EVALUATING THE IMPACT OF ONE-WORD STUDENT FEEDBACK ON LECTURE EFFECTIVENESS IN VIRTUAL LEARNING ENVIRONMENTS

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This study investigates the use of Mentimeter, an interactive presentation tool, to gather and analyze students' feedback in virtual learning environments, particularly within open and distance learning (ODL) environments. It aims to evaluate how word cloud analysis of students' feedback responses can provide actionable insights into lecture content and delivery. Participants included 300 undergraduate students from three disciplines (A, B, and C) at the Open University of Sri Lanka. A Mentimeter tool was used to collect feedback, which was analyzed to identify key themes and common viewpoints. A chi-square test was conducted to examine the distribution of positive and negative feedback across the disciplines. The chi-square test results ($\chi 2 = 58.52$, $p < 0.05$) indicate a significant difference in feedback distribution, with a high proportion of positive feedback (95.7%) and a high engagement rate (70%). Specifically, 67 out of 70 active responses were positive in the "A" discipline, 62 out of 63 in the " C discipline, and 59 out of 62 in the "B" discipline. The findings suggest that students generally perceive Mentimeter positively for providing feedback, which supports its use in enhancing teaching strategies in ODL environments. The significant positive feedback distribution highlights Mentimeter's effectiveness in engaging students and giving comprehensive insights to educators.

Keywords: Higher education, Mentimeter, Open and distance learning (ODL), Student feedback, Virtual Learning

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INTRODUCTION

Teaching in open and distance learning (ODL) classes presents significant challenges and remarkable opportunities (Pitsoe & Maila, 2014). One of the primary challenges is ensuring student engagement (Maringe & Sing, 2014), which is crucial for achieving desired learning outcomes (Mohin et al., 2022). Traditional large-group lectures, while efficient for delivering content to a large audience, can struggle to actively engage students and foster meaningful learning experiences (Maringe & Sing, 2014). In higher education, the rapid attention to assessment feedback has often been overshadowed by a historical emphasis on summative assessment (Pitsoe & Maila, 2014). However, traditional feedback mechanisms, such as surveys conducted through platforms like Forms (Ferguson, 2011) and Google Forms, alongside focus groups, often fall short in capturing students' dynamic and immediate reactions within the digital learning environment (Henderson et al., 2019). Moreover, the collection and analysis of such feedback through these conventional channels pose significant logistical hurdles (Ferguson, 2011). Managing the accumulation of feedback forms, administering surveys, and processing responses are arduous tasks that consume valuable time and resources (Gibbs & Simpson 2005) particularly in courses with a large number of participants. The inefficiency is further compounded when considering the environmental impact of paper-based feedback forms (Chawinga & Zozie, 2016), which not only necessitate significant paper and printing costs but also contribute to environmental waste. Audience-Response Systems (ARS), also known as clicker systems or classroom response systems, offer a solution to this challenge by enabling instructors to gather instant feedback from students during lectures (Saidi et al., 2021). Existing research has emphasized the importance of student feedback in online education. Studies by Harris et al. (2014), Van Der Kleij and Adie (2020), and Gamlem and Smith (2013) have highlighted the role of feedback in promoting student engagement and satisfaction in online courses. Mentimeter's interactive features, instructors can instantly gauge student sentiment, gather spontaneous reactions, and adapt their teaching strategies accordingly (Mayhew et al., 2020).

This study explores the use of Mentimeter, an interactive tool (Mohin et al., 2022), to gather and analyze student feedback through word clouds, offering a real-time and visual representation of student perspectives. However, there remains a gap in understanding how technology-enabled feedback mechanisms can enhance the feedback process. This study aims to bridge this gap by investigating the effectiveness of Mentimeter Word cloud analysis for collecting and analysing student feedback in online courses.

METHODOLOGY

Hypothesize that the integration of Mentimeter in Word Cloud analysis will facilitate more meaningful and actionable student feedback in online courses. To test this hypothesis, our research questions include:

1) How do students perceive the use of Mentimeter for providing feedback in online courses?
2) What are the advantages and limitations of Word Cloud analysis for analyzing student feedback?
3) How do insights influence online education strategies and course enhancements?

Participants for this study

The participants in this study include undergraduate Level 3 students from Support Materials (A), Operational Breakdown of garments (B), and Closures for garments (C) disciplines to gather insights

into their experiences and perceptions of feedback. Participants for the study were recruited from virtual learning environments, specifically focusing on open and distance learning (ODL) settings. A total of 100 students in each discipline from the Open University of Sri Lanka enrolled in online courses were invited to participate. The selection of 100 participants from each discipline was based on the need for a sufficiently large sample size to ensure the statistical significance of the results, while also being manageable within the scope of this study.

