flipped classroom approach incorporating video-based learning followed by an interactive classroom activity with 180 Level 1 Ayurveda students. Divided into 14 groups, students applied video content by enacting patient scenarios with targeted questioning to identify disease traits. Classroom time emphasized peer interaction and discussion. Cognitive performance and confidence were assessed via gamified testing with re-attempt options. Gamified testing significantly increased student confidence and reduced anxiety (in over 80%). Performance on 30 analytical MCQs showed 49.3% of students achieving a pass grade, indicating a positive impact on learning 'basic' knowledge. Re-attempts promoted a growth mindset. However, 14.1% non-attendance suggests a need to address access and engagement barriers. Gamified testing within a flipped classroom model enhanced undergraduate level I Ayurveda education by improving memory retention while reducing anxiety and supporting 'basic' conceptual learning. The positive impact on anxiety, along with a substantial portion demonstrating basic learning, supports the method's efficacy. However, the non-attendance rate highlights the need for further investigation to ensure equitable access and optimize benefits for all students.

Background

Contemporary education presents students with significant anxiety and stress, notably in philosophy-based Ayurveda studies due to complex concepts. This intensifies when educational design lacks Constructive Alignment (CA) - a principle ensuring aligned learning outcomes, activities, and assessments for deep learning (Biggs, 1996). CA absence creates a fundamental disconnect, reducing effectiveness.

Over-reliance on extrinsic motivators (e.g., high grades, exam shortcuts) further exacerbates issues. This problematic focus is compounded by Ayurveda students' academic background. Admitted from a science-based Advanced Level stream, their empirical training contrasts sharply with Ayurveda's philosophical, terminological, and holistic frameworks (Patwardhan *et al.*, 2017) demanding a distinct 'philosophical eye' (Deshpande, 2014). The confluence of a philosophical curriculum, an empirically trained cohort, and extrinsic motivation creates formidable challenges. This orientation demotivates struggling learners and undermines intrinsic motivation. Emphasis on shortcuts bypasses deep processing, hindering participation and clinical competency. Addressing this interplay (student background, curriculum, motivation) is paramount for optimizing learning in complex fields, being a key concern behind exam anxiety. University students globally face pervasive stress and anxiety from academic, financial, and social pressures (Eisenberg *et al.*, 2007). This pressure manifests as performance anxiety and reduced concentration, impeding academic success, necessitating effective pedagogical interventions. Student motivation (intrinsic or extrinsic) profoundly influences learning (Ryan and Deci, 2000). Intrinsic motivation fosters deep engagement. Extrinsic motivation, driven by external incentives, risks superficial learning, stifling creativity, and eroding intrinsic drive (Kohn, 1999; Ryan and Deci, 2000). This is critical in complex fields where shortcuts compromise mastery. The flipped classroom transforms instruction by dedicating in-class time to active, collaborative learning (Bergmann and Sams, 2012). This accommodates diverse paces, preparing students for interactive application. Evidence suggests flipped classrooms enhance engagement, critical thinking, and problem-solving through active participation (Abeysekera and Dawson, 2015). Gamification—applying game-design elements in non-game contexts—boosts educational engagement, motivation, and learning achievements (Deterding *et al.*, 2011). Incorporating mechanics like points, badges, and re-attempt opportunities makes tasks appealing and provides immediate, constructive feedback (Kapp, 2012). This feedback loop, coupled with low-stakes practice, alleviates performance anxiety, cultivates a growth mindset, and enhances cognitive performance by reframing mistakes as learning opportunities. Such strategies hold significant potential for motivating diverse learners and reducing assessment anxiety.

Methodology

This observational study involved 180 Level 1, Third Semester undergraduate students from diverse ethnic backgrounds, enrolled in the 'Phenotype Study' module. The learning environment was specifically designed to promote intrinsic motivation and support struggling learners by reducing dependence on extrinsic motivators. This was achieved through a single-activity flipped classroom model. The intervention commenced with Pre-Class Preparation. Students accessed pre-recorded video lessons and supplementary reading materials introducing core theoretical concepts of Ayurvedic disease traits and phenotypes, facilitating self-paced foundational learning. Following this, In-Class Interactive Activities focused on active, collaborative learning within 14 groups (n ≈ 13 per group). Students engaged in interactive content through a combined approach: enacting hypothetical patient scenarios with targeted questioning to identify/differentiate disease traits, and applying 'Categorical Dosha Enactment' through role-play for unstable traits. Teacher-student and peer interactions reinforced learning via active discussion and collaboration with provided materials.

The effectiveness of this flipped classroom model was evaluated with an emphasis on creating an anxiety-free evaluation environment. Cognitive performance and student self-confidence were primarily evaluated via a gamified testing platform. This engaging assessment featured analytical questions in a self-attempting, automated quiz format (3 minutes, brief stems, 4-option SBA). Feedback included sounds/symbols of pleasure for passing and encouraging ones for failed attempts. Re-attempts were facilitated after the first read, providing constructive feedback to promote a growth mindset and learning from mistakes.

Student performance was tracked via these gamified assessment metrics (e.g., scores, completion rates). Qualitative observations of group interactions (e.g., participation, collaborative effort) also informed the analysis. Data were analyzed using descriptive statistics for performance and engagement patterns, and qualitative observations were reviewed for recurring themes related to student interaction and learning behaviours.

Results

A total of 154 students were included in the analysis of their performance on 30 analytical Multiple-Choice Questions (MCQs). The distribution of student scores across various mark bands is presented in detail in Table 1. Analysis of the performance assessment revealed that 11 students (7.1% of the analyzed cohort) achieved high scores, falling within the above 80% accuracy band. The largest proportion of students, 26 individuals (16.9%), demonstrated strong performance within the 70–80% band. Overall, 49.3% of students successfully achieved a pass grade (50% and above), indicating a positive impact on their acquisition of basic knowledge. Conversely, 30 students (19.5%) scored below 40%, and notably, 41 students (26.6%) did not attempt any questions.

Table 1. Student Performance on Gamified Analytical MCQs, Categorized by Accuracy Bands

Accuracy Band	Range	Number of Students	Percentage (%)
Above 80%	81–100%	11	7.1
70–80%	70–80%	26	16.9
60–69%	60–69%	13	8.4
50–59%	50–59%	17	11.0
40–49%	40–49%	16	10.4
Below 40%	1–39%	30	19.5
Not Attempted	0%	41	26.6

Discussion and Conclusion

Interpretation of Main Findings: This study investigated whether specific Teaching Learning Activities (TLAs) (a flipped classroom with gamified testing) could mitigate performance anxiety and enhance learning outcomes in Level 1 Ayurveda undergraduates by addressing diverse student motivators. Findings largely supported these hypotheses. A primary observation was the significant positive impact on student confidence and anxiety levels. Over 80% reported increased confidence and reduced anxiety in the assessment environment. This directly addresses the research question's aim to reduce self-reported performance anxiety, suggesting the anxiety-free evaluation environment (gamified elements, re-attempt options) created a less intimidating experience. This aligns with literature on gamification reducing anxiety and enhancing self-efficacy in low-stakes settings (Kapp, 2012). Furthermore, the study showed a positive impact on learning outcomes: 49.3% of students passed 30 analytical MCQs, indicating acquisition of 'basic' knowledge and learning of complex Ayurvedic concepts. This supports the expectation that TLAs enhance learning. Re-attempt opportunities fostered a crucial growth mindset by reframing mistakes as learning opportunities and encouraging perseverance through constructive feedback. This is vital for struggling learners prone to challenge avoidance. While quantitative results indicate success, the 14.1% non-attendance rate warrants critical reflection. This suggests persistent barriers (technical issues, resistance to new models) for a subset of students, underscoring the complexity of new strategy implementation and the need for adaptation to ensure equitable engagement and access. This study's positive findings on anxiety reduction and confidence enhancement align with established gamification research (Deterding *et al.*, 2011). The gamified testing environment, with immediate feedback and re-attempts, directly addressed performance anxiety prevalent in higher education (Eisenberg *et al.*, 2007), consistent with the study's aim. This approach is particularly valuable in complex disciplines like Ayurveda, where inherent concept difficulty exacerbates student apprehension (Gobena, 2024).

The flipped classroom integration also corroborates its advantages in fostering active learning and engagement (Abeysekera and Dawson, 2015). Shifting foundational content to pre-class videos provided flexible, self-paced learning, crucial for struggling learners. In-class time was effectively utilized for interactive application and collaborative problem-solving, essential for deep understanding in Ayurveda. This model offers clear practical implications for educators. Institutions facing similar challenges (student anxiety, low engagement from extrinsic motivation, complex curricula) can adopt this approach. Integrating pre-recorded video content, interactive in-class activities, and gamified assessments (with low-stakes re-attempts and immediate feedback) can enhance student confidence and learning outcomes. This model is particularly applicable in disciplines requiring theoretical comprehension and practical application, allowing self-paced foundational learning before active application. The current study offers valuable insights but has limitations. As an observational study within a single module and institution, direct generalizability to all academic contexts is limited. The lack of a control group also restricts attributing all changes solely to the intervention. To enhance generalizability and strengthen causal claims, future research should employ randomized controlled trials across multiple institutions. This provides more robust evidence of the model's applicability in diverse settings.

The 14.1% non-attendance rate warrants further investigation. Understanding specific reasons (technical barriers, initial engagement) is crucial for refining the model and ensuring equitable access. Future work will include qualitative inquiries (interviews, focus groups) to explore these barriers and student perceptions beyond this observational study's scope. The positive results on anxiety reduction, confidence, and basic knowledge acquisition advocate for expanding this work. Applying this combined model to other Ayurveda modules, and potentially other complex health sciences or STEM disciplines, could further evidence its broad impact. Continued development of such learner-centered, anxiety-reducing pedagogies is vital for fostering effective, supportive higher education environments.

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Student perceptions on the impact of chunking and Bloom's Taxonomy to help reduce student anxieties on examination performance

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Abstract

Answering Higher Order Thinking (HOT) questions require students to focus attention on different question components that first require deconstructing the questions by "chunking". I noted that many students who followed modules in Foundations of Human Resource Management (first year), Global Human Resource Management (second year), and International Business Strategy 1 and 2 (third year) struggled to deconstruct complex assignment questions, often overlooking key components and contributing to their performance anxiety and procrastination. I therefore undertook to test whether specific changes to my Teaching Learning Activities (TLAs) could help students manage these anxieties. In the above four classes, I used TLAs of Tell-Show-Do and Chunking, along with the use of Bloom's Taxonomy to help in the student learning process. Using a mixed-methods approach, integrating qualitative and quantitative data, I evaluated how students perceived the effectiveness of Bloom's Taxonomy and the new TLAs in helping them deconstruct assignments and improve academic performance and anxiety levels. To do so, I used a structured online questionnaire with a 5-point Likert scale, deploying it among students from all three academic years across four modules. Observational inputs supplemented the data. 50% of students found Bloom's Taxonomy effective, with similar results for Tell-Show-Do. Chunking was effective for 42%, while it is neutral for 50%. Despite mixed opinions, 79% intended to apply these strategies in future coursework. Marks showed that 100% successfully passed final assignments, compared to 90% passes seen in the previous year. Bloom's Taxonomy and Tell-Show-Do method helped address student anxiety levels. Further work is needed to evaluate whether it was these methods that enabled students to apply 'chunking'. A blended instructional approach and psychological support could further help reduce anxiety and improve performance.

Purpose/Background

Higher Order Thinking Skills (HOTS) are central to the academic development of university students. HOTs involve the ability to analyze, evaluate, and create rather than memorize and repeat information (Alanazi *et al.*, 2024; Zain *et al.*, 2022). Such skills are crucial for academic success and preparing students for complex problem-solving in real-world professional settings (Zain *et al.*, 2022). However, many students, particularly in their early undergraduate years, struggle with HOTS-focused assignments. A pilot study revealed that this issue was consistently observed, specifically in the modules Foundations of Human Resource Management (Year 1), Global Human Resource Management (Year 2), and International Business Strategy 1 & 2 (Year 3). Students were challenged in deconstructing complex assignment questions, exhibited through heightened performance anxiety, procrastination,

and diminished academic confidence, ultimately contributing to lower pass rates. In response to these challenges, I revised the TLAs within these modules. Specifically, I incorporated structured scaffolding strategies, including Bloom's Taxonomy, the Tell-Show-Do method, and Chunking to better support student learning.

Prior research highlights the critical role of scaffolding in promoting HOTS (Alanazi *et al*., 2024). Scholars frequently study scaffolding as a key mechanism through which students' learning is supported by others, enabling them to solve problems, complete tasks, or achieve goals that would otherwise be beyond their independent capabilities (Stone, 1998; Van de Pol *et al*., 2010). Stone (1998) identified scaffolding as an effective instructional technique for enhancing learning outcomes. However, Van de Pol *et al*. (2010) noted challenges in accurately measuring scaffolding practices and recommended further research to address this gap.

Bloom's Taxonomy presents a hierarchical model that guides students from basic knowledge toward higher levels of thinking, such as analysis, evaluation, and creation (Anderson *et al*., 2001). In this study, I define HOTS according to revised Bloom's taxonomy as the ability to apply, analyze, evaluate, and create, following the framework established by Anderson et al. (2001) and further supported by Zain *et al*. (2022). Anderson *et al*. (2001) stress that the revised taxonomy aids instructional design, more empirical studies are needed to test its impact on student learning outcomes, especially in higher education. Instructional strategies such as Tell-Show-Do refer to a stepwise teaching approach where the instructor first tells the learner how to perform a task (verbal instruction), then shows the task (demonstration), and finally supports the learner as they do the task themselves (guided practice). This method aligns with the principles of scaffolding, gradually transferring responsibility from the teacher to the learner (Marzano *et al.*, 2001). This method also follows active learning principles, promoting deeper student engagement and enhancing knowledge retention (Prince, 2004). Additionally, the strategy of Chunking, breaking down information into manageable, bite-sized units, enables the brain to process complex information more efficiently (Anggraini, 2015). Research by Zhang *et al*. (2020) indicates that Chunking proves to be particularly effective when tasks are complex and demand greater working memory capacity. However, Zhang *et al*. (2020) also emphasized the need for further studies with larger samples to validate the effectiveness of Chunking across a broader range of academic tasks.

