THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

AAEE
36th Australasian Association for Engineering Education Annual Conference

Australasian Association for Engineering Education

Students' Satisfaction with Peer Evaluation in Teamwork: Equity and Expectation Theories

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ABSTRACT

CONTEXT

Peer evaluation (PE) is commonly used in engineering education to assess individual contributions in team-based projects, a core component of professional engineering training. While PE offers benefits such as promoting accountability and reflective practice, its effectiveness depends heavily on students' perceptions of fairness and usefulness. Prior research highlights both the pedagogical potential and implementation challenges of PE, especially in promoting equitable team assessment. Despite its wide use, there is limited understanding of what drives student satisfaction with PE in engineering contexts. Addressing this gap is essential for improving teamwork assessment practices in engineering programs.

GOAL

This study aims to investigate the cognitive and contextual factors that influence engineering students' satisfaction with peer evaluation. Guided by equity theory and the expectations (disconfirmation) paradigm, we developed a conceptual framework that models the role of outcome expectations, perceived fairness, and performance expectancy in shaping students' PE satisfaction. The primary objective is to identify mechanisms through which engineering educators can design more effective and equitable PE practices.

METHODOLOGY

We proposed a model based on five key constructs: outcome expectations, outcome expectations congruency, performance expectancy, personal equity evaluation, and team equity evaluation. A survey instrument is being developed to capture these variables among students enrolled in engineering and IT courses at a large Australian university. The data will be analysed using Structural Equation Modelling (SEM) to test the hypothesised relationships and validate the framework. This study is conceptual and focuses on the development of a theoretical framework. Data collection and empirical testing will be conducted in future research to validate the proposed model.

ANTICIPATED OUTCOMES

We anticipate that students' satisfaction with PE will be positively influenced by outcome expectations congruency and perceptions of fairness in both personal and peer performance evaluations. The model is also expected to reveal that unrealistic outcome expectations can reduce satisfaction unless balanced by strong team performance and constructive peer feedback. The results will provide empirical support for the theoretical model and offer insights into PE practice in engineering curricula.

CONCLUSIONS/RECOMMENDATIONS/SUMMARY

This study contributes a theory-informed framework to guide the design of peer evaluation systems in engineering education. By focusing on expectation alignment and fairness, educators can better support student satisfaction, engagement, and learning in team-based environments. Our findings will inform practical strategies for integrating peer evaluation into engineering courses in a way that enhances student experience and assessment integrity.

KEYWORDS

Peer evaluation, engineering education, student satisfaction, teamwork assessment

Introduction

Assessment is a vital component of higher education for evaluating students' knowledge, skills, and competencies. However, traditional assessment methods such as tests and individual assignments have limitations in promoting collaborative learning, communication skills, and providing feedback (Ellis et al., 2020). This is especially evident in engineering education, where team-based design projects, capstone experiences, and problem-based learning are central to curriculum delivery. Consequently, team assignments and peer evaluation (PE) within teams have emerged as essential tools in engineering programs to assess individual contributions, promote accountability, and simulate real-world engineering teamwork (Daniel et al., 2007; Iglesias Pérez et al., 2022). In engineering education, where teamwork is an essential part of the curriculum, from first-year design studios to final-year capstone projects, peer evaluation offers a practical mechanism for assessing individual contributions, ensuring accountability, and mirroring professional engineering practice.

PE is becoming an increasingly popular method for assessing students' learning outcomes in engineering and other disciplines due to its potential to help students learn from their mistakes and develop critical thinking, collaboration, and communication skills (Kaddoura & Al Husseiny, 2021). Despite the growing interest in this practice, there are still several challenges associated with its implementation, such as students' negative attitudes towards peer evaluation and difficulties in ensuring the fairness and validity of the assessment (Panadero & Alqassab, 2019). Therefore, there is a need to investigate the effectiveness of PE in engineering education and explore ways to improve its implementation.

In engineering programs, where teamwork and collaborative projects are central to course design, educators face the challenge of assessing individual contributions in a fair and motivating way. Peer evaluation is commonly used to address this, but its success depends on how students perceive its fairness and usefulness. Understanding what drives student satisfaction with peer evaluation is essential to improving its design and implementation in engineering education (Adesina et al., 2023).

While peer evaluation has been widely studied, little is known about how students' satisfaction with the process is shaped by underlying cognitive mechanisms such as perceived fairness or expectations alignment. Moreover, few studies have integrated theoretical perspectives such as equity theory and expectation disconfirmation theory to model satisfaction, particularly within engineering education contexts.

