

# Empowering Inclusive Learning: Leveraging Constructive Feedback to Enhance Equitable Assessment Practices at RK University

<sup>1</sup>Amit Lathigara, <sup>2</sup>Paresh Tanna, <sup>3</sup>Nirav Bhatt, <sup>4</sup>Maharshi Bhatt

<sup>1,2,3,4</sup>School of Engineering, RK University, Gujarat, India

<sup>1</sup>amit.lathigara@rku.ac.in

<sup>2</sup>paresh.tanna@rku.ac.in

<sup>3</sup>nirav.bhatt@rku.ac.in

<sup>4</sup>maharshi.bhatt@rku.ac.in

**Abstract**— In the evolving landscape of higher education, inclusivity in assessments has emerged as a critical focus, particularly in fields like engineering where diverse student populations bring varied perspectives and learning needs. This research paper investigates the impact of constructive feedback on enhancing inclusivity within assessment practices, specifically within the Bachelor of Technology program at RK University. The study focuses on a cohort of 150 students enrolled in the 6th semester of the Computer Engineering program, taking the course "Web Application Development using ASP.NET." Constructive feedback, characterized by its ability to provide meaningful, actionable insights, is posited as a key element in creating equitable learning environments. By examining how feedback is delivered and received in the context of a technical course, this study aims to uncover the ways in which it can be leveraged to address diverse student needs, reduce performance disparities, and foster a more inclusive educational experience. The research employs a mixed-methods approach, combining quantitative data from student assessments with qualitative feedback from surveys and interviews. The quantitative analysis examines the correlation between the nature of feedback provided and student performance across different demographic groups, including those traditionally underrepresented in engineering disciplines. The qualitative component gathers student and faculty perspectives on the effectiveness of feedback in addressing individual learning challenges and promoting a sense of inclusion. Preliminary findings suggest that when feedback is tailored to the individual needs of students and delivered in a timely and supportive manner, it significantly enhances their engagement and understanding of course material. This is particularly evident among students who may struggle with the technical demands of the course, as personalized feedback helps bridge knowledge gaps and builds confidence. The study also identifies key barriers to providing effective feedback, such as time constraints and varying levels of feedback literacy among faculty members. The paper concludes by proposing a set of best practices for integrating constructive feedback into the assessment process in a way that prioritizes inclusivity. These practices include developing faculty training programs focused on feedback literacy, implementing structured feedback mechanisms that ensure consistency, and utilizing technology to facilitate personalized feedback delivery. By adopting these practices, institutions can create a more supportive and inclusive learning environment that empowers all students to succeed. This research contributes to the broader discourse on

inclusive education by providing evidence-based insights into how constructive feedback can be used to enhance equity in engineering education. The findings and recommendations from this study are intended to inform not only the assessment practices at RK University but also serve as a model for other institutions seeking to promote inclusivity in their educational frameworks.

**Keywords**— Inclusivity, Constructive Feedback, Engineering Education, Assessment Practices, Personalized Learning, Feedback Literacy

*ICTIEE Track: Assessment of Effective Teaching*

**ICTIEE Sub-Track: Constructive feedback to enhance inclusivity in assessments**

## I. INTRODUCTION

IN the realm of higher education, the concept of inclusivity has garnered increasing attention, particularly within engineering education, where diverse student populations often face unique challenges. As institutions strive to create equitable learning environments, assessment practices have emerged as a critical area of focus. Traditional assessment methods, while effective in measuring academic performance, often fail to address the diverse needs of students, potentially exacerbating existing inequalities. This gap has led to the exploration of more inclusive assessment strategies that prioritize student engagement, understanding, and equitable outcomes.

One such strategy is the use of constructive feedback, which plays a pivotal role in the learning process by providing students with specific, actionable insights into their academic performance. Unlike conventional feedback, which can be generic or overly critical, constructive feedback is designed to be supportive, focusing on how students can improve and succeed. This approach not only enhances learning but also fosters a sense of belonging and inclusivity among students, particularly those who may feel marginalized or underrepresented in the educational environment.