Thus, this study aimed to scaffold student learning, simplify complex assignment questions, and ultimately enhance both academic performance and emotional well-being by integrating Bloom's Taxonomy, Tell-Show-Do, and Chunking into the TLAs. Limited research has explored the combined impact of these strategies within a university-level business curriculum. This study seeks to address the research questions: 1)How do students perceive the usefulness of Bloom's Taxonomy, Tell-Show-Do, and Chunking in initially learning and next, responding to HOTS questions? 2) Is there a measurable improvement in academic performance following the introduction of these TLAs? 3) Do these TLAs reduce assignment-related anxiety and procrastination?. By answering these questions, this study intended to produce 1) A clearer identification of how students experience and engage with TLAs aimed at HOTS. 2) Evidence-based recommendations for integrating Bloom's Taxonomy and other scaffolding methods into undergraduate teaching. 3) Preliminary data on the psychological and academic impact of active instructional strategies.

Methodology

I gave an explanation stating the importance of Bloom's Taxonomy, Tell-Show-Do, and Chunking to motivate the students. The keywords from Bloom's Taxonomy were highlighted in a sample assignment. The meaning of those keywords was explained, and the procedure was shown to break the assignment question into manageable chunks. I repeated the procedure for all the questions in the sample assignment. After following the above steps mentioned, a survey was distributed to obtain students' perceptions of the usefulness of the said methods. A mixed-methods approach was employed. Quantitative data were collected through a structured online questionnaire distributed to students across four modules (first to third year). The instrument used a 5-point Likert scale to gauge perceptions of usefulness for each strategy. Qualitative insights were gathered from open-ended questionnaire items and in-class observations.

Results

Out of 35 students representing the 1st year, 2nd year, and 3rd year, only 14 responded to the survey. The distribution of 14 students was 4, 2, and 8 from 1st year, 2nd year, and 3rd year, respectively. Figure 1 illustrates participants' perceptions of the effectiveness of three TLAs. The Tell-show-do strategy garnered the highest positive perception, with 36% of respondents rating it as "Effective" and an additional 14% as "Very effective," totaling 50% positive endorsement. Notably, no participants rated Tell-show-do as "Not effective." In contrast, Chunking was predominantly perceived as "Neutral" by 50% of respondents, with 21% finding it "Very effective" and 21% "Effective," suggesting a more moderate or less distinct impact on perceived learning. Similar to Tell-show-do, Chunking received no "Not effective" ratings. The perceived effectiveness of Bloom's Taxonomy was more diverse; while 21% found it "Very effective" and 29% "Effective," 36% rated it "Neutral," and 7% each rated it as "Somewhat effective" or "Not effective." This indicates a mixed reception for Bloom's, with a notable portion of participants not finding it useful, a characteristic unique among the three strategies. Overall, these findings suggest that the Tell-show-do method was most consistently perceived as beneficial by students, while Chunking's impact was largely neutral, and Bloom's had a more polarized range of perceptions.
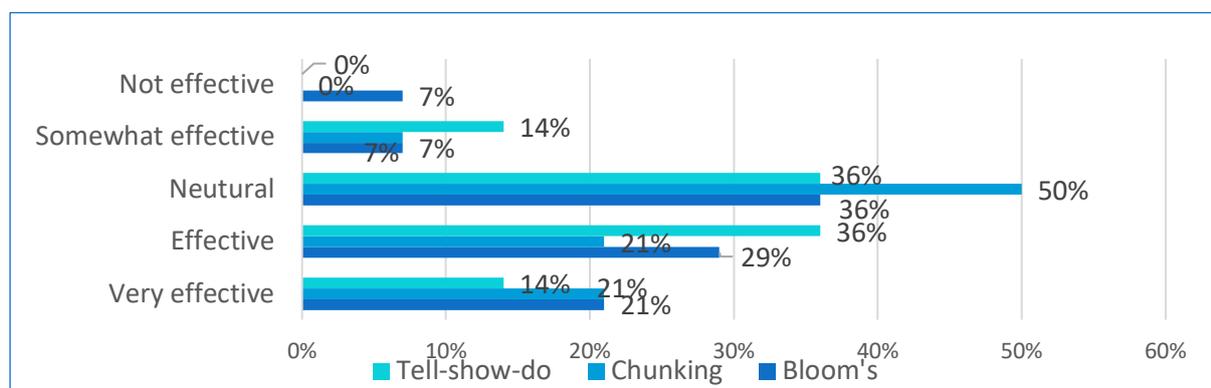

Figure 1. Perception of effectiveness of TLAs

Figure 2 depicts that 79% of students reported intentions to use the TLAs in future

coursework. I observed that the 100% pass rate was recorded for final assignments across the modules after TLA implementation, compared to 90% in the previous year, where these TLAs were not utilised. Qualitative comments and observations suggested reduced anxiety (80%) and procrastination (70%) among students who actively engaged with the TLAs.
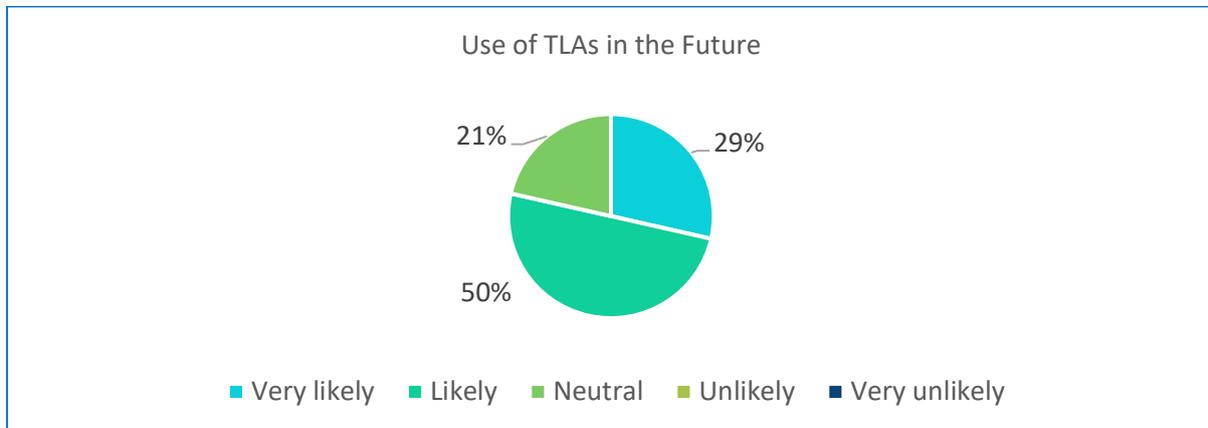

Figure 2. Intentions to use the TLAs in the future

Discussion and Conclusion

The findings suggest that scaffolding strategies such as Bloom's Taxonomy and Tell-Show-Do can significantly assist students in managing complex HOTS assignments. The notable rise in assignment pass rates indicates academic benefits, while the high percentage of students expressing intent to continue using the strategies shows their perceived value. Moreover, the emotional impact, reduced anxiety, and increased confidence emphasize the need to consider not only cognitive outcomes but also affective responses when evaluating instructional interventions. These results show that scaffolding strategies can support both students' academic success and emotional well-being.

This study provides promising evidence that integrating Bloom's Taxonomy, Tell-Show-Do, and Chunking into business education enhances students' academic and emotional outcomes. The findings support the adoption of a blended instructional approach that explicitly teaches cognitive deconstruction strategies for HOTS tasks while simultaneously supporting emotional regulation. Based on strong theoretical support and positive results, educators in diverse fields, especially those focused on critical thinking, can apply these strategies to enhance learning. Future longitudinal research is needed to assess long-term effects, and further studies should explore how to effectively implement chunking within teaching practices to better manage cognitive load.

While this study focuses on business modules at a single institution, the alignment with well-established learning theories supports broader application. Replication in other disciplines and institutions will be essential to validate and refine the approach, taking into account contextual differences and diverse learner needs. Educators and institutions can take practical steps such as embedding scaffolding strategies explicitly within curricula, providing faculty development on these instructional methods, integrating emotional regulation support alongside cognitive scaffolding, and exploring technology tools that facilitate

chunking and active learning. By adopting these strategies and pursuing further research, educational stakeholders can foster deeper learning, improve academic success, and support students' emotional health across a wide range of educational settings.

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Impact of changing teaching activities in reducing teacher performance anxiety on student non-engagement behaviour

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Abstract

Teacher anxiety can arise from student underperformance, lesson disruptions and classroom misbehavior, affecting lesson effectiveness and student engagement. In teaching computing classes with an average of 25 students, I noticed these students also showing above-mentioned behaviors that led to my performance anxiety. This study was undertaken to address this teaching anxiety that I experienced as a teacher. This study was carried out across three computing classes for three different modules. I thought that changing my Teaching Learning Activities (TLAs) could help to overcome the student non-engagement that I had experienced. Hence in the redesigned TLAs, students were asked to recall key terminologies daily to encourage self-reflection on their knowledge levels, while group activities were conducted using the Placemat, T-Chart and Mind Map activities to carry out subject related learning tasks. The resulting teaching effectiveness as well as engagement and anxiety levels were evaluated through task submission numbers, observations on student numbers, student feedback and reflections at pre and post interventions. Findings indicated that redesigned TLAs had increased student participation and engagement. Submission rates rose from 17% to 52%, 35% to 65%, and 52% to 84% across three modules. Classroom observations showed active discussions, idea-sharing, and students explaining terminologies during "recalling" time. Feedback revealed that 33.3% strongly agreed, 50% agreed and 16.7% were neutral on the benefits of recalling time for revisiting covered subject matter. Improved academic performance was evident in class tasks mapped to Bloom's levels, with answers achieving 85%-100% accuracy. These performance gains positively impacted my teacher anxiety levels, as students demonstrated deeper learning and engagement in group tasks. This study showed how, by planning and integrating structured TLAs, educators can enhance teaching and learning effectiveness to reduce teacher anxiety by improving student learning experiences.

Purpose/Background

Teacher performance anxiety is a well-documented phenomenon that significantly affects both teaching effectiveness and student engagement. Traditionally, anxiety has been viewed as a negative emotional state. However, scholars Senyshyn (1999) and Jamieson *et al.* (2013) argued that anxiety can also serve as a positive as it is a creative force when properly identified and handled. This perspective suggests that changing teachers' approach and their teaching activities could transform anxiety from a paralyzing factor into a motivating one. This can potentially be enhanced by classroom engagement.

Aydin (2021) and Tschannen-Moran and Hoy (2001) confirmed that teaching anxiety is closely tied to affective states and that factors such as teaching strategies, classroom management, planning and school climate directly influence anxiety levels. Importantly, the review

emphasizes that deliberate changes in instructional methods and better preparation can significantly decrease anxiety, which could, in turn, influence student engagement.

Studies that discuss teachers' practices by Agustiana (2019) and Paker (2011) highlighted specific sources of teaching anxiety, such as evaluation inconsistencies, classroom management challenges, and personal doubts about teaching abilities. Both studies suggest that structured support and communication with stakeholders can mitigate these anxieties. If similar supports or changes in teaching activities are extended to in-service teachers, a reduction in performance anxiety could likely influence classroom dynamics, leading to fewer instances of student non-engagement behaviour.

Furthermore, the dramaturgical analysis by Scott (2007) explores how "stage fright" affects university lecturers. The research indicates that teachers used different strategies to manage stage fright, which fit into Erving Goffman's ideas of cynical (e.g., scripted speeches, rehearsals, dressing formally), which are associated with lower anxiety levels and better teaching performances. Such adaptive behaviours could serve as examples of how changing teaching practices reduces teacher anxiety and fosters a more engaged student body.

Together, these findings underline the importance of examining the impact of targeted changes in teaching activities not only on teacher anxiety but also on student engagement. By adapting teaching methods, providing consistent feedback and promoting open communication, teachers may transform performance anxiety into a constructive force, ultimately reducing student non-engagement behaviour in educational settings.

Methodology

I conducted this study across three undergraduate computing classes covering three distinct modules: Emerging Technologies I, Web Development and Operating Systems I and Digital Technologies. Each class had an average of 25 students. The primary aim of the study was to address the student non-engagement that I experienced during earlier teacher-centered lessons. To achieve this, the Teaching-Learning Activities (TLAs) were redesigned to promote more active participation, collaboration and self-reflection among students.

A structured "recalling" activity was introduced into each session, known as the "I-P-U-R" activity, which stands for Identify-Plan-Undertake-Review. This approach was adapted from Kolb's Experiential Learning Cycle and aimed to encourage students to reflect on and consolidate their learning. During each class, students were presented with a list of key terminologies or concepts from previous sessions. For instance, in the fourth week of the module, terminologies covered during the first three weeks were displayed on a screen. Students, arranged into small groups of three to four members according to their seating, were given 15 minutes to discuss the given terms. This exercise aimed to foster deeper self-reflection, enhance peer discussion, and help students identify gaps in their knowledge. Feedback was subsequently collected from the students to check the perceived effectiveness of this daily activity.

