# ASSESSMENT OF ONLINE PEER ASSISTED STUDY SESSIONS ON THE ACADEMIC PERFORMANCE OF CHEMISTRY STUDENTS AT THE FIRST YEAR (LEVEL 3) OF THE BSC DEGREE PROGRAMME

***Kumudika G. Jayalath*, M. N. Kumudinee De Zoysa and M. Thayaparan***
*Department of Chemistry, The Open University of Sri Lanka, Sri Lanka*

Peer Assisted Study Sessions **(**PASS) is a well-established model worldwide practiced enhancing student's study habits through peer discussion that helps to improve academic performance. The Faculty of Natural Sciences of the Open University of Sri Lanka has implemented the PASS model for first year (Level 3) BSc undergraduates since 2010 at four regional centers. However, with the COVID-19 pandemic, PASS was shifted from conducting onsite to online to minimize the gatherings at the University. In the academic year 2023/2024, the Department of Chemistry successfully conducted 12 online PASS sessions (via Zoom) for two Chemistry courses offered in semester 1 and semester 2. Eligibility to sit for the Final Examination (FE) for each course is usually evaluated by the Overall Continuous Assessment Mark OCAM (≥35%). This study was carried out to analyze the impact of online Chemistry PASS on students' performance based on the OCAM. The percentage of students who attended only one PASS in semester 1 and semester 2 was 22% and 19%, respectively and the students who attended to number of PASS sessions gradually decreased to 2% in both semesters. The percentage of students who did not attend any of the Chemistry PASS sessions and were eligible to sit for the FE was 67% for both courses. However, it showed that 78% and 85% of students were eligible for sitting the FE by attending at least one PASS in semester 1 and semester 2 respectively. The average OCAM obtained by the students who attended the Chemistry PASS was 3% higher than that of the unattended students in semester 1. The students who attended the Chemistry PASS and the eligibility to sit for FE gradually increased to 100% with an increase in the number of PASS sessions attended by the students in semester 2 and the OCAM also increased about 12 marks (12%) higher than the students who did not attend the Chemistry PASS. Although this study, compared the OCAM with the Chemistry PASS attendance, there may be students who did not attend the Chemistry PASS but developed their study habits through the PASS conducted for another discipline. However, this study showed that there was a positive impact on the online Chemistry PASS sessions for the students' academic performance.

Keywords: PASS, Open and Distance Learning, Sri Lanka

**Corresponding Author: jijay@ou.ac.lk*

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*Department of Chemistry, The Open University of Sri Lanka, Sri Lanka*

## INTRODUCTION

Peer Assisted Study Sessions (PASS) is a well-established practice in more than 30 countries, and over 1000 universities provide students with student-to-student interactions to enhance their learning outcomes. Most studies have reported a positive correlation between academic performance and participation in PASS programmes (Birch et al., 2009). In 2010, the Faculty of Natural Sciences of the Open University of Sri Lanka (OUSL) introduced the Learning Support Programme using the PASS model to develop and practice good study habits while learning the subject. Small group discussions were led by the Graduated Young Mentors (GYMs) who graduated recently at the OUSL and Student Young Mentors (SYMs) with good academic standing (Bandarage, et al., 2011).

According to literature, the impact of PASS programmes on academic performance varies with the number of PASS sessions attended, and students who attended a larger number of sessions scored higher marks than the non-PASS attended students (Coe et al., 1999, Miller et al., 2004). In the academic year 2013/2014, PASS was conducted at four regional centres (Colombo, Kandy Matara and Jaffna) of the OUSL for five disciplines Botany, Chemistry, Physics, Pure Mathematics and Zoology in the BSc. Degree Programme and showed that students who attended more than 10 PASS sessions out of 16 for any discipline in the first year have improved the academic performance in any course in their first year (Bandarage et al., 2015). Furthermore, another study by Bandarage et al. (2021) has shown a positive impact on the students' performance by attending the PASS.