Selection of interactive presentation tool

Mentimeter word cloud analysis was chosen as the interactive presentation tool for gathering student feedback due to its user-friendly interface and the availability of features such as the word cloud generator.

Data Collection

Online lecture sessions were conducted using Mentimeter to gather real-time feedback from students. Mentimeter polls with open-ended questions were integrated into the lecture presentations to prompt students to provide feedback on the content and delivery. Participants were asked to provide one-word feedback at the end of each lecture. Responses collected through Mentimeter were exported and analyzed using word cloud generation software. Qualitative data analysis was conducted using thematic analysis techniques. Quantitative analysis was performed to identify trends and correlations in student feedback. Using descriptive statistics, the feedback was categorized into positive and negative responses. The proportion of positive and negative feedback was calculated for each discipline. In the Chi-Square Test, a chi-square test of independence was performed to determine if there was a significant difference in the distribution of positive and negative feedback across the three disciplines.

RESULTS AND DISCUSSION

By collecting and analyzing one-word responses from students, we aim to determine how such concise feedback can provide valuable insights into lecture dynamics, student engagement, and overall satisfaction. The analysis revealed several key themes in the one-word feedback.

Participant Demographics

The feedback from students was collected and analyzed across three different disciplines: Support Materials, Closures for Garments, and Operational Breakdown of Garments. The data is summarized in Table 1. Figures 1,2, and 3 results contribute to understanding the effectiveness of virtual lectures and highlight areas for potential improvement, particularly in lecture pacing and addressing language barriers of students. Out of the 300 students invited to participate in the study, 195 students actively provided feedback, resulting in an overall participation rate of 65%. In support materials(A), Out of 70 active participants, 67 (95.7%) provided positive feedback, while 3 (4.3%) provided negative feedback. In closures for garments(B)Out of 63 active participants, 62 (98.4%) provided positive feedback, and 1 (1.6%) provided negative feedback. In an operational breakdown of garments: Out of 62 active participants, 59 (95.2%) provided positive feedback, and 3 (4.8%) provided negative feedback.

Table 1 : Feedback Summary

Discipline	No. of Positive feedback	No. of Negative feedback	No. of participants	No. of active participants
A	**67**	**03**	**100**	**70**

B	**62**	**01**	**100**	**63**
C	**59**	**03**	**100**	**62**
Overall	188	**7**	**300**	**195**

Figure 1: Word Cloud of Feedback Responses for (A)

Figure 2: Word Cloud of Feedback Responses for (B)

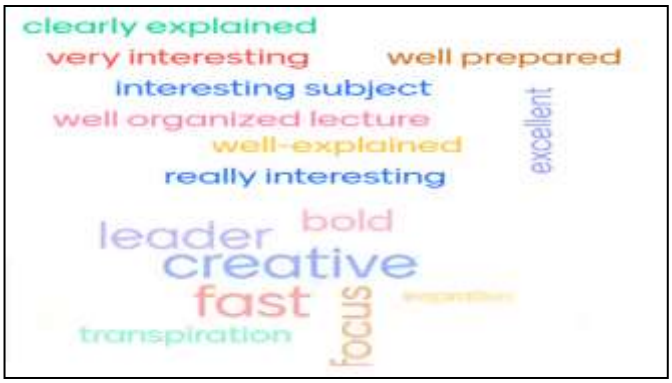

Figure 3: Word Cloud of Feedback Responses for (C)

Proportion Calculations

The distribution of positive and negative feedback is detailed in Table 2. Collecting feedback should consider the active participation of students to improve their learning and achievement (Flores et al.,

2014). The high proportions of positive feedback across all disciplines indicate a generally favorable student perception of the use of Mentimeter for providing feedback.

Table 2 Distribution of Positive and Negative Feedback

Discipline	Proportion Positive Feedback	Proportion Negative Feedback
Support materials	95.7%	4.3%
Closures for garments	98.4%	1.6%
Operational breakdown of garments	95.2%	4.8%
Overall	96.4%	3.6%

Expected Frequencies

To further analyze the feedback distribution, expected frequencies were calculated assuming an equal distribution of positive and negative feedback among the active participants. This serves as a baseline to compare the observed frequencies and understand the significance of the results shown in Table 2.