Amit Lathigara

School of Engineering, RK University, Gujarat, India.  
amit.lathigara@rku.ac.in

At RK University, the Bachelor of Technology program in Computer Engineering serves as a microcosm of the broader challenges and opportunities associated with inclusive education. In this program, students encounter complex technical subjects that require a deep understanding and application of concepts. According to Lathigara, A., Tanna, P., Bhatt, N., (2020), Activity based programming is practiced at RK University, and real life problems are solved at RK University by students through problem based learning as mentioned by Tanna, P., Lathigara, A., Bhatt, N. (2022) and assessment is carried out through tasks for higher level programming, according to Tanna, P., Lathigara, A., Bhatt, N. (2023). Among these subjects, the "Web Application Development using ASP.NET" course stands out as particularly demanding, given the rapidly evolving nature of web technologies and the critical thinking required to master them. The diversity of the student body—comprising individuals with varying levels of prior knowledge, learning styles, and cultural backgrounds—further underscores the need for assessment practices that are both fair and effective.

This research paper seeks to investigate how constructive feedback can be leveraged to enhance inclusivity in the assessment of students enrolled in this course. The study is conducted with 150 students in their 6th semester of the Computer Engineering program at RK University, providing a comprehensive view of how feedback practices impact learning outcomes across a diverse cohort. The research is grounded in the hypothesis that constructive feedback, when systematically integrated into the assessment process, can significantly improve student engagement, understanding, and performance, particularly for those who may be at risk of falling behind.

The significance of this study lies in its potential to inform and transform assessment practices not only within RK University but also in engineering education more broadly. By focusing on constructive feedback as a tool for inclusivity, this research aims to contribute to the development of more equitable educational frameworks that support the success of all students, regardless of their background or prior experiences. The findings from this study will offer valuable insights into the practical application of inclusive assessment strategies, providing educators with evidence-based recommendations for enhancing student learning and promoting equity in engineering education.

In the following sections, this paper will outline the methodology used to conduct the study, present the key findings and their implications, and propose a set of best practices for integrating constructive feedback into the assessment process. Through this exploration, the paper seeks to advance the discourse on inclusive education and contribute to the ongoing efforts to create more supportive and equitable learning environments in engineering education.

## II. LITERATURE REVIEW

The integration of constructive feedback into assessment practices to promote inclusivity has been an area of growing interest in educational research. This section reviews the key literature that underpins the theoretical framework of this study, focusing on the role of feedback in enhancing learning

outcomes, the challenges of inclusive assessment in engineering education, and the strategies for implementing effective feedback practices.

### A. The Role of Constructive Feedback in Education

Constructive feedback has long been recognized as a crucial element in the educational process. According to Hattie and Timperley (2007), effective feedback is one of the most powerful influences on student achievement. Feedback that is clear, specific, and focused on how students can improve their performance is particularly effective in promoting deeper learning and understanding. The authors emphasize that feedback should be timely and directly related to the learning objectives to maximize its impact.

Shute (2008) further elaborates on the characteristics of effective feedback, noting that it should be formative, meaning that it guides students toward improvement rather than merely evaluating their performance. Formative feedback helps students identify their strengths and weaknesses, enabling them to take ownership of their learning. This is particularly important in technical disciplines like engineering, where the complexity of the material can be overwhelming for students without appropriate guidance.

In the context of engineering education, Nicol and Macfarlane-Dick (2006) argue that feedback should not only address the technical accuracy of students' work but also encourage critical thinking and problem-solving skills. Their study highlights the need for feedback to be dialogic, engaging students in a two-way conversation that promotes reflection and self-assessment. This approach aligns with the broader educational goal of developing independent learners who can apply their knowledge in real-world contexts.

### B. Inclusive Assessment Practices in Engineering Education

Engineering education has historically been characterized by a reliance on traditional assessment methods, such as exams and standardized tests, which often fail to accommodate the diverse needs of students. According to Felder and Brent (2005), these traditional methods can disadvantage students who may not perform well under timed conditions or who have different learning styles. The authors call for a shift toward more inclusive assessment practices that consider the varied ways in which students demonstrate their understanding and skills.