In addition to the daily reflection tasks, group-based learning activities were introduced to

support subject-related tasks. These included the use of Placemat, T-chart, and Mind Map activities. Through the Placemat activity, students collaboratively brainstormed ideas and synthesized shared responses, while the T-chart activity helped them organize and compare various aspects of key concepts. Mind mapping enabled students to visualize and connect major themes within the course material. These activities were designed to enhance critical thinking, foster collaboration and increase active engagement during sessions.

To evaluate the impact of the redesigned TLAs on teaching effectiveness and student engagement, feedback was collected from students through questionnaires. Task submission rates were recorded and compared against submission rates from the traditional teacher-centered lessons prior to the intervention. Informal observations were made throughout the sessions to monitor levels of participation, group dynamics and overall student interaction. I documented my reflections before and after the intervention period to capture changes in student behaviour, engagement and classroom atmosphere.

By bringing together these multiple sources of evidence, the study aimed to build a comprehensive analysis of the effects of changing the teaching-learning approach on student engagement and classroom experience.

Results

The impact of the redesigned teaching-learning activities was evaluated using responses taken from the questionnaire. The findings indicate notable improvements in student engagement, performance and classroom interaction, as well as a positive shift in the teacher's experience and confidence.

Submission rates across all three modules showed a marked increase after the intervention (Figure 1). In Emerging Technologies I, the submission rate rose from 17% to 52%, while in Web Development and Operating Systems I, it increased from 35% to 65%. The most significant rise was observed in the Digital Technologies module, where submission rates improved from 52% to 84%. These improvements suggest that the new TLAs were more effective in encouraging student participation and completion of tasks compared to the previous teacher-centered methods.

Classroom observations during the intervention period revealed enhanced student engagement. During the "recalling" sessions, students actively discussed key terminologies, shared ideas, and demonstrated peer-to-peer learning. In several instances, students were seen explaining concepts to their group members, indicating an application of deeper knowledge and greater confidence in communication.
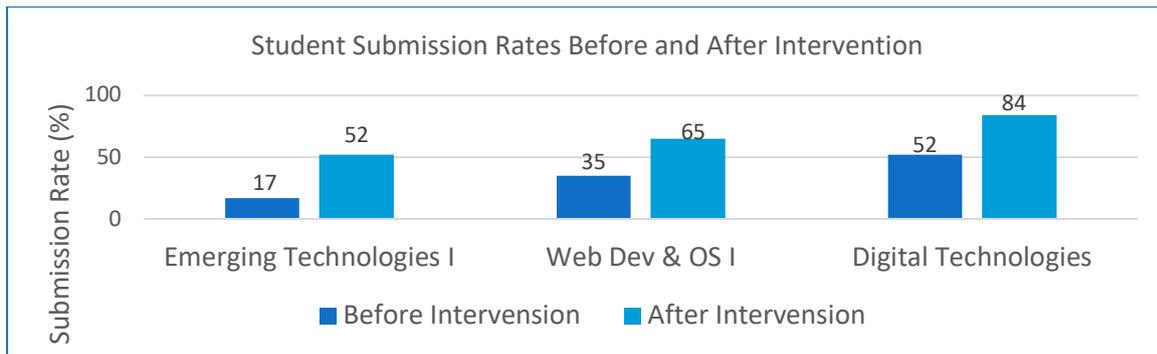
Figure 1. Student Submission Rates Before and After Intervention

Student feedback further supported these observations. When asked about the usefulness of the daily recalling activity, 33.3% of the students strongly agreed, 50% agreed and 16.7% remained neutral, indicating that a significant majority found the activity helpful for revisiting and reinforcing previously covered subject matter.

Academic performance also improved in classroom tasks that were aligned with Bloom's Taxonomy levels. Post-intervention assessments showed that student responses demonstrated high accuracy, ranging from 85% to 100%. These gains point toward better conceptual learning and application of knowledge during higher-order thinking tasks such as analysis and evaluation.

In addition to the improvements in student outcomes, the intervention had a positive impact on my own professional development and emotional well-being. Self-reflection before and after the intervention indicated an increase in satisfaction across key teaching areas such as directing student tasks, monitoring engagement, and maintaining lesson relevance. For example, prior to the intervention, aspects such as monitoring student activity, maintaining pace and summarizing sessions were rated as satisfactory or needing improvement. After implementing the I-P-U-R method and activity-based learning tools like the T-chart, mind map and placemat, I was able to perform all aspects of teaching with greater confidence and effectiveness.

The structured student tasks, increased interaction, and observable engagement helped reduce my anxiety, reinforcing the value of adopting student-centered and reflective teaching strategies. The combination of quantitative gains and qualitative feedback confirms that the intervention created a more active and meaningful learning environment.

Discussion and Conclusion

The findings of this study suggest that adopting redesigned Teaching-Learning Activities (TLAs) particularly those that incorporate reflective and collaborative strategies such as the I-P-U-R (Identify–Plan–Undertake–Review) method, mind maps, placemats and T-charts can significantly enhance student engagement and academic performance in computing-related modules. These approaches not only increased submission rates and classroom participation but also contributed to reducing teacher anxiety by fostering a more responsive and interactive learning environment.

The success of these methods indicates that similar strategies can be applied by other educators in both computing and non-computing disciplines where student engagement is a concern. While the improvements observed were encouraging, the findings are based on a relatively small sample three classes with approximately 25 students each. The intervention was also implemented over a limited period and within a specific subject area (computing). As such, the generalizability of the results may be limited. Further research involving a more diverse range of subjects, larger student populations and extended timelines is necessary to confirm the broader applicability of these methods.

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Use of Bloom's Taxonomy, problem-centred learning and Think-Pair-Share activities to reduce examination anxiety of students

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Abstract

The sources of examination anxiety can be widespread and diverse. Linked to the complexity of content and learning outcomes, I observed such anxiety consistently in lectures in the Tort Law (Level 4) module. Signs of anxiety were often reflected in lack of examination readiness and module feedback. Thus, this study was conducted to evaluate the feasibility of utilizing Teaching-Learning Activities (TLAs) involving Bloom's Taxonomy awareness building, problem-centred learning and peer learning to reduce examination anxiety of students. In a class of 23 students, I utilized Bloom's Taxonomy coupled with problem-centred scenarios, using permanent student groups, supported by a think-pair-share method to assist students learn to systematically develop answers. The students were shown how Bloom's Taxonomy can be used to structure answers before problem-centred scenarios were provided to the groups to present answers to the class collectively. Using both qualitative and quantitative methods of research, the feasibility of the methods utilized in reducing exam anxiety was evaluated through classroom observations and by a 5-point Likert Scale feedback survey. 100% of the students agreed that using Bloom's Taxonomy assisted them to develop answers and as a negating factor of exam anxiety, with 47% strongly agreeing and 42% agreeing on the feasibility of problem-centred activities via think-pair-share method in developing answers. The pass rate showed an increase from 62% to 83% compared to the previous semester. The use of Bloom's Taxonomy, problem-centred learning and think-pair-share methods has proven to produce positive results pertaining to addressing examination anxiety and improving student performance. However, the possibilities pertaining to continuous improvement should be explored further.

Purpose/Background

Anxiety is a response that is triggered by the body to certain environmental stimuli such as stress, social isolation, negative life events and childhood trauma attention (Chakraborty, 2023). Anxiety can cause persons to suffer from restlessness, extreme levels of nervousness, irritability, lack of concentration and loss of focus (Robinson *et al.*, 2013). Thus, anxiety might negatively affect student flourishing (Yu *et al.*, 2024). Examination anxiety is a state that includes a range of behavioural, mental and physical reactions that exemplifies worry or unease based on the presumed possible outcomes or the fear of underperformance in evaluation-related contexts (Zeidner, 1998). It is recognized by research that exams can be a cause of anxiety for students in their academic programmes (Ping *et al.*, 2008). Excessive levels of anxiety may hinder academic performance of students due to impaired cognitive capabilities, including the skills pertaining to reasoning even though moderate anxiety levels may motivate individuals and make them responsible in their undertakings (Chakraborty,

2023). Habitual and irrelevant negative thoughts on tests, lack of knowledge on proper study and preparation strategies, distractions during examinations and mistaken beliefs pertaining to the adequacy of examination strategies are few causes of exam anxiety (Mealey and Host, 1992). Additionally, excessive content is also considered as a contributing factor for examination anxiety (Hashmat *et al*., 2008). Interestingly, Hashmat *et al*. (2008) have further identified that there is lack of knowledge of the students on examination stress management and anxiety reduction strategies, which could also be a contributing factor to examination anxiety.

A learning atmosphere where the students are consumed by anxiety may render the learning experience ineffective and stressful for the students as well as the educators (Córdova *et al*., 2023). Thus, the current research was inspired by the initial feedback obtained from the students regarding the Level 4 Semester 1 Tort Law module of the Bachelor of Laws Programme offered by the University of Staffordshire. It was identified that the students often are anxious about complexities pertaining to application of knowledge, extensive content of the module and because of the two-hour examination that consists of a pre-seen question and ten multiple choice questions. Hence, the current research was conducted to test whether a fusion of the Bloom's Taxonomy, problem-centred learning and think-pair-share activities as a mechanism to reduce examination anxiety of students and improve the effectiveness of the teaching and learning process.

Methodology

First, I divided the students into groups that were to be considered as their assigned study groups for the semester during the fourth week of their studies. Factors such as English language skills, presenting skills and writing skills of the students were considered in the process based on measurable criteria such as the results of the English proficiency test. In the fourth week of the teaching and learning period, I had collected opinions of the students regarding the course through which I identified a nexus between examination anxiety and the course content along with application requirements. Secondly, I explained about Lower Order Thinking Skills (LOTS) and the Higher Order Thinking Skills (HOTS) as depicted in the Bloom's Taxonomy as a guideline pertaining to developing answers via stressing on cognitive development. In this stage, I employed a presumption stating that the stages of knowledge would provide the students a clear perspective about how they should develop their cognitive skills to find solutions for problems.

I explained the question structure and the skill level that is expected from the students, distinguishing HOTS and LOTS by using a previous formative examination question. Furthermore, a mapping exercise with the students where we collectively identified the necessary skills and competencies expected was completed through a marking exercise using three different answers for a previous examination question. Learning outcomes were also considered thoroughly during the process. In the third step, starting from the sixth week of the teaching and learning period, inspired by the characteristics of problem-centred learning (Elbyaly and Elfeky, 2023; Utami *et al*., 2019) the students were provided with different hypothetical scenarios/problems that portrays negligent behaviour that can be related to the Tort of Negligence. The students, in their groups had to discuss the scenario using the principles of negligence and develop an answer collectively to present before the class. The

answer development process by groups was inspired by the underlying principles of the think-pair-share method and its positive effects on student participation and growth (Mundelsee and Jurkowski, 2021). The fourth step of the exercise was to allow the students to present their solutions for the problem scenario as groups. All groups were instructed to focus on the presentations and share comments on the presentations and the graphical illustrations. The final stage of the experiment consisted of providing opportunities for the students to develop written answers within two hours for a separate formative question based on the knowledge that they have obtained through the lectures, tutorials and the activities. To measure the results of the experimental process, both qualitative and quantitative measures including classroom observations, quality of the answers based on the generic assessment criteria in line with the learning outcomes for the course and a 5-point Likert Scale feedback survey provided to the students at the conclusion of the exercise were utilised.

Results

In the feedback survey, 100% of the students agreed that using Bloom's Taxonomy assisted them to develop answers and reduced their confusions by providing a step-by-step learning path to develop answers and develop their critical thinking skills. Furthermore, all respondents have unanimously stated that their knowledge on the Blooms Taxonomy has reduced their examination anxiety. 47% of the students strongly agreed and 42% of the students agreed on the feasibility of problem-centred activities via think-pair-share method in developing answers. The pass rate for the module showed an increase from 62% to 83% compared to the previous semester. Interestingly, results also depicted that 25% of the pass level answers were within the second upper-level category whereas and 17% were first-class level category. In the previous semester where the current methodological process was not specifically employed, irrespective of the extra activities conducted, there were no first-class level or second-class level answers for the summative examination. In certain responses, it was suggested that students have identified the effective use of Bloom's Taxonomy as a method to reduce examination anxiety. However, it should be noted that certain challenges pertaining to groupwork, such as distractions, dominance exercised by group members and language barriers were detected in the feedback, which may have had a certain degree of impact on the overall development of the respective students which remained undetected through the data obtained.

Discussion and Conclusion

The Bloom's Taxonomy is proven to be an effective logical structure that portrays the cognitive skills that the students will need to follow to obtain knowledge in a comprehensive and a meaningful manner (Nurmatova and Altun, 2023). Analytical skills and cognitive capabilities of learners can be improved through integrating the Taxonomy for teaching and learning (Nurmatova and Altun, 2023). Thus, for the current experiment, the Bloom's Taxonomy was utilised as a benchmark as it summarises the process of acquiring, applying and developing scholarly capacity and skills (Khan *et al.*, 2024). The results of using the Bloom's Taxonomy as a benchmark for cognitive development appears to be quite satisfactory when student responses are considered as depicted in student feedback. Problem-centred knowledge is the opposite of referent-centred knowledge which includes

subject matter that is organised around topics as seen mostly in school textbooks as opposed to being organized around problems (Tan *et al.*, 2022). Problem-centred questions appear to have provided opportunities to the students to develop solutions while challenging them intellectually during the teaching and learning process. Working in groups, as reported in various studies, appears to show a positive relationship with developing critical thinking skills (Xu *et al.*, 2023). Such findings laid the basis for the adopted mechanism through the think-pair-share method during the experiment and student responses appear to have crystallised the effectiveness of the same.