Support Materials: Expected positive feedback = 70 / 2 = 35
Expected negative feedback = 70 / 2 = 35
Closures for Garments: Expected positive feedback = 63 / 2 = 31.5
Expected negative feedback = 63 / 2 = 31.5
Operational Breakdown of Garments:
Expected positive feedback = 62 / 2 = 31
Expected negative feedback = 62 / 2 = 31

The predominant positive feedback terms included "excellent," "good," "great," "useful," "clear," and "interesting." In contrast, the negative feedback highlighted issues such as the lecture being "too fast" and students experiencing "English language problems." The frequency and distribution of these words provided a clear picture of student perceptions and areas needing improvement. The high proportion of positive feedback (96.4% overall) and the substantial engagement rate (65% active participation) indicate that students generally perceive the use of Mentimeter for providing feedback positively.

Chi-square Test Results:
The chi-square statistic ($\chi 2$) is 58.52 with 1 degree of freedom (df=Number of Categories: 2−1=1) (Table 3). Using a chi-square distribution table or calculator, the p-value is found to be 3.825 x 10^-9. A chi-square test was conducted to determine if the observed distribution of feedback (positive vs. negative) was statistically significant compared to an expected equal distribution (Roebuck et al., 2016). The p-value indicates a significant difference in the distribution of feedback among the disciplines ($p < 0.05$). This suggests that positive feedback was significantly more prevalent across all disciplines. The chi-square test for Support Materials showed a significant deviation from the expected frequencies. With 67 positive responses and only 3 negative responses out of 70 active participants, the high proportion of positive feedback (95.7%) suggests that students in this discipline perceive the use of Mentimeter very favourably. The results for Closures for Garments indicated the highest proportion of positive feedback at 98.4%, with 62 positive and only 1 negative response out of 63 active participants. This discipline exhibited the most significant preference for Mentimeter, reflecting its effectiveness and high acceptance rate among students. For the Operational Breakdown of Garments, 59 out of 62 active participants provided positive feedback, resulting in a 95.2% positive feedback rate. Despite being slightly lower than the other disciplines, this still represents a strong positive reception, with a notable deviation from the expected frequencies. The significant chi-square

statistic ($\chi 2 = 58.52$) and the very low p-value (3.825 x 10^-9) confirm that the distribution of positive and negative feedback is not due to random chance. Instead, it highlights a clear preference for positive feedback across all disciplines. This high level of positive feedback, coupled with substantial engagement rates, indicates that students find Mentimeter to be an effective tool for providing feedback in an online learning environment. These results suggest that Mentimeter can enhance instructor-student communication, promote higher levels of student engagement, and inform better instructional design decisions.

Table 3: Results of Chi-Square Statistic

Statistic	Values
Chi-Square Statistic ($\chi 2$)	58.52
Degrees of Freedom (df)	1
p-value	3.825 x 10^-9

Student Perception of Mentimeter for Feedback

Across all disciplines (Support Materials, Closures for Garments, and Operational Breakdown of Garments), there was a predominant trend of positive feedback using Mentimeter. The results indicate that students perceive Mentimeter very positively across all disciplines. The high proportion of positive feedback (96.4% overall) and substantial engagement rate (65% active participation) suggest that students find Mentimeter to be an effective and engaging tool for providing feedback. This aligns with the observed chi-square results, which show a significant preference for positive feedback. It encourages participation by offering a dynamic and interactive platform for students to express their views. It allows for real-time collection and analysis of feedback, making it easier for educators to address student concerns promptly.

Limitations

Word clouds may oversimplify complex feedback by focusing on the frequency of words rather than the context. There may be a bias towards more commonly used words, potentially overshadowing less frequent but equally important feedback.

CONCLUSIONS/RECOMMENDATIONS

One-word feedback offers a novel approach to understanding and improving lecture effectiveness. While it should not replace comprehensive feedback methods, its simplicity and immediacy make it a valuable addition to the educator's toolkit. The statistical analysis demonstrates a strong positive reception to the lecture in the virtual learning environment. The high proportion of positive feedback (96.4%) and the analysis of feedback using Mentimeter reveals a strong preference among students for this interactive tool, as evidenced by the chi-square test results ($\chi 2 = 58.52$, $p < 0.05$) and the high proportion of positive feedback (95.7%). This positive reception was consistent across all three disciplines, with high engagement rates (70%) further underscoring its effectiveness. Specifically, 67 out of 70 active responses in Support Materials, 62 out of 63 in Closures for Garments, and 59 out of 62 in Operational Breakdown of Garments were positive. These findings indicate that Mentimeter significantly enhances instructor-student communication by providing a platform for real-time feedback and engagement. The tool's ability to capture and visualize student responses through word clouds not only promotes active participation but also helps educators identify common themes and areas for improvement.

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