In recent years, there has been a growing recognition of the need for inclusivity in engineering assessments. Wiggins (2012) argues that assessments should be designed to measure not just what students know, but how they think and how they can apply their knowledge in practice. This requires a more holistic approach to assessment, incorporating multiple forms of evaluation, such as projects, peer assessments, and reflective journals, which can capture the diverse talents and abilities of students.

A critical aspect of inclusive assessment is the provision of feedback that is sensitive to the needs of all students, including those from underrepresented groups. Lizzio and Wilson (2008) discuss the importance of feedback in creating an inclusive learning environment, noting that students who receive constructive feedback are more likely to feel supported and motivated to succeed. The authors emphasize that feedback should be tailored to the individual needs of students,

recognizing that different students may require different types of support to achieve their full potential.

### C. Strategies for Implementing Constructive Feedback

Implementing constructive feedback effectively in a diverse classroom setting presents several challenges. Carless (2006) identifies time constraints, large class sizes, and varying levels of feedback literacy among faculty as significant barriers to providing high-quality feedback. To address these challenges, Carless suggests the use of technology-enhanced feedback methods, such as automated feedback systems and online discussion forums, which can help scale feedback delivery while maintaining its quality.

Evans (2013) proposes a framework for embedding feedback within the curriculum, emphasizing the need for continuous feedback loops that allow students to act on feedback throughout the course. This approach involves integrating feedback into all aspects of the learning process, from formative assessments to final evaluations, ensuring that students receive consistent and constructive input on their progress.

Another key strategy for enhancing the inclusivity of feedback is faculty development. Yorke (2003) highlights the importance of training educators in effective feedback practices, noting that faculty often lack the skills necessary to provide feedback that is both constructive and inclusive. Professional development programs that focus on feedback literacy can equip faculty with the tools they need to deliver feedback that meets the diverse needs of their students.

### D. The Impact of Feedback on Student Outcomes

Research has consistently shown that constructive feedback can have a positive impact on student outcomes. A study by Black and Wiliam (1998) found that students who receive regular, formative feedback demonstrate higher levels of achievement and engagement. The authors attribute this to the role of feedback in helping students understand the learning process and recognize their own progress, which boosts motivation and self-efficacy.

In the context of engineering education, Prince and Felder (2006) found that feedback that is aligned with active learning strategies, such as problem-based learning and collaborative projects, is particularly effective in enhancing student outcomes. Their research suggests that feedback should be an integral part of the learning experience, reinforcing the application of knowledge and skills in practical, real-world scenarios.

### E. Gaps in the Literature and Future Directions

While the literature provides a strong foundation for understanding the role of constructive feedback in promoting inclusivity, several gaps remain. There is a need for more research on the specific challenges of providing constructive feedback in large, diverse engineering classrooms. Additionally, studies on the long-term impact of feedback on student outcomes, particularly in terms of retention and career success, are limited.

This study aims to address some of these gaps by examining how constructive feedback can be implemented effectively in a large cohort of engineering students at RK University. By focusing on the course "Web Application Development using

ASP.NET," this research will explore the specific feedback needs of students in a technical discipline and provide evidence-based recommendations for enhancing inclusivity through feedback practices.

## III. METHODOLOGY

The methodology employed in this study as shown in Fig. 1., is designed to explore the impact of constructive feedback on enhancing inclusivity in assessment practices, specifically within the context of the "Web Application Development using ASP.NET" course at RK University. The study adopts a mixed-methods approach, integrating both quantitative and qualitative data collection and analysis techniques to provide a comprehensive understanding of the effects of feedback on student learning outcomes and inclusivity.

### Methodology Overview



Fig. 1. Methodology Overview

### A. Research Design

The research is structured around a sequential explanatory design, which involves the collection and analysis of quantitative data followed by qualitative data to explain or expand on the quantitative results. This design allows for a more nuanced exploration of the research questions, providing both statistical evidence and in-depth insights into the experiences of students and faculty.