With the recent COVID-19 pandemic, most academic institutes shifted to online mode to continue the education process. Therefore, in the academic year 2021/2022, PASS was conducted online to motivate students towards study habits. In the academic year 2023/2024, the Department of Chemistry conducted 12 online PASS sessions for the first-year students in the BSc Degree Programme. As all previous studies conducted at the OUSL were based on the PASS conducted onsite at the regional centres, the objective of this study was to assess the impact of participation in the Chemistry PASS conducted online on the first-year chemistry courses.

## METHODOLOGY

The students enrolled for the BSc Degree Programme offered by the Faculty of Natural Sciences, OUSL for the academic year 2023/2024 were considered for this analysis. The PASS was conducted online (Zoom) for the two Chemistry course units; In semester 1 (Basic Principles of Chemistry I - CYU3300) and semester 2 (Basic Principles of Chemistry II- CYU3201). For each course unit, there are two Continuous Assessment Tests (CAT1 and CAT2) and students should gain more than 35% Overall Continuous Assessment Mark (OCAM) to be eligible to sit for the Final Examination (FE). Six online PASS sessions were scheduled for each semester during the weekend (Sunday 3.00 pm – 7.00 pm), and three such sessions were scheduled before each CAT. PASS was carried out in two parallel sessions: Sinhala/English and Tamil/English with a GYM and four SYMs supporting in each session.

The trained GYMs and SYMs facilitated the PASS sessions using the activity-based presentations prepared by the PASS Coordinators (Senior Academics in Chemistry) followed by the course material. Peer discussions inside breakout rooms in ZOOM supported to develop study habits, collaborative learning skills, leadership skills, thinking skills and communication skills.

Student attendance was collected through Zoom and recorded attendance for 12 PASS sessions was used for this analysis. Further, CAT1 and CAT2 marks were collected from the respective course

coordinators of the said two courses. The student who sat for at least one CAT was selected and the OCAM of each student was calculated by getting 60% from the best CAT and 40% from the remaining CAT. The average OCAM mark of the students who attended the Chemistry PASS was compared with the average OCAM of those students who did not attend the PASS. Furthermore, the effect of the number of PASS attended by the student to the OCAM was compared using one-way ANOVA (Minitab 17).

## RESULTS AND DISCUSSION

The number of students who registered for the said Chemistry course during the first year of study and sat for at least one CAT were 952 and 720 for semester 1 and semester 2 respectively. Among them, 697 and 520 students were eligible to sit for the Final Examination (FE) in each semester. Maximum attendance was observed for the first PASS session conducted in semester 1. It may be due to most of the students interested to see the benefits of PASS for their learning at the beginning of their study period. However, the number of students who attended only one PASS in semester 1 and semester 2 was 218 and 99 respectively while attendance to all the six PASS sessions was reduced to 23 and 12 respectively. Although a smaller number of students attended all the PASS sessions, the range of PASS attendance for one session was from 128 to 313 in semester 1 and from 70 to 116 in semester 2.

The percentage of students who did not attend any Chemistry PASS and were eligible to sit for the FE was 67% for both said courses while it showed 78% and 85% of students were eligible to sit for the FE by attending at least one PASS for semester 1 and semester 2 respectively. The student's performance rate was determined as a percentage of the students who were eligible for the FE with their PASS attendance. Figure 1 shows the number of students eligible for the FE and their attendance for the PASS for semester 1 and semester 2 separately.