With the justifications deduced from existing research on the relevant field and the results pertaining to the experiment conducted in light of the current research, a fusion of Bloom's Taxonomy, think-pair-share and problem-centred learning appears to have produced positive results in terms of student's performance and has affected the examination anxiety levels of students positively. However, there is still a pressing requirement to foster further research on the field due to various complications, including the negative aspects of the tools utilised. For instance, Cooper *et al.* (2021) have reported that think-pair-share may induce call panics which may cause the students to feel more anxious. Further to the same, the number of classes on whose benefit the experimental process was implemented was restricted, making it possible that certain subjective factors such as student commitment, literacy, cognitive level skills may have had an impact on the results of the experiment. Thus, continuous research appears to be pivotal to identify further productive mechanisms that are competent in reducing student anxiety levels pertaining to examinations while considering the merits of the research findings of the current research.

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Reducing the anxiety of students' memorization-learning Sanskrit stanzas as first learners

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Abstract

When students from a Bio-science background with secondary education in Sinhalese or Tamil are introduced Ayurveda Sanskrit stanzas for the first time, difficulty in memorization and the subsequent analyzing of content generates anxiety. This results in poor performances in the end semester examinations with low scores. This research was focused on developing a mechanism to reduce anxiety of students in learning Sanskrit stanzas and increase their adaptability to gain a comprehensive knowledge in Ayurveda fundamentals. 100 students in the First Professional Academic Year, in the Ayurveda Basic Principles subject, participated and were grouped into 4 to 8 self-selected students per group to engage in studying on a daily basis. To test the outcome of memorizing, two stanzas per day on a specific topic, group Teaching-Learning Activities (TLAs) commenced in class by an introduction followed by group-work commencement with a group-chosen memorization method. Next, groups were asked to practice and complete memorization task within two weeks, with a selected member in a group responsible for group performance. Each student was given a unique identity code so that the Pre and post perception and stanza memorization marks of the same student could be assessed to evaluate the TLA outcomes. Students' perception was evaluated using pre and post questionnaires. Results indicated that average memorization marks improved from 53% to 86%. Most preferred methods were "repeat aloud" of the stanzas (67%) and group discussions (50.5%). Student questionnaire results indicated the perception that this group method enhanced their performance by 89%. This group method could be utilized to enhance the confidence and to reduce student anxieties in memorization-learning novel subjects for the first time. Reduction of anxiety is vital for students to enhance their comprehensive learning.

Background

Mental health is recognized as a fundamental of human health by the World Health Organization and introduces plans for treatment and overcoming mental health disorders (W.H.O., 2013). As a vulnerable population, undergraduates are at risk of experiencing mental health problems such as anxiety, depression and stress in different levels (Tosevski *et al.*, 2010; Shamsuddin *et al.*, 2013; Ramón-Arbués *et al.*, 2020). Anxiety would appear during anytime of an undergraduate life due to multifaceted causes including workload, competitiveness, social demands. These conditions generate poor academic, emotional and health outcomes (Teh *et al.*, 2015; Al-Naggar *et al*., 2012). Impaired concentration and Learning, poor ability of information retrieval due to blockage or reduction of memory capacity, avoidance behaviours, negative self-Beliefs and self-efficacy, poor physical health resulted by anxiety hinder academic performances (Konwar *et.al.*, 2023). Anxiety among first year medical students may cause consequences like poor quality medical care (Mihăilescu *et.al.*, 2016). Thus, an attempt to prevent anxiety will not only improve academic performances in medical students but also could lead to improve the quality of medical care.

Ayurveda Medical education in Sri Lankan state Universities is based on Ayurveda compendia and medical textbooks mainly written in Sanskrit language. Teaching Sanskrit Language in public schools is a very rare incident in Sri Lankan education system. Many Sri Lankan students obtain their primary and secondary education in their mother tongue, which is either Sinhala or Tamil language. English is taught as a second language in government schools. Thus, Most of the Sri Lankan students enter state Universities after completing their secondary education in native languages.

Even though Sanskrit is taught as a subject in the first year of Ayurveda Medical education in Sri Lanka, at this initial stage of studies students find it difficult to absorb the core concepts of the subject which are expressed in Sanskrit stanzas. Specifically, when students from a Bio-science background with secondary education in Sinhalese or Tamil are introduced to Ayurveda Sanskrit stanzas for the first time, they find it difficult to gain a comprehensive knowledge at once. Further, students find it difficult to memorize the stanzas due to the new language. Anxiety generated by foreign languages is considered as a more provoking, separate process from other forms of anxiety (MacIntyre and Gardner, 1989). Learning Ayurveda Sanskrit stanzas for the first time, difficulty in memorization and analyzing of content generates anxiety in first year students. This results in poor performances in the end semester examinations with low scores. This research study was focused on developing a mechanism to reduce anxiety of students in learning Sanskrit stanzas and increase their adaptability to gain a comprehensive knowledge in Ayurveda fundamentals.

Methodology

In this study, we explored how an individual's perceptions of anxiety, regardless of how high or low it was, changed as a result of engaging in active group learning practices. 132 students in the First Professional Academic Year in the Ayurveda Basic Principles subject were selected for this study. 32 responses were discarded due to repetition of same unique number or not mentioning unique numbers. These selected students were grouped into groups of 4 to 8 self-selected students per group to engage in studying on daily basis. The group was given the opportunity to choose their memorization method. Teaching-Learning Activities (TLAs) commenced in class by an introduction followed by group-work commencement. Then, groups were asked to practice two stanzas per day on a selected topic and complete memorization task within two weeks, with a selected member in a group responsible for group performance. Each student was given a unique identity code so that the Pre and post perception evaluated with same pre and post questionnaires on student perception and stanza memorization marks of the same student could be assessed to evaluate the TLA outcomes.

Results

Pre-assessment memorization marks of students were widely distributed across all the five mark bands (Figure 1) and reflected a moderate level of memorization with majority scored between 40 - 60 marks. A considerable number scored in lower bands indicated a limited memorization of Sanskrit stanzas. Figure 2 shows a drastic improvement in memorization of Sanskrit stanzas after the implementation of the group method, with over 60 students scoring

in the range of 80 – 100 and a significant decrease of the number of students in lower mark bands. This result clearly shows that many students progressed in memorization of Sanskrit stanzas from lower and middle mark bands with an average memorization mark of 53% to the highest band with an average memorization mark of 86% after the implementation of this group method.
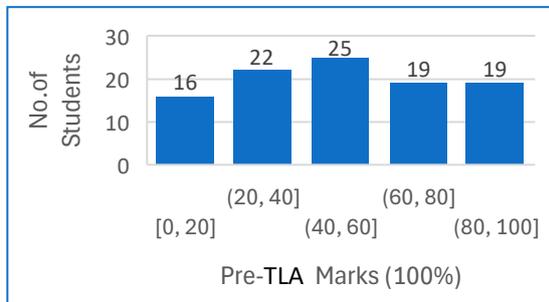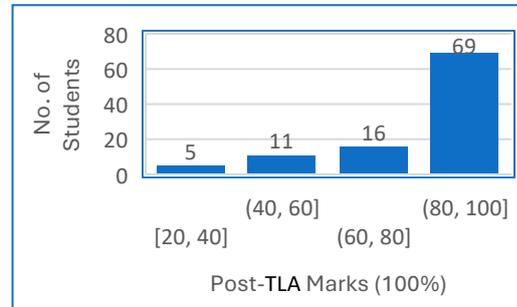

Figure 1. Pre-TLA Marks

Figure 2. Post-TLA Marks

(TLA = Group Teaching-Learning Activity)

Majority of students (67%) favoured 'repeating aloud' as the most effective technique to memorize Sanskrit stanzas followed by 'group discussions' (50%) reflecting the importance of collaborative learning strategies (Figure 3). Each student indicated all the methods one preferred. Further 33% preferred 'writing down' stanzas and a least of 26% preferred 'silent reading' to memorize Sanskrit stanzas suggesting their perception that passive strategies of memorization are less effective (Figure 4).
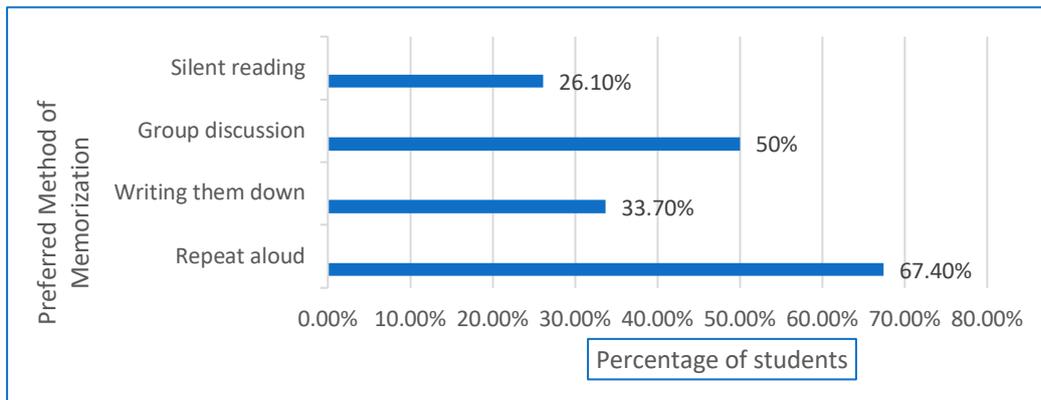

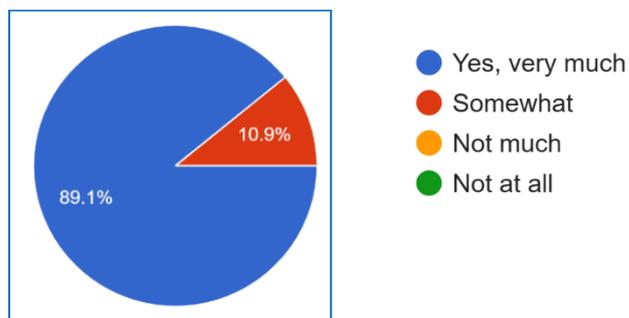Figure 3. Percentages of students on preferrable methods of Sanskrit stanza memorization

Figure 4. Students' perception of the group method enhancing their performance

Discussion and Conclusion

Lev Vygotsky's (1978), "Sociocultural theory" emphasizes social interaction is important in learning. Using role-plays, debates, recitals and discussions, an inclusive learning environment could be created to enhance students' interactions while reducing learning anxieties. Integration of "group work" as active learning process improves attitudes towards learning (Johnson and Johnson 2009; Tanner *et al.*, 2003). Students obtain more knowledge as they open up to diverse opinions. Allowing Students to choose their groups maximize student comfort, idea sharing, turns of recitals and reduce anxiety (Cooper *et al.*, 2018). Listening to simple peer explanations, peer instructions are beneficial in group work learning (Chi *et al.*, 2004). By comparing their levels students enhance the idea of "academic self-concept (Brunner *et al.*, 2009). This study shows that group-based learning methods reduce the anxiety experienced by first-time learners effectively when memorizing Sanskrit stanzas. At pre-TLA, the students' performance was moderate, with most of them struggling in lower mark bands, which reflects challenges and stress related to individual memorization as first-time learners. With the introduction of collaborative techniques such as group discussions and repeat-aloud practice, their average score increased from 53% to 86%, and most students reached the highest performance band. Majority preferred active methods like repeating aloud (67%) and group discussions (50%), while minority favoured passive strategies. These perceptions of students suggest that interactive, multisensory learning not only improves memorization but also creates a supportive environment that eases learning-related anxiety. In conclusion, Students perceived that they benefit from the activity implemented. Groupwork enabled them to obtain improved memorization that can support an in depth meaning of the words in their familiar or native languages. Further it can enable students to learn concepts comprehensively and realize that other students also find matters challenging, which indirectly reduce their anxiety. We believe that the study encourages educators to minimize students' anxiety by implementing active learning activities.

Acknowledgements

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Reducing anxiety and enhancing student engagement through Oscillation Teaching and Tell-Show-Do Method to improve academic performance

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Abstract

Long-duration lectures (over one hour) often lead to reduced student engagement and passive learning. This study explored the impact of oscillation teaching in enhancing student interaction and active learning. The study was conducted in the Business Information Systems (BIS) Development module at the Business School of Informatics Institute of Technology, with a cohort of 104 second-year students. Prior observations indicated that these students had low engagement levels in a previous module, possibly due to engagement anxiety, and this reflected in their marks, which ranged between 30% and 60%. This study aimed to implement a structured intervention to address these issues. A pre-survey was conducted to assess student engagement levels in prior lectures. The results revealed that 66% of students reported low engagement, while 60% struggled to focus. Additionally, 78% expressed interest in a new approach to active learning. To address this, oscillation teaching was introduced as an interactive teaching method in lectures. A formative quiz was administered at the end of the session to evaluate the outcome. A post-survey was also conducted to gauge student perceptions of the new approach. The quiz results indicated an average score of 74.7%, demonstrating improved knowledge retention. Post-survey findings revealed that 86.5% of students felt that oscillation teaching significantly enhanced their learning of the subject. Additionally, 91.3% of students responded positively, affirming the effectiveness of the new teaching approach. The findings suggested that oscillation teaching can be a viable method for improving student engagement by lowering interaction anxieties and for knowledge retention, particularly in long-duration lectures. The strong positive response from students highlights the potential of this technique in fostering active learning. Further research and iterative refinements could enhance its effectiveness across different disciplines and student groups through interactive activities.

Purpose/Background

Traditional lecture-based delivery methods often focus on content transmission while neglecting student interaction and emotional well-being. This can lead to disengagement, surface-level learning, and elevated performance anxiety, especially in long lecture sessions exceeding two hours. Learning anxiety, including fear of underperformance or fear of being called upon, often hinders students' ability to participate confidently in class (Wickramasinghe, 2022; Oltra-Badenes *et al.*, 2023).