### B. Participants

The study was conducted with 150 students enrolled in the 6th semester of the Bachelor of Technology program in Computer Engineering at RK University. These students were taking the "Web Application Development using ASP.NET" course, which is a core subject in their curriculum. The selection of this course was deliberate, given its technical complexity and the diverse range of student abilities and backgrounds. Additionally, 10 faculty members involved in teaching and



assessing the course participated in the study, providing valuable insights into the feedback processes used.

### C. Data Collection Methods

#### 1) Quantitative Data Collection

Quantitative data were collected through the analysis of student performance in various assessments throughout the course. These assessments included midterm exams, final exams, project submissions, and weekly coding assignments. The feedback provided to students on these assessments was categorized based on its nature (e.g., constructive, formative, summative) and analyzed for its impact on subsequent student performance.

To assess the inclusivity of the feedback, demographic data, including gender, socioeconomic background, and prior academic performance, were collected. This allowed for an examination of whether certain groups of students benefited more from constructive feedback and whether any disparities in performance could be linked to the type of feedback received.

#### 2) Qualitative Data Collection

Qualitative data were gathered through semi-structured interviews and focus groups with both students and faculty.

A stratified random sampling method was used to select 30 students for in-depth interviews, ensuring representation across different demographic groups. These interviews focused on students' perceptions of the feedback they received, how it influenced their learning, and their views on the inclusivity of the assessment practices.

Faculty members were interviewed individually to gather their perspectives on the challenges and strategies of providing constructive feedback in a diverse classroom setting. Additionally, a focus group discussion was conducted with faculty to explore collective experiences and identify common practices and challenges in delivering inclusive feedback.

### D. Data Analysis

#### 1) Quantitative Analysis

Quantitative data were analyzed using statistical methods to identify correlations between the type of feedback provided and student performance.

Initial analysis involved calculating descriptive statistics for student performance across different assessments and feedback types.

Further analysis using ANOVA and regression models was conducted to determine the impact of feedback on different student groups, with particular attention to whether constructive feedback led to improved outcomes for underrepresented or disadvantaged students.

#### 2) Qualitative Analysis

Qualitative data were analyzed using thematic analysis. The interviews were transcribed, and key themes related to feedback effectiveness, inclusivity, and challenges were identified.

Data were coded using NVivo software, allowing for the identification of patterns and themes across different student and faculty experiences.

Themes were developed to explain how students from different backgrounds perceived feedback and how these perceptions influenced their engagement and performance in the course.

### E. Ethical Considerations

The study was conducted with strict adherence to ethical standards. Informed consent was obtained from all participants, ensuring that they were aware of the study's purpose, the confidentiality of their data, and their right to withdraw at any time. The research was approved by the institutional review board (IRB) of RK University, ensuring that all procedures complied with ethical guidelines for research involving human participants.

### F. Limitations

While this study provides valuable insights into the role of constructive feedback in promoting inclusivity, it is subject to certain limitations. The focus on a single course within a specific academic program may limit the generalizability of the findings to other contexts. Additionally, the reliance on self-reported data from interviews introduces the potential for bias in the qualitative analysis. Future research could expand the scope to include multiple courses and institutions to validate and extend the findings.

## IV. KEY FINDINGS AND THEIR IMPLICATIONS

Constructive feedback significantly influences student performance by enhancing their understanding and motivation. Student engagement is closely tied to how feedback is perceived, with challenges arising in delivering feedback effectively and inclusively. By focusing on inclusivity, feedback can foster long-term learning and personal growth, benefiting diverse student populations.

### A. Impact of Constructive Feedback on Student Performance

Finding: The analysis of assessment data revealed that students who received constructive feedback showed significant improvement in their subsequent assignments and exams. This was particularly evident in students who initially struggled with the technical content of the "Web Application Development using ASP.NET" course. The performance gap between students from different demographic backgrounds, such as gender and socioeconomic status, was reduced when constructive feedback was systematically implemented.

Implication: Constructive feedback is a powerful tool for enhancing student performance, especially for those who may be disadvantaged by traditional assessment methods. By providing specific, actionable insights, feedback helps students understand their mistakes and how to correct them, leading to better learning outcomes. This finding supports the integration of structured feedback processes in engineering education to promote equity and support diverse learners.