To address this gap in the literature, our study aims to develop a conceptual framework that utilises the disconfirmation paradigm to identify the cognitive components that influence students' satisfaction with PE. This paradigm has been widely used in marketing literature to investigate consumer satisfaction and involves comparing an individual's expectations with their actual experiences. By applying this paradigm to the context of PE in engineering, we hope to uncover the factors that contribute to students' satisfaction or dissatisfaction with the evaluation process.

Through our study, we also aim to review the existing literature on the benefits, challenges, and effective implementation strategies of PE from the students' perspectives. By synthesizing this information with our conceptual framework, we aim to provide insights and recommendations for improving the implementation of PE in engineering education. This paper contributes a theory-driven framework for understanding student satisfaction with peer evaluation in team-based engineering education, with practical implications for improving fairness, motivation, and engagement.

Literature Review

The peer evaluation within teams is a technique where team members evaluate and assess each other's performance, skills, and contributions. This method is frequently applied in higher education to promote teamwork and collaboration among students, and to enhance their communication and critical thinking abilities. By participating in peer evaluation, students acquire the ability to give constructive feedback to their team members, identify the strengths and weaknesses of their peers, and use the feedback received from others to improve both their own and their team's performance (Laal & Laal, 2012; Snyder & Snyder, 2008). Research studies have been conducted to examine the effectiveness of peer evaluation within teams, but the findings have been inconclusive. While some studies have shown that peer evaluation can lead to better learning outcomes and academic performance (Petkova et al., 2021; Todd & Hudson, 2007), others have highlighted issues such as grade inflation, social loafing, and biased evaluations (Jassawalla et al., 2009). Despite these varying results, peer evaluation remains a prevalent practice in higher education, and scholars are working to identify ways to improve its efficacy and reduce potential negative consequences (Johnston et al., 2022). This literature review will analyse existing research on peer evaluation in higher education, focusing on its advantages, challenges, and strategies for effective implementation.

In engineering education, peer evaluation is not only common but essential for supporting team-based learning environments that reflect professional engineering practice. Through PE, students develop accountability, teamwork, and communication skills, which are integral to engineering graduate attributes (Bradley, 2010). These settings simulate real-world engineering practice, where students must collaborate effectively and be accountable for shared outcomes. Several studies have demonstrated that peer evaluation can enhance engagement, communication, and teamwork skills in engineering programs, while also presenting unique challenges around consistency and fairness. Incorporating theories like equity and expectation congruency can help educators address these challenges and improve the quality and acceptance of peer evaluation systems in engineering contexts (Thite et al., 2024).

Equity Theory (ET), as a broad theory of social behaviour, has been utilised for many years to comprehend workers' reactions to unfair circumstances in the workplace (Adams, 1963). According to this theory, workers determine equity or fairness in their workplace by examining their inputs and outcomes (costs and rewards), and by comparing them to those of other reference teams. The theory suggests that individuals in an unfair situation will try to restore equity by altering their own and others' inputs and outcomes (Hess & Hightower, 2001). In other words, equity theory, as a social psychological concept, suggests that individuals are motivated by a sense of fairness in their interactions with others (Hess et al., 2010). In the context of peer evaluation, equity theory proposes that students will be more satisfied with the evaluation process if they perceive it to be fair and equitable (Joshi, 1990). This theory provides a useful framework for understanding the factors that influence student satisfaction and motivation in peer evaluation (Joshi, 1989). Studies have explored the role of feedback in peer evaluation from an equity theory perspective (Joshi, 1989). Feedback that is perceived as constructive, specific, and relevant can enhance the perceived fairness of the evaluation process and motivate students to improve their performance (Hess et al., 2010). Therefore, this study suggests that educators can enhance student engagement, motivation, and learning outcomes by incorporating principles of equity and fairness into the design and implementation of peer evaluation processes.

In addition, according to the Expectations Congruency (or Disconfirmation) paradigm (EDT), customers form expectations about a product or service before purchasing or using it, based on a variety of factors such as advertising, word-of-mouth recommendations, previous experiences, and personal beliefs (Oliver, 1980). After they use the product or service, they compare their actual experiences to their initial expectations, and this comparison leads to a feeling of satisfaction or dissatisfaction (Yi, 1990). EDT suggests that when a customer's actual experience exceeds their