This study explores the use of Oscillation Teaching and Learning (OTL), an approach that intersperses lectures with short, structured learning activities (group tasks, peer discussions, quizzes), to reduce performance anxiety and improve both interaction and cognitive retention. The methodology is paired with the Tell-Show-Do strategy, which gradually shifts

responsibility from instructor to student, promoting confidence through progressive scaffolding.

The central research question was: "Can Oscillation Teaching reduce performance anxiety and enhance student engagement during lectures?" The hypothesis is that intermittent active learning sessions will help students feel more in control of their learning, resulting in lower anxiety and higher participation. Through this model, learning becomes more interactive and emotionally supportive, contributing to better academic performance and engagement.

Methodology

I conducted this study with 104 second-year students enrolled in the Business Information Systems (BIS) Development module at the Informatics Institute of Technology (IIT). The intervention followed six key stages:

1. **Pre-Observation:** Identification of limited student participation during prior lecture sessions.
2. **Pre-Survey:** Collection of student feedback on engagement, cognitive fatigue, and anxiety levels using a Google Form.
3. **Lesson Planning:** Designing oscillating lecture sessions alternating between lecture and active learning activities.
4. **Implementation:** Delivering the redesigned session using Tell-Show-Do and Oscillation methods.
5. **Performance Evaluation:** Conducting an end-of-session quiz to assess comprehension and focus.
6. **Post-Survey:** Collecting reflections on student confidence, learning experience, and anxiety reduction.

As illustrated in Figure 1, most students in the previous module (BIS Design and Architecture) scored between 30%–60%, indicating gaps in learning and possible anxiety around assessments.
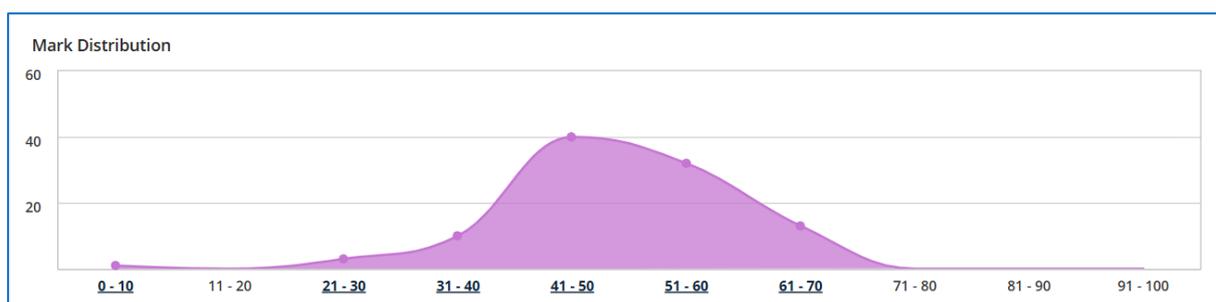
Figure 1. Marks Distribution Before Introducing Oscillation Teaching and Learning Techniques

The pre-survey revealed that only 3.8% found the existing lectures engaging, and 51% had difficulty staying focused. Many reported a sense of pressure when expected to perform or respond in traditional lecture settings.

The redesigned lecture used an oscillating format. Initially, I introduced the concepts and demonstrated using examples, followed by students replicating the examples and solving

similar problems using the "Tell-Show-Do" method. This cyclical structure encouraged active participation while lowering performance pressure through collaborative learning.

A 10-question multiple-choice quiz was conducted at the end of the lecture using the blackboard platform. Post-survey feedback was collected using a Likert scale-based questionnaire assessing emotional comfort, clarity, perceived improvement, and interest in applying this approach in other modules.

Results

The pre-survey confirmed a baseline of low engagement and high cognitive fatigue. After introducing Oscillation Teaching, quiz performance improved the average score rose to 74.7%, with 82% scoring between 7-9 out of 10. As shown in Figure 2, the new approach led to a more normal distribution with fewer low scores.
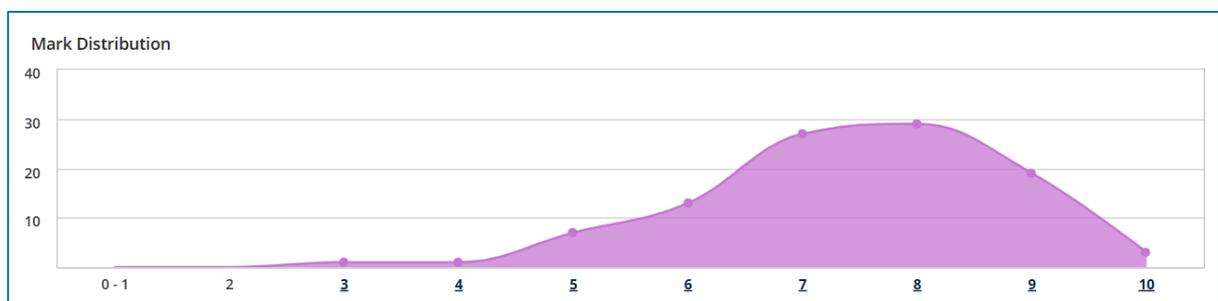
Figure 2. Marks Distribution After Introducing the Oscillation Teaching and Learning Technique

The post-survey findings, as detailed in Table 1, provide strong evidence of the positive impact of Oscillation Teaching and the Tell-Show-Do method on student engagement, focus, and perceived learning. 81.7% of students found the session *very engaging*, a sharp increase from pre-intervention levels. 76% reported it was *very easy* to stay focused during lectures, and 91.3% felt the method *improved their learning*. Additionally, 81.7% preferred this approach for future sessions, and 91.3% said they would recommend it for other modules. These findings suggest the new teaching strategy effectively enhanced engagement, reduced cognitive fatigue, and supported better learning outcomes.

Table 1. Post-Survey Result

Question		Very easy	Somewhat easy	Neutral	Somewhat difficult	Very difficult
How engaging did you find the lectures after the new technique was used?	Student Count	85	12	5	1	1
	Response	81.7%	11.5%	4.8%	1.0%	1.0%
How easy was it for you to stay focused during the lectures?	Student Count	79	16	8	0	1
	Response	76.0%	15.4%	7.7%	0%	1%
		Yes	No	Maybe		
Do you think the process improved your learning	Student Count	94	7	2		
	Response	91.3%	6.8%	1.9%		

Students also noted that they felt less anxious when participating in group discussions or responding to questions after collaborative learning tasks. The environment allowed them to explore mistakes without fear of judgment, suggesting a decrease in performance anxiety.

Discussion and conclusion

The introduction of Oscillation Teaching and the Tell-Show-Do method significantly improved student participation, focus, and academic outcomes. Pre-intervention data highlighted clear issues with engagement and anxiety. The new model addressed these by promoting short, active learning bursts interleaved with theory, reducing mental fatigue and the emotional pressure of passive learning.

Results confirmed that the method helped reduce performance-related anxiety by fostering a low-stakes, collaborative learning environment. Activities that emphasized peer interaction rather than individual performance encouraged more students to speak up, attempt answers, and engage meaningfully with content.

Although most students responded positively, a small number with weak prior knowledge in PHP still struggled, highlighting the need for differentiated support. Technical disruptions also occasionally affected the rhythm of oscillation.

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Student perceptions on incremental teaching activities to mitigate teacher anxiety in information access and communication skills development

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Abstract

I became anxious on observing the reluctance of first-year undergraduates in Database Systems module (of 133 students) to engage in accessing the given learning resources and peer collaboration that they could have easily used for self-clarification and additional knowledge. Instead, they relied heavily on direct lecturer instruction, taking up significant lecture time, hindering planned content coverage. This study explored the potential of sequentially incrementing (from Lower to Higher Order) Teaching Learning Activities (TLAs) to enhance information accession skills and communication skills to mitigate my teaching anxiety. Students were facilitated to engage in sequentially incrementing TLAs during lectures and tutorials, starting with think-pair-share, group share to access slide-content in the LMS. Higher Order TLA's of simple Jigsaw activities were used next and, finally, a larger Jigsaw TLA during the tutorial. For this last TLA, students were randomly assigned to Home Groups of six, each selecting a unique topic provided by me. Those with the same topic formed Expert Groups, conducting independent study utilizing numerous resources and refining their findings collaboratively. Then returned to Home Groups to share insights and compiled a report integrating key learnings from all topics. Over four weeks, Expert Groups conducted an in-depth study, creating hand-drawn posters for an exhibition. Each member presented findings to a panel of three subject and language lecturers, who evaluated their information accession and communication skills through oral and poster presentations and offered constructive feedback. The intervention's effectiveness was evaluated through Likert scale questionnaires on student and peer perceptions. Student feedback showed information accession skill to increase from 36.1% to 49.2%, with 57.4% reporting improved motivation for learning and 64% for communication skills. Peer perceptions confirmed these improvements, with 75% recognizing enhanced learning and communication skills in students. The incremental TLAs ending with the Jigsaw method can foster information access and communication skills through independent and collaborative learning. Optimizing group dynamics, scaffolding, feedback, and rubric-based evaluation can enhance future interventions.

Background

In the evolving information age, empowering university students to take ownership of their learning is essential for academic and professional success. Student-centered learning (SCL) approaches promote this by transforming passive recipients of information into active participants in knowledge creation (Wahidin, 2024). However, students experiencing various learning difficulties due to insufficient guidance and encouragement provided by the educators may struggle to achieve academic goals, which can substantially affect teacher anxiety. Educators are key to promoting deep learning by fostering curiosity based on prior knowledge, and applying effective teaching strategies (Biggs and Tang, 2007).

Strategic SCL engagement with essential learning resources through peer collaboration has effectively fostered independent learning and academic performance (Alwis, 2024). Small group discussions, such as pair-share and buzz groups, are recognized as Lower Order Thinking Skills (LOTS) based Teaching & Learning Activities (TLAs) that are effective in exposing students to diverse perspectives and fostering critical thinking (Gibbs and Habeshaw, 1992). Jigsaw groups stand out as Higher Order Thinking Skills (HOTS) based TLAs that effectively address complex tasks by ensuring that every participant contributes insights in each round (Biggs and Tang, 2007). The Jigsaw activity involves students being assigned specific subtopics within diverse home groups and then joining the expert groups to deepen their knowledge of assigned subtopic before returning to home groups to share their insights. The home group collaboratively assembles the final task, much like putting together a jigsaw puzzle (Hanapi and Kamal, 2024).

This study was based on my anxiety when teaching a group of first year undergraduates in the Database Systems module of the BSc in Artificial Intelligence and Data Science program. These students demonstrated limited information access and communication skills, with minimal engagement in independent learning using the resources provided in the Learning Management System (LMS) and showed reluctance in peer collaboration for self-clarification or knowledge extension. Instead, they relied heavily on direct lecturer instruction, which significantly consumed lecture time and hindered the planned content coverage. To address these challenges and mitigate teacher anxiety, this study explores the implementation of incremental TLAs including Think-Pair-Share, Group Share, and Jigsaw activities designed to foster the progression from LOTS to HOTS.

Methodology

To enhance engagement with theory-heavy content in the first two weeks, I implemented structured think-share activities at 15-minute intervals during lectures. Students began by individually reflecting on the lecture content, followed by pair-share discussions with rotating partners, and concluded with group-share (buzz groups) discussions to encourage deeper learning and broaden peer interaction.

In the next tutorial, I implemented a simple Jigsaw activity with student-formed Home Groups of six. Each member chose a unique topic I provided and joined an Expert Group to independently explore and refine their findings using LMS resources. They then returned to their Home Groups to share insights, after which they collaboratively compiled a report integrating the key learnings. Tutorial lecturers reviewed the reports, providing constructive feedback to strengthen the students' work. In the subsequent tutorial, I implemented an advanced Jigsaw activity with randomly assigned Home Groups of six, each chose a unique topic I provided and joined an Expert Group to independently explore and refine their findings using textbooks, reputable online sources, and Generative AI tools. Students returned to their Home Groups to share insights in a collaborative session, followed by a lecturer-led discussion offering constructive feedback and clarification.

Over four weeks, each Expert Group conducted an in-depth study of their assigned subtopic and created hand-drawn posters to visually present their knowledge. These were displayed

in a university-wide exhibition featuring 26 groups, where students also delivered oral presentations to showcase their learning. A panel of subject and language lecturers assessed the work based on content depth, creativity, communication, and collaboration. Constructive feedback was provided by the evaluators to enhance subject knowledge and presentation skills. The effectiveness of the intervention was evaluated through a Likert scale questionnaire on student and peer perceptions.