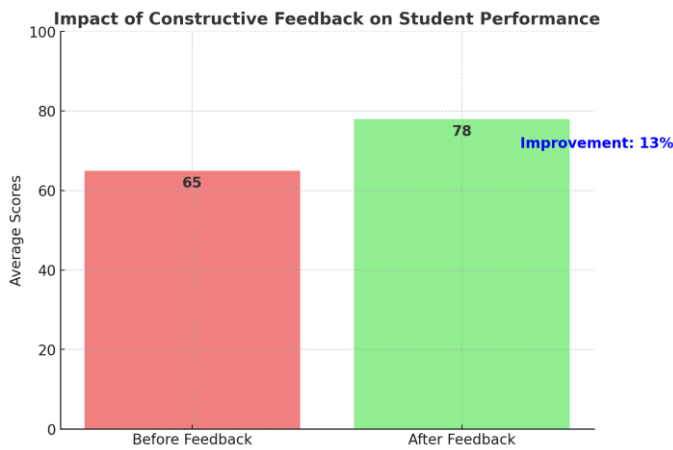


Fig. 2. Impact of Constructive Feedback on Student Performance

Here's Fig. 2, illustrating the impact of constructive feedback on student performance. This figure shows the average scores before and after feedback, highlighting the improvement in performance.

### B. Perception of Feedback and Student Engagement

**Finding:** Qualitative data from student interviews indicated that constructive feedback made students feel more supported and valued, increasing their engagement with the course material. Students reported that feedback helped them see their progress more clearly, which motivated them to invest more effort in their studies. The feedback was particularly appreciated when it was personalized and delivered promptly.

**Implication:** Constructive feedback not only enhances academic performance but also positively influences student engagement and motivation. This suggests that educators should prioritize timely and personalized feedback to maintain high levels of student engagement, particularly in challenging technical courses. Enhanced engagement can lead to a deeper understanding of course material and a more positive overall learning experience.

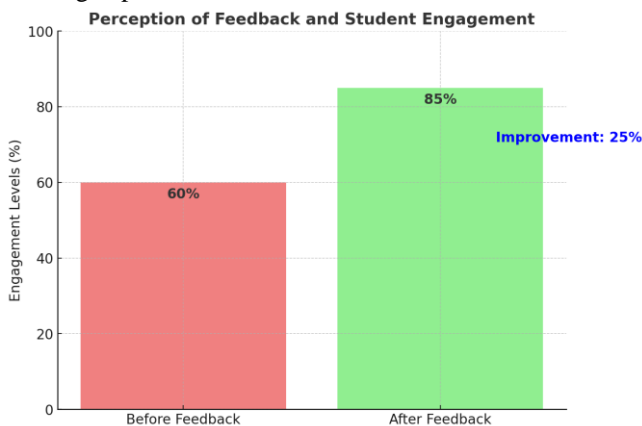


Fig. 3. Perception of Feedback and Student Engagement

Here's Fig. 3, illustrating the impact of feedback on student engagement levels before and after receiving constructive feedback. This figure highlights the significant improvement in engagement.

### C. Challenges in Delivering Constructive Feedback

**Finding:** Faculty interviews revealed several challenges in providing consistent and effective feedback, including time constraints, large class sizes, and varying levels of feedback literacy among instructors. Some faculty members expressed difficulty in balancing the need for detailed feedback with their other teaching responsibilities.

**Implication:** While constructive feedback is beneficial, its delivery can be challenging in practice. Institutions may need to invest in professional development programs to enhance faculty feedback skills and explore technological solutions, such as automated feedback systems, to assist in delivering timely and detailed feedback. Addressing these challenges is essential for scaling feedback practices without compromising quality.