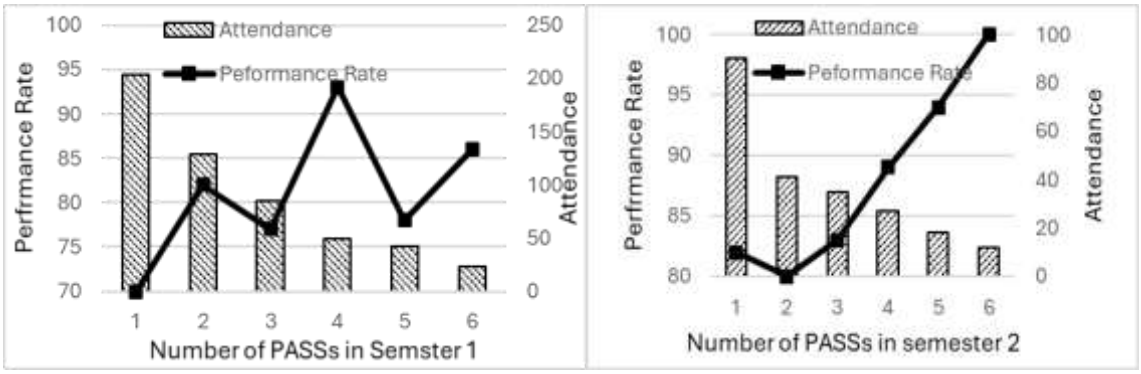


*Figure1: The students' attendance and the percentage of eligible students for each PASS session in semester 1 and semester*

Figure 1 shows the percentage of students who were eligible to sit for the FE increased maximum of 93% in semester 1 with the attendance of four PASS sessions while it gradually increased to 100% in semester 2 from the PASS session 2 to 6. The total number of PASS sessions attended by the students gradually decreased.

In addition, the average OCAM obtained from the students who did not attend the PASS was compared with the number of PASS attended by the students in each semester respectively and those statistics are given in Table 1.

According to Table 1, it shows that there was a significantly higher OCAM for the students who attended the Chemistry PASS sessions, and it was at least 03 marks (3%) higher than for the students who did not attend the chemistry PASS in semester 1. However, there was no significant relationship between mean OCAM and the number of PASS sessions in semester 1 which may be due to the number of sessions attended by a student not exceeding the number of PASS sessions recommended by previous research (Bandarage et al., 2015). In semester 2, the OCAM gradually

increased with the number of PASS sessions attended by the students and there was no significant difference between the students who attended 5 or 6 PASS sessions, and it was about 12 marks (12%) higher than the students who did not attend the Chemistry PASS sessions.

*Table 1: The average OCAM with the number of PASSs attended by the student in two semesters*

| Number of PASSs attended by the student | Average OCAM (± Standard Deviation) | |
|---|---|---|
| | Semester 1 | Semester 2 |
| 0 | 38.2 (±14.6)[a*] | 38.8 (±12.2)[a] |
| 1 | 41.1 (±14.7)[ab] | 41.5 (±11.8)[ab] |
| 2 | 44.9 (±13.1)[b] | 45.1 (±12.8)[b] |
| 3 | 42.5 (±12.2)[ab] | 50.5 (±15.2)[bc] |
| 4 | 47.3 (±11.5)[b] | 47.1 (±13.6)[bc] |
| 5 | 44.2 (±16.3)[ab] | 54.2 (±15.4)[c] |
| 6 | 49.2 (±13.9)[b] | 52.3 (±12.3)[c] |

**Different letters (a, b and ab) indicated the significant difference among the OCAM in semester 1 and semester 2 separately (one-way ANOVA, $p < 0.05$)*

The findings of this analysis support the findings in the literature that have shown a positive impact on students' academic success even though PASS was conducted online. However, there can be students who did not attend the Chemistry PASS but develop their study habits by participating in another PASS offered by one of the disciplines: Physics, Zoology, Botany, Computer Science or Mathematics.

## CONCLUSIONS/RECOMMENDATIONS

The findings reveal that online Chemistry PASS has been constructive in increasing the performance of students in Chemistry in their first year. Therefore, attendance of students to the PASS to be increased in the next academic year and it is suggested to develop the first PASS session with new strategies to engage the students to the PASS till the end as number of students who attended the first PASS session were higher than the others.

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