Results

As per Figure 1, a pre-intervention survey showed that 73.8% of students regularly attend lectures and tutorials, while 42.6% prefer one-on-one instruction from lecturers. However, only 36.1% engaged in independent use of additional learning resources while only 42.6% independently study the learning resources in the LMS. It is also noted that only 55.7% collaborate with peers to clarify doubts. The results, therefore, indicate that a considerably high percentage of students have not been actively engaging in information access, peer communication and self-learning.
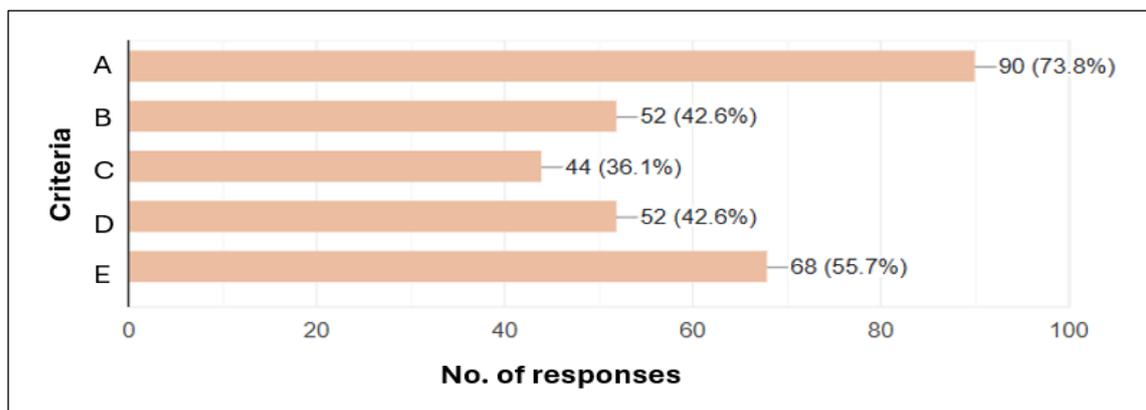

Figure 1. Student Learning Preferences (at pre-intervention): A) Regular participation in lectures & tutorials, B) Independently studying the learning resources in LMS, C) Independently consulting additional learning resources, D) Receiving one-on-one instructions from lecturers, and E) Collaborating with peers to clarify doubts

Table 1 presents a summary of the perceptions of 122 students, with results indicating that over half of the responses across most criteria were either in the 'Agree' or 'Strongly Agree' categories. Notably, 53.3% of students reported that the incremental TLAs supported knowledge acquisition both independently and collaboratively (C1). Additionally, 57.4% felt encouraged to take ownership of their learning (C6), and 59.8% acknowledged an improvement in teamwork (C4). Importantly, 49.2% were motivated to explore supplementary learning materials (C7), while 61.4% were encouraged to collaborate with peers (C8) beyond the context of this intervention. The oral presentations positively impacted students, with 64% reporting increasing confidence in public speaking (C10) and 55.7% noting improved communication skills (C11).

Feedback from the 12 evaluation panel lecturers indicated that 75% agreed students demonstrated accurate and comprehensive learning in their posters and presentations. All agreed that the intervention fostered teamwork, with 83.3% noting strong group collaboration, and 91.7% affirming it promoted both self-learning and peer learning.

Overall, the intervention was positively received by both students and lecturers for fostering self-directed learning, collaboration, and communication, while enhancing students' confidence and ability to manage complex tasks, supporting both academic and professional development. While the intervention was well-received, respondents suggested several improvements. 11.5% of students reported difficulties with time management during activities, particularly in relation to the creation of handmade posters. Additionally, 2.5% suggested allowing self-formed groups to better accommodate differences in student competence and contribution levels. Furthermore, 3.3% of respondents indicated a preference for traditional lectures over the incremental TLAs.

Table 1. Student Feedback Summary (1 is indicated as 'Strongly disagree' and 5 as ' Strongly agree')

Intervention Phase	Criteria	Scale (%)				
		1	2	3	4	5
In-class Incremental TLAs (LOTS to HOTS)	I was able to learn relevant and useful information both independently and collaboratively. (C1)	4.9	16.4	25.4	34.4	18.9
	The peer discussions were valuable in clarifying complex concepts. (C2)	5.7	19.7	26.2	27.9	20.5
	Sharing my findings with peers significantly enhanced my ability to learn and retain information. (C3)	9.0	11.5	26.2	27.0	26.2
	The intervention promoted effective teamwork and collaboration. (C4)	6.6	9.8	23.8	34.4	25.4
	The Jigsaw approach is effective in breaking down complex topics and making them easier to learn. (C5)	12.3	19.7	23.8	28.7	15.6
	The intervention encouraged me to take responsibility for my own learning. (C6)	6.6	14.8	21.3	32.0	25.4
	The intervention inspired me to explore supplementary learning materials beyond its context. (C7)	9.0	13.9	27.9	30.3	18.9
	The intervention encouraged me to collaborate with peers beyond its context. (C8)	8.2	12.3	18.0	31.1	30.3
Poster Exhibition & Presentation	The hand-drawn poster creation allowed me to express my findings creatively. (C9)	14.8	9.8	23.0	32.0	20.5
	Oral presentations during the exhibition improved my confidence in public speaking and presentation skills. (C10)	7.4	10.7	18.0	27.9	36.1
	Communicating my findings to peers and evaluators enhanced my communication abilities. (C11)	7.4	10.7	26.2	31.1	24.6
	The feedback from the panel of evaluators and lecturers was constructive and helped me identify areas for improvement. (C12)	13.1	10.7	22.1	24.6	29.5

Lecturers observed uneven group participation, with more academically capable students assuming a disproportionate share of the workload. They recommended enhancing the visual appeal of posters and deepening research by incorporating more credible sources. Additionally, lecturers advised students to avoid overly technical language and to present concepts in simpler, more accessible terms.

Discussion and Conclusion

The intervention using incrementing TLAs, including Think-Pair-Share, Group Share, and Jigsaw activities, proved to be effective for enhancing both information access and communication skills among undergraduates. By promoting independent and collaborative learning, these activities fostered deeper engagement with the learning resources, encouraging students to take ownership of their learning and to improve their ability to manage complex tasks. The culmination of the intervention through poster presentations also allowed students to creatively synthesize their knowledge while developing important public speaking and communication skills. Importantly, the strategic implementation of incremental TLAs was observed to facilitate the mitigation of teacher anxiety, as students began to rely less on direct lecturer instruction and demonstrated greater autonomy in navigating learning resources and engaging in peer collaboration for self-clarification and knowledge enhancement following the intervention. Despite the overall positive reception from both students and lecturers, several areas for improvement were identified. Future interventions can benefit from optimized group dynamics, enhanced time and resource management, and a stronger emphasis on rubric-based evaluation and constructive feedback. Additionally, addressing students' diverse learning styles and preferences will help ensure more inclusive and meaningful learning experiences. Ultimately, this study underscores the potential of well-designed, incremental TLAs to foster academic growth, enhance professional development, and support the long-term success of students.

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Student perceptions on collaborative storytelling to help learners overcome second language speaking anxiety

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Abstract

Second language (L2) anxiety has been recognized widely since Krashen (1982) introduced the affective filter hypothesis. Most students transitioning from high school to college where the medium of instruction is English find such transfer of academic language to generate high anxiety. My study explored if collaborative storytelling could help learners following the Essential Communication Skills course (Foundation Level) overcome this speaking anxiety. I started the Teaching Learning Activity (TLA) discussing a model story for students to identify story structure and plot development. Next, the 17 students were divided into 4 groups, each group asked to choose a different story prompt of interest and introduced to useful words and phrases. Upon the story draft completion, each group presented their narrative to class, followed by a written reflection on the TLA learning experience. These reflections were used to evaluate the TLA effectiveness using Taguette, a free qualitative data analysis tool. Each reflection was coded using 5 tags: beginning discomfort; improved confidence, enjoyment and learning in group-work, improved communication skills, and learning how to learn. Findings were compared with my classroom observations made during the TLA. It was observed that students worked in a more relaxed environment, and eight students spoke using the microphone for the first time. Analysis of reflections revealed that 82% of students felt nervous before grouping, showing initial speaking anxiety. 100% expressed they enjoyed the storytelling activity and felt it helped them learn new vocabulary and storytelling techniques. 58% mentioned an increase in public speaking confidence, while 41% believed it improved communication skills. 35% reflected on the experience as an opportunity to identify self-improvement areas. While there were challenges in administering the activity and more such classes need to be conducted, results show that collaborative storytelling creates a low anxiety environment due to the opportunity to share ideas in small peer groups before speaking in class. This may have reduced stage fear and built confidence in these L2 learners.

Purpose and Background

Anxiety in college is very common, and many students starting their higher education (HE) after O/Levels or A/Levels find the initial transition to college both exciting and challenging. While many factors contribute to the increase in anxiety among these students, having to follow their studies in the English medium after 11-13 years of studies in the first language frustrates the majority of Sri Lankan students. Further, they are often required to complete assessments in the form of presentations that demonstrate their public speaking skills. This leads to high anxiety. These students have not had the natural exposure to English language during their childhood as they have studied English as a second language (L2) without the opportunity to acquire language skills.

Moreover, speaking is the most important skill of all the four language skills because "the first impression of a person is based on his/her ability to speak fluently and comprehensively" (Brown and Yale (1983) as cited in Bahadorfar and Omidvar (2014)). Also, many studies have supported the fact that most crucial aspects of learning are all controlled by students' emotions. In the words of Arnold (2011), "any classroom situation is influenced by the relationship between learning and affect but with language learning this is especially crucial since our self-image is more vulnerable when we do not have mastery of our vehicle for expression-language." This highlights the reason why speaking anxiety is a common issue in English language classrooms.

Furthermore, Krashen (1982) has explored how those feelings of anxiety affect L2 learning. He explains how a high affective filter, a mental barrier created by negative emotions, prevents a learner from acquiring the target language and expressing his/her ideas in that language. It has been observed that this makes them speak less fluently, avoid speaking in class or use their mother tongue all the time, and, in the worst-case scenario, skip English language classes. Therefore, according to Krashen (1982), "the effective language teacher is someone who can provide input and help make it comprehensible in a low anxiety environment." In this light, this study is an attempt to explore if collaborative storytelling can help students enrolled to the Essential Communication Skills course at the IIT Regional Centre,Galle overcome speaking anxiety and build confidence. It is expected to improve students' English language proficiency, boosting their confidence to succeed academically and professionally in a global setting, which is one of the main course objectives of the Foundation Certificate programs at IIT. (Informatics Institute of Technology, 2023).

Ur (2012) also agrees that speaking is the most important of all four skills and observes that activities that help learners express themselves through speech are a primary component of a language course. She recommends task-centered communication activities for elementary and intermediate learners as "there is more talk, more balanced participation, more motivation, and enjoyment." Ur (1996) also encourages using group work for oral fluency and explains its benefits to learners: each student gets more time to practice speaking; speaking to a few classmates before speaking in front of the whole class helps them overcome speaking anxiety; the teacher is free to observe and help less confident students. Furthermore, she believes that "it's useful to review in advance words or expressions students are likely to need for the task" (Ur, 2016).

When it comes to storytelling, a number of studies have explored the effectiveness of storytelling in L2 classes. To illustrate this, Yulianawati *et al* (2025), show that storytelling effectively enhances speaking skills by expanding vocabulary and pronunciation, building confidence, and improving fluency in addition to helping learners learn grammar, develop cultural awareness, and become creative. To optimize results, the authors recommend including pre-storytelling activities and confidence-building exercises to reduce anxiety.

However, there is limited research focused on how "collaborative storytelling" can reduce speaking anxiety among students transitioning to HE upon completion of secondary level education, hence this study being timely and original in the context of learning/teaching English as a L2 in Sri Lanka.

Methodology

The teaching learning activity (TLA) was designed for a class of 20 students and the study involved 17 students. The motivation portion of the lesson focused on why it is important to learn to speak before an audience and how great speakers started. It was a brief interactive session to encourage student participation and help them realize the value of communication. The TLA began with a discussion on a model story for students to identify story structure and plot development. I introduced them to key features of a story: the introduction, problem, turning point, and resolution. They were also provided with useful vocabulary items including time adverbs besides phrases and structures to make a story interesting. Next, the 17 students were divided into four groups. Each group was asked to choose a story prompt based on their interests and asked to think about how they want to describe their characters and places in addition to making the ending more dramatic/ interesting. During the activity, I moved around the classroom observing behaviours such as group participation and levels of enthusiasm while encouraging them to use English all the time. Once they had completed their story drafts, they presented their stories. Following the presentations, I got each student to write a short reflective paragraph discussing their learning experience. The lesson concluded with a brief discussion admiring their efforts and commenting on some common errors observed during their presentations. I evaluated the written reflections using Taguette, a free qualitative data analysis tool. Each reflection was coded using 5 tags: beginning discomfort, improved confidence, enjoyment and learning in group work, improved communication skills, and learning how to learn. Finally, I compared the findings with my classroom observations during the activity.