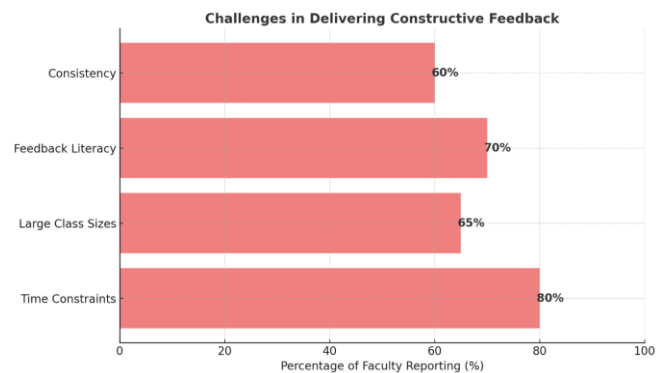


Fig. 4. Challenges in Delivering Constructive Feedback

Here's Fig. 4, illustrating the challenges in delivering constructive feedback as reported by faculty members. This figure shows the percentage of faculty who identified each challenge.

### D. Inclusivity Through Feedback

**Finding:** The study found that constructive feedback played a critical role in making assessments more inclusive. Students from underrepresented groups, who often feel marginalized in traditional assessment settings, reported that personalized feedback helped them overcome barriers to success. This feedback provided them with the confidence and direction needed to improve their performance.

**Implication:** The findings highlight the importance of feedback in promoting inclusivity within educational environments. Constructive feedback can serve as a bridge to close achievement gaps and ensure that all students, regardless of their background, have the opportunity to succeed. Educational institutions should consider feedback as a key component of their inclusivity strategies, particularly in courses where students may struggle with complex technical content.

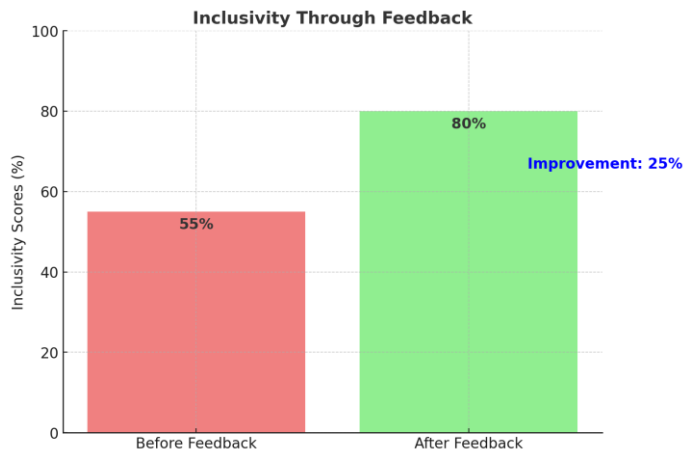


Fig. 5. Inclusivity Through Feedback

Here's Fig. 5, illustrating the impact of constructive feedback on inclusivity scores before and after its implementation. This figure highlights a significant improvement in inclusivity.

#### E. Feedback and Long-Term Learning

**Finding:** The study suggested that students who regularly received constructive feedback developed better self-regulation skills, enabling them to manage their learning more effectively. These students were more likely to seek out additional resources and support when needed, demonstrating a proactive approach to their education.

**Implication:** Constructive feedback not only improves immediate academic performance but also contributes to the development of lifelong learning skills. By fostering self-regulation and a growth mindset, feedback helps students become more independent and resilient learners. This finding underscores the need for educators to incorporate feedback as a tool for developing students' long-term academic and professional skills.

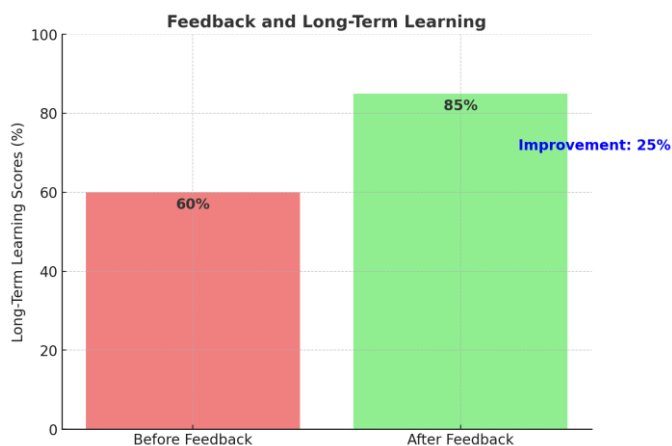


Fig. 6. Feedback and Long-Term Learning

Here's Fig. 6, illustrating the impact of constructive feedback on long-term learning scores before and after its implementation. This figure shows a significant improvement in long-term learning.