Results

It was observed that the activity created an engaging classroom environment where students could figure out how to express their ideas collaboratively. One group turned to me for help with the plot development; some used online dictionaries/ translators, but they worked without the fear of making mistakes. They were even seen providing feedback to one another. Everyone looked enthusiastic and stayed on task. During the presentations, eight students voluntarily spoke using the microphone for the first time. However, several students were unable to resist using Sinhala language (first language) in their discussions, and a couple of students relied on help from peers in drafting their parts of the story and written notes while speaking. Also, some were very reluctant to use the microphone. As summarized in figure 1, student reflections revealed that 82% of students felt nervous before being placed in groups. However, those feelings were gradually reduced and all students reported enjoying the activity, which also helped them learn new vocabulary and storytelling techniques. 58% of students reported a boost in public speaking confidence while 41% believed the activity helped them improve their communication skills. Another 35% mentioned it enabled them to identify areas for improvement.
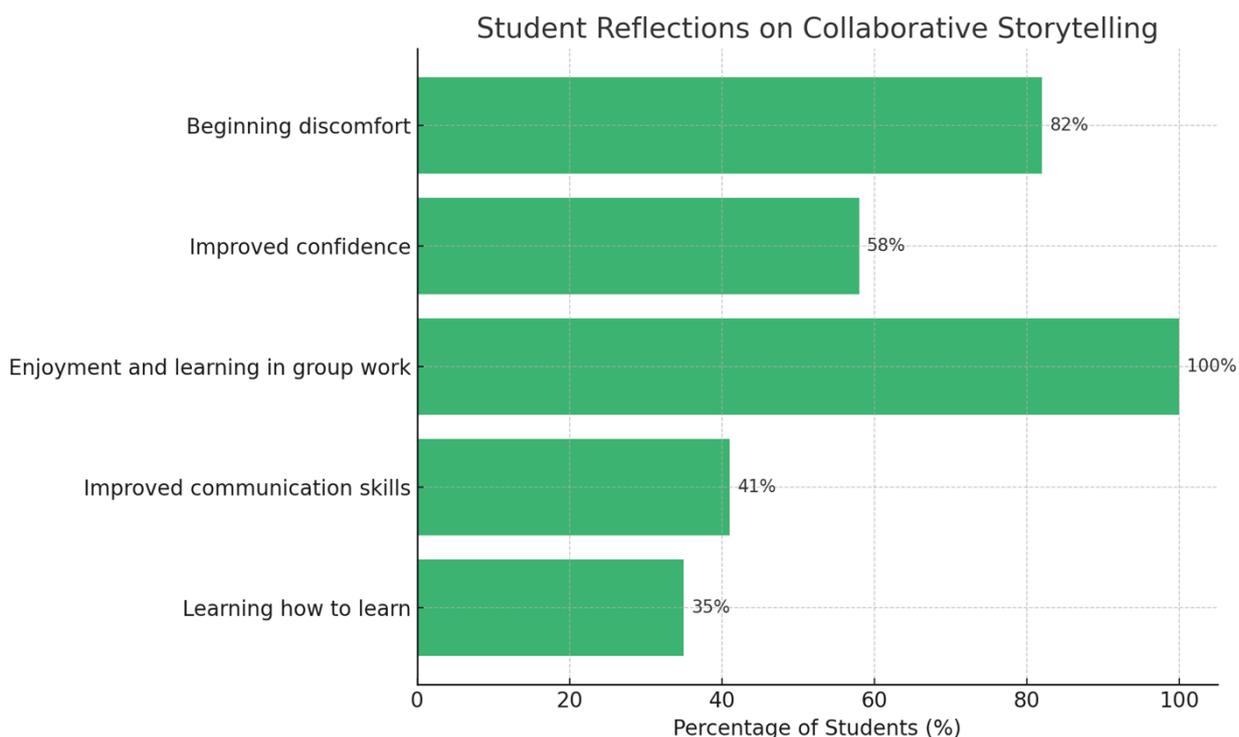
Figure 1. Student Reflections on Collaborative Storytelling

Discussion and Conclusion

The results are in line with literature. Students demonstrated active participation and increased confidence in a low anxiety setting, and task-centered activities that allow them to engage in group work boost confidence and reduce speaking anxiety. What is more, pre-storytelling activities create a more supportive learning environment. The initial emotional responses of students are indicative of why speaking anxiety is a common barrier in L2 classrooms. The activity helped them overcome negative feelings only because they were convinced that the goal was to use English in meaningful communication, not just apply some complex grammar rules. On the other hand, peer interaction convinces students that they communicate with peers at a similar proficiency level, which is less stressful than being directed by the teacher. They feel they are not alone facing the challenges of the task at hand.

Additionally, the success of this activity can be attributed to its alignment with the theory of constructive alignment (Biggs and Tang, 2011). The learning outcome was clearly defined at the beginning. It guided the development of the activity as well as the teacher feedback (as part of formative assessment) at the end. This also fits the collegial requirements of the institution (as mentioned in the *Purpose and Background* section). In the words of Biggs (2011), "quality teaching means trying to enact the aims of the institution by setting up a delivery system that is aligned to those aims" and "allow for desirable but unintended outcomes."

It was also a holistic learning opportunity that enabled students to engage beyond intended learning outcomes as it aligned with Fink's (2003) Taxonomy of Significant Learning to a certain extent. Students used their foundational knowledge in generating story prompts and brainstorming ideas. Pre-task scaffolding helped them connect knowledge with real-world

74

applications in drafting their stories while developing communication skills and creative thinking skills. They also learned how to interact effectively with their peers while making connections among ideas to generate a story. This also gave them "energy" to overcome anxiety and engage actively in the task. Finally, 35% of students recorded the development of metacognitive awareness. When it comes to more anxious students who refused to use the microphone (but are quite proficient in digital skills), the opportunity for digital storytelling may help them practice speaking in a lower pressure setting. Recording voices individually will serve as a steppingstone toward confident public speaking. As discussed by Bai and Xian (2024), the multimedia features of digital storytelling allow learners to express themselves creatively, easing the stress of traditional speaking tasks while its collaborative aspects develop a sense of community and emotional support, which helps students overcome anxiety.

In conclusion, collaborative storytelling can help learners develop confidence and overcome anxiety. However, it is important not to overlook the challenges (already mentioned in the *Results* section), because they offer insights for future research and reflective teaching. Further scaffolding and more opportunities of a similar nature for oral practice throughout the course is essential to help students gradually build confidence.

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Using the More Knowledgeable Other (MKO) strategy
to reduce students' anxiety in task completion

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Abstract

This study investigated the effectiveness of the "More Knowledgeable Other" (MKO) strategy in reducing task completion anxiety among first-year undergraduates in an 'English Communication Skills for IT' course. Based on Vygotsky's sociocultural theory and the Zone of Proximal Development, the MKO strategy provides peer guidance to scaffold learning, especially for slow learners facing affective barriers. Ten slow learners and six proficient peers (MKOs) were identified and paired for collaborative learning activities. Data was collected through observations, feedback questionnaires, and task completion records, and analysed using a mixed-method approach. Findings revealed reduced anxiety levels from 80% to 30% and a 45% improvement in task completion rates. Active participation also increased from 40% to 85%. The results affirm the MKO strategy as a valuable tool for fostering inclusive and emotionally supportive learning environments. The study suggests broader implications for peer-based scaffolding in addressing emotional and academic challenges in language classrooms.

Purpose/Background

Students in a classroom exhibit varied proficiency levels, leading to challenges in maintaining engagement. Learners who learn slowly often struggle to keep up with the pace of instruction. Conversely, advanced learners may lose motivation without sufficient challenges. Therefore, task completion anxiety can be considered a common affective factor that significantly impacts academic performance, as it affects engagement while diminishing confidence. In the English Communication Skills for IT course, I observed that some students struggled to initiate or complete language-based tasks, despite possessing the required technical competence. Many students need additional guidance beyond standard instruction to develop their language proficiency and confidence. Thus, I employed the More Knowledgeable Other (MKO) strategy to bridge the engagement gap among learners and foster a more inclusive learning environment. An MKO is typically a teacher, peer, mentor, or an individual with greater knowledge or skill. In the present study, the role of the MKO was specifically assigned to peers within the classroom context.

More Knowledgeable Other (MKO) is deeply rooted in Vygotsky's (1978) sociocultural theory, which posits that learning occurs through social interaction. Vygotsky's Zone of Proximal Development (ZPD) highlights the gap between what a learner can do independently and what they can achieve with guidance from an MKO (Vygotsky, 1978). Numerous research studies have highlighted that peer interaction plays a significant role in second language acquisition. Donato (1994) found that when learners collaborated on tasks, they could scaffold each other's learning through dialogue, reflection, and negotiation of meaning. Similarly, Swain and Lapkin (2001) noted that peer collaboration during writing tasks enabled students to notice language gaps and co-construct knowledge, often leading to higher-quality

outcomes. Mercer and Howe (2012) argue that dialogue-based interactions between MKOs and learners enhance critical thinking and problem-solving abilities. Further, McDonough (2004) observed that shy students in English as a Second Language (ESL) classrooms exhibited greater participation when placed in supportive peer group settings, where the threat of judgment was minimized.

Accordingly, previous studies collectively support the effectiveness of MKOs in fostering student engagement and comprehension. The present study investigates whether the More Knowledgeable Other (MKO) strategy, also known as peer guidance, reduces task-related anxiety and enhances students' confidence and active participation in completing assigned tasks.

Methodology

The study was conducted in a first-year undergraduate English Communication Skills for IT course. The class consisted of 35 students with varying proficiency levels in English. In-class activities during the first week were used to identify slow learners and proficient learners (potential MKOs). Accordingly, ten students (29%) were identified as slow learners who exhibited signs of hesitation, avoidance, or low confidence during task completion. Six students (17%) were selected as MKOs based on their active participation in activities, language fluency, and interpersonal skills. In the following class, the students were assigned a group activity to create a mind map after a brainstorming session. The MKOs were grouped with slow learners during teaching and learning activities.

Data was collected through observation checklists, student feedback questionnaire, and task completion records. The students were observed by the researcher before and after the intervention by the researcher, while the students were given a questionnaire to rate their confidence and anxiety before and after the intervention. Additionally, the task completion rate of the identified slow learners was observed by comparing the progress before and after the intervention.

A mixed-method approach was used to analyse the data collected. The quantitative data collected from the Likert-scale feedback questionnaire and task completion records were analysed, and percentages were derived. The Likert-scale questionnaire was primarily used to identify the anxiety levels and the rates of active participation in the class, before and after the intervention. The qualitative data collected from the classroom observations and student reflections were analysed, and the overall impact was identified.

Results

Findings indicated a reduction in reported anxiety levels. Out of the students 80% were highly anxious before the intervention, whereas it was reduced to 30% after the MKO intervention. Students expressed increased confidence when working with an MKO, particularly in complex tasks requiring language production. Task completion rates improved, with a 45% increase in students finishing assignments within the given timeframe. The feedback highlighted that peer involvement and support created a non-threatening learning environment, encouraging an increase in active participation from 40% to 85%.
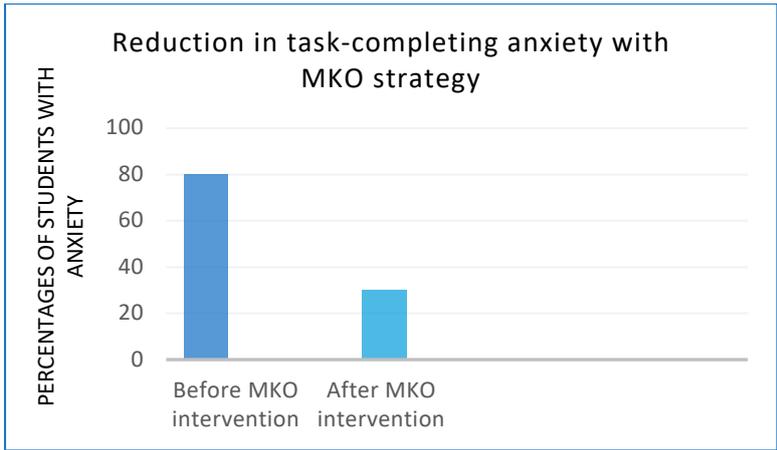
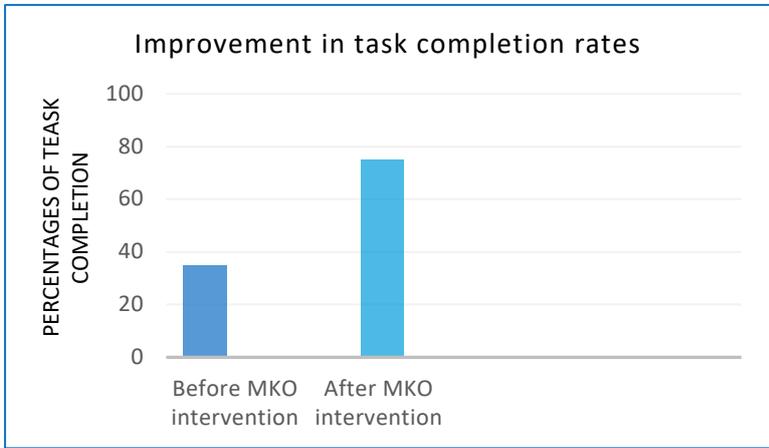Figure 1. Reduction in task-completing anxiety with the MKO strategy

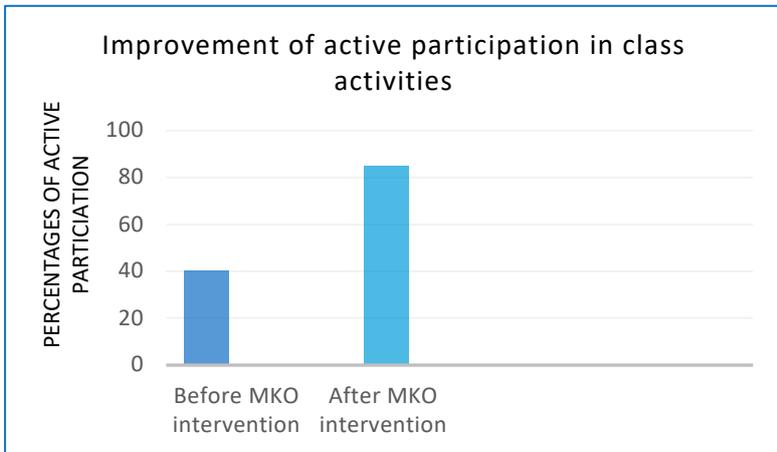Figure 2. Improvement in task completion rates

Figure 3. Improvement of active participation in class activities

Students' written feedback highlighted their positive responses to the collaborative strategy implemented in class, which emphasized peer interaction and group work. The comments revealed a noticeable improvement in students' comfort, confidence, and engagement during tasks. Several students noted that working with friends helped them better identify the activity, reduced their nervousness, and made the learning experience more enjoyable. These responses suggested that the use of the More Knowledgeable Other (MKO) approach fostered a supportive learning environment, enhanced thinking, and increased students' willingness to participate.

Discussion and Conclusion

The results of this study indicated that using the More Knowledgeable Other (MKO) strategy significantly reduced task-based anxiety in slow learners. Before the intervention, 80% of students reported moderate to high anxiety when engaging in speaking and writing. Post-intervention, that number dropped to 30%, which is a 62.5% decrease. This finding aligns with McDonough (2004), who observed that peer collaboration in ESL contexts reduces learner anxiety and fosters active engagement. Similarly, Horwitz *et al.* (1986) highlighted fear of negative evaluation as a central cause of language anxiety—an issue addressed effectively in this study through peer-supported emotional scaffolding.