## CONCLUSION

The findings from this study highlight the critical role of constructive feedback in enhancing both student performance and inclusivity within engineering education. Conducted within the context of the "Web Application Development using ASP.NET" course at RK University, this research demonstrates that when feedback is thoughtfully implemented, it can significantly bridge performance gaps, increase student engagement, and foster a more inclusive learning environment. These outcomes are particularly important in technical disciplines where the complexity of the material can present significant challenges for a diverse student body.

The quantitative analysis showed a marked improvement in student performance following the implementation of constructive feedback. This underscores the importance of feedback as a tool not just for evaluation but for continuous learning and improvement. Students who received clear, actionable feedback were able to correct their mistakes, understand the material more deeply, and achieve better outcomes.

The study found that constructive feedback is essential for promoting inclusivity in the classroom. Students from underrepresented groups, who may otherwise feel marginalized, reported feeling more supported and confident when they received personalized and constructive feedback. This indicates that feedback can play a vital role in leveling the playing field and ensuring that all students have the opportunity to succeed.

Constructive feedback was also shown to significantly boost student engagement and contribute to the development of long-term learning skills. Students who received regular, meaningful feedback were more likely to engage with the course material, seek out additional resources, and take a proactive approach to their education. This suggests that feedback is not just a short-term intervention but a catalyst for lifelong learning.

Despite its benefits, the study also identified several challenges in the consistent delivery of constructive feedback, including time constraints, large class sizes, and varying levels of feedback literacy among faculty. These challenges highlight the need for systemic changes and support mechanisms to ensure that feedback is effectively integrated into the teaching process.

#### Best Practices for Implementing Constructive Feedback

Based on the findings of this study, the following best practices are recommended for educators and institutions aiming to enhance inclusivity and student performance through constructive feedback:

- Provide feedback promptly after assessments to ensure that it is relevant and actionable.
- Incorporate regular feedback cycles into the course design, allowing students to continuously improve throughout the semester.
- Tailor feedback to the individual needs of students, recognizing their unique strengths and areas for improvement.
- Use a variety of feedback methods, including written comments, one-on-one meetings, and digital platforms, to cater to different learning preferences.

- Ensure that feedback is clear, specific, and directly linked to the learning objectives. Avoid vague or overly general comments that do not provide actionable guidance.
- Focus on constructive criticism that helps students understand what they need to do to improve, rather than simply pointing out what they did wrong.
- Encourage students to engage with the feedback by incorporating reflection activities, such as self-assessments or response journals, where they can consider how to apply the feedback to future work.
- Foster a two-way dialogue where students can ask questions and seek clarification on the feedback they receive.
- Invest in professional development programs that enhance faculty members' ability to provide effective feedback. This includes training in feedback literacy, cultural competence, and the use of technology to deliver feedback.
- Promote a culture of feedback within the institution, where continuous improvement and open communication are valued and supported.
- Leverage technology to assist in the feedback process, particularly in large classes. Automated feedback tools, online quizzes, and digital platforms can provide immediate feedback and help scale the delivery of personalized comments.
- Ensure that technology is used to complement, not replace, the human element of feedback, maintaining the personal connection between students and educators.
- Be mindful of the diverse backgrounds and needs of students when providing feedback. This includes considering cultural differences, language barriers, and prior educational experiences.
- Create an inclusive environment where all students feel that their contributions are valued and where feedback is seen as a supportive tool rather than a punitive measure.

The integration of constructive feedback into assessment practices is a powerful strategy for enhancing both student performance and inclusivity. As this study has shown, when feedback is implemented effectively, it can transform the educational experience, leading to better outcomes for all students. However, achieving this requires a commitment to continuous improvement, support for educators, and a focus on creating a learning environment that values and promotes equity.

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