These findings suggest that the MKO strategy can be replicated by other educators working with slow learners in language classrooms to mitigate task completion anxiety and improve task engagement. This strategy provides a psychologically safe environment where students receive feedback from peers rather than authority figures. As highlighted in student reflections, this peer dynamic increased confidence and reduced fear of making mistakes, key barriers to learning.

Beyond emotional gains, the intervention also made noticeable changes in academic behaviours. Task completion rates rose by 45%, and classroom participation increased from 40% to 85%. These improvements are consistent with Donato (1994) and King (2002), who emphasized the motivational and cognitive benefits of peer scaffolding in language learning. Students expressed greater motivation, a desire for feedback, and a stronger sense of task ownership, all essential for sustained learning. Students' reflections further highlighted the importance of peer relatability and accessibility. Students frequently noted that MKOs clarified instructions and offered reassurance, promoting both academic persistence and emotional well-being. This aligns with Swain and Lapkin's (2001) view that collaborative dialogue promotes deeper learning through the co-construction of meaning.

The findings of this study can be extended in future work to explore long-term impacts of peer scaffolding and its applicability across different subjects or educational levels. While the study demonstrated results within a specific group, further research is needed to determine the generalisability of the MKO strategy. Larger sample sizes and diverse learning environments could help validate its broader application. The findings affirm that the MKO strategy not only improves measurable academic behaviours, such as task completion and participation, but also creates the emotional conditions necessary for sustained learning. In conclusion, this study provides compelling evidence for the integration of the MKO strategy

in supporting slow learners, contributing to a more inclusive and emotionally supportive classroom environment. It sets a foundation for further exploration and encourages educators to embrace peer-based learning as a powerful tool for academic and emotional development.

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Progressive reduction of speaking anxiety using online platforms, gamified tasks, and targeted feedback

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Abstract

The need for speaking skills enhancement and speaking anxiety reduction in English as a Second Language (ESL) students has been widely reported, which we also experienced in our English Communication Skills in IT module for 32 first-year (L4) students. We report our use of Teaching-Learning Activities (TLA's) aimed at active engagement to reduce resource acquisition barriers and create a low-stress environment to build confidence. We selected the Task-Based Language Approach (TBLA) and utilised digital platforms such as Padlet (6 times) and Kahoot (12 times). A rubric with five criteria was used to evaluate participants' speaking proficiency and anxiety levels through pre and post-tests. Students participated in a sequence of technology-mediated TBLA activities designed to foster communicative competence, where Padlet facilitated authentic, collaborative speaking tasks, and Kahoot integrations provided targeted, interactive exercises that reduced the pressure associated with spontaneous speaking. The highest anxiety level was recorded at 53% during the pre-test evaluation (in their self-introduction task). The post-test evaluation using the same activity (self-introduction) and the rubric indicated a marked improvement in students' speaking performance. This practice-based TBLA led to a substantial reduction in speaking anxiety, with the anxiety level dropping from 53% to 4%. A supplementary feedback survey conducted via Google Forms further reinforced these findings, with 78.1% of students indicating that it was these platforms that supported their learning and 58.1% reporting a decrease in speaking anxiety. This study highlights the potential of online TBLA TLAS to address common challenges faced by ESL learners, particularly in reducing anxiety to develop speaking confidence. Creating a supportive and engaging learning environment makes speaking tasks more accessible and less intimidating. It provides valuable insights for educators seeking to incorporate digital tools to enhance student engagement, alleviate speaking anxiety, and improve overall communicative competence in ESL classrooms.

Purpose/ Background

In Sri Lanka's multilingual context, English is a vital link language in higher education, especially with prevalent English-medium instruction. At our institute (IIT), collaborating with the University of Westminster (UOW) and Robert Gordon University (RGU), English proficiency is essential for academic tasks like presentations, group projects, and *viva-voce* examinations. Among the four core language skills, speaking is the most anxiety-inducing but crucial for academic and professional success. This anxiety increases due to the emphasis on spoken English by both universities, as it is key to producing industry-ready graduates.

Many students, even those with adequate language skills, experience speaking anxiety due to fear of negative evaluation, limited vocabulary, grammatical uncertainty, and perfectionism.

Traditional teaching methods may not fully engage Gen Z learners, who prefer interactive, technology-integrated environments. Socio-cultural factors, like limited real-world exposure to English, can intensify this issue. Our research aimed to reduce speaking anxiety among ESL learners through a structured intervention that integrated online platforms, gamified tasks, and targeted feedback within a Social-Emotional Learning (SEL) framework. According to CASEL (2020), SEL supports students' emotional and interpersonal development, fostering a supportive and engaging environment.

Research indicates that integrating SEL into language education significantly alleviates anxiety and enhances speaking competency. Brookhart (2017) emphasised that effective feedback cultivates motivation and confidence, while Hattie and Timperley (2007) highlighted its role in performance improvement. In second language acquisition, Dörnyei (2009) and Krashen (2009) explored how reduced anxiety positively influences language performance, and Oxford (2017) promoted self-regulation strategies for autonomy. Combining these insights with online platforms and gamified activities creates interactive, supportive learning environments that address language proficiency and emotional well-being.

This study's primary research question was: How can online platforms, gamified tasks, and targeted feedback alleviate speaking anxiety among first-year undergraduate ESL learners? The objectives were twofold: first, to explore how online platforms and gamified tasks foster engagement and emotional safety; second, to assess the effect of targeted feedback on enhancing learners' confidence and reducing anxiety during speaking tasks.

Methodology

This study used a mixed-method, practice-based action research design over 12 weeks for the English Communication Skills module (CM1607). The intervention aimed to reduce speaking anxiety through weekly structured activities. We grouped 32 Level-4 undergraduates in the BSc Artificial Intelligence and Data Science program at RGU, aged 17–22, from diverse educational, linguistic, and socio-cultural backgrounds. While they had satisfactory reading and listening skills, many felt discomfort and anxiety during speaking tasks.

Speaking tasks were integrated throughout the module using real-time (Kahoot- 12 times) and self-paced (Padlet- 6 times) methods. We included activities such as group discussions, role-plays, and oral presentations. Digital platforms like Kahoot provided warm-up quizzes to activate prior knowledge and encourage low-stakes verbal participation. Padlet supported collaborative planning and reflection, allowing students to engage in pre-task preparation and multimodal communication. In Week 5, students participated in a role-play simulating a project proposal meeting, and in Weeks 7 and 10, mock presentations to practise fluency and public speaking (Appendix 1). Progress was assessed using a rubric (Appendix 2) measuring fluency, pronunciation, articulation, voice quality, non-verbal cues, and confidence, with evaluations in Week 1 (pre-test) and Week 10 (post-test).

Quantitative data, including rubric scores and anxiety ratings, were analysed using descriptive statistics to monitor performance. Qualitative data, comprising tutor observations and student feedback, were thematically analysed to examine learner experiences and perspectives.

Results

The intervention resulted in considerable improvements in speaking performance and a decrease in anxiety, as evidenced by the marks achieved by the students, as indicated (Table 1)

Table 1. Data Visualisation of the Pre & Post-test marks for self-introduction

Anxiety range		Number of students in Pre- test	Number of students in Post- test
Very high Anxiety	0-5	5	6 (Absentees)
High Anxiety	6-10	17	1
Moderate Anxiety	11-15	9	10
Low Anxiety	16-20	1	9
Very low Anxiety	21-25	0	6
Total students		32	32

Comparing pre-test and post-test results showed marked improvements in reducing anxiety levels, as reflected in rubric-based scores for most participants.

The Low Anxiety group (16–20 marks) rose from one to nine. Similarly, the Very Low Anxiety category (21–25 marks) increased from zero to six, indicating a reduction in performance-related stress. These results suggest that online tools like Kahoot and Padlet, along with targeted feedback, have enhanced learner confidence.

The improvement in final presentations after the mock session, with focused feedback, is evident in the increased scores from both mock and final presentations, highlighting the positive impact of this approach.

Students who scored below 15 in mock presentations gained 5 to 10 marks in the final assessment, showing improvements in fluency, articulation, and engagement, along with increased risk-taking in speaking. There was a slight rise in the Very High Anxiety category (0–5 marks) from five to six students, likely due to some learners missing the post-test, which may have skewed the overall data. The Moderate Anxiety group also rose from nine to ten students, indicating that while many benefited from the intervention, some were still overcoming their anxiety.

Discussion and Conclusion

This study reinforces the effectiveness of digital tools and gamified activities in alleviating speaking anxiety for ESL learners. The interactive opportunities helped address emotional

barriers to participation. These results are consistent with previous literature, as Edward (2022) indicated that immersive gamified experiences foster communication and reduce anxiety. Furthermore, Vincent *et al.* Said (2022) observed a 25% increase in speaking fluency among students who utilised AI-driven platforms, emphasising their contribution to enhancing fluency and comprehension. Online platforms fostered safe spaces for students to articulate ideas, and targeted feedback encouraged reflection and growth, evident in their responses. Gen Z learners validated these approaches in their feedback, and the impact of the targeted feedback was widely recognised as beneficial for enhancing speaking skills, as confirmed by the learners noted in Table 2.

Table 2. Feedback from the Student Sample

Categories	No of Students (in Percentage)				
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The lessons and activities helped reduce anxiety	29%	58.10%	12.90%	0	0
The effectiveness of online platforms such as Kahoot and Padlet	78.10%	18.80%	3.10%	0	0
The feedback from lectures helps improve speaking skills	71%	22.60%	6.50%	0	0

The programme faced limitations affecting its success. The absence of an attendance tracking system hindered follow-up with absent students, impacting learning continuity and reliability. Large class sizes limited individual support. Logistical issues, such as insufficient private spaces and time constraints, along with separating students and lecturers, restricted one-on-one feedback sessions. These challenges emphasise the need for improved structural and administrative support in future implementations. To enhance future interventions, several recommendations are proposed. Extending the programme to a year-long module would enable more sustained progress, a point further supported by students, as illustrated by the student feedback comment, below.

"I think it would be nice if we have a similar module for the 2nd year as well (without any exams), just to be relaxed with all the stress we are going to be having with the academic and technical work. This module not only taught us lessons, but it was a time of relaxation for our minds as well. To be able to talk with the lecturers, play a game or learn through kahoot which was really competitive, that we enjoyed so much doing them".

Creating smaller learner groups and using peer mentoring can provide personalised support. A tiered intervention model with differentiated activities for students' anxiety levels, plus one-on-one coaching for those with severe anxiety, could improve outcomes. Digital attendance systems would enable responsive, data-informed instruction. Feedback from students further validated the approach of utilising gamified activities and online platforms,

alongside targeted feedback, for implementing SEL environments.

In conclusion, this study demonstrates that a thoughtful intervention incorporating gamification and targeted feedback can significantly reduce speaking anxiety among ESL learners. Although the results are promising, future efforts should concentrate on addressing structural limitations and scaling personalised support to enhance the generalisability and long-term impact of such programmes.

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Appendixes

Appendix 1. Lesson Plan for the Selected Sample

Week	Lesson plan
Week 1	self- Introduction **Kahoot 1** - Articles (beginning of the lesson to test their knowledge on Articles) **Kahoot 2** - Academic writing (end of the lesson)
Week 2	**Kahoot 3**- Prepositions **Padlet 1**- Technical writing PPT Presentation- For graphs & Charts (Students elaborated)
Week 3	**Kahoot 4** - Nouns + Skimming and Scanning **Padlet 2 -** Gather the essential information required for a topic using the provided research articles.
Week 4	**Kahoot 5** - Adjectives Handout - Reading Comprehension and Critical Reading
Week 5	**Kahoot 6** - Verbs & Adverbs **Padelt 3** - Speaking Activity: Stimulating a Project Proposal (Group Activity)
Week 6	**Kahoot 7**- Tenses Writing -Reflective and Critical Thinking (Short Essay in Preparation for Coursework 1)
Week 7	**Kahoot 8**- Phrasal Verbs Presentation Skills - Introductory Practice: Using a Designated Topic
Week 8	**Kahoot 9** - Affixation **Padlet 5** - References in academic writing
Week 9	**Kahoot 10** - Pronouns and Blended Words **Padlet 6**- Brand promotion (branding a product)
Week 10	**Kahoot 11 -** Idioms and Proverbs Mock Presentation - Preparation for Coursework 2
Week 11	**Kahoot 12** - Revision on Grammar **Padelt 7**- Create a poster that focuses on the theme of teamwork, based on the video provided.
Week 12	Group Presentation with Individual Evaluation for CW2

Appendix 2. Speaking Evaluation Rubric

Category	1 (Very High Anxiety)	2 (High Anxiety)	3 (Moderate Anxiety)	4 (Low Anxiety)	5 (Very Low Anxiety)
Fluency & Hesitation	Frequent pauses, hard to finish thoughts.	Often hesitates, uneven flow.	Some pauses, mostly smooth.	Few pauses, natural flow.	Smooth, no hesitation.
Voice Quality (Volume & Clarity)	Very soft, shaky, or hard to understand.	Often unclear or rushed.	Mostly clear, some issues.	Clear and steady voice.	Strong, clear, natural.
Pronunciation & Articulation	Hard to understand, many errors.	Several unclear words.	Some errors, mostly clear.	Minor issues, mostly accurate.	Clear and confident.
Eye Contact & Facial Expressions	Avoids eye contact, tense face.	Rare contact, stiff expression.	Some contact, a bit tense.	Regular contact, natural face.	Confident and expressive.
Overall Confidence & Engagement	Very anxious, disengaged.	Uncomfortable, low energy.	Somewhat engaged, anxious.	Confident, good energy.	Very confident and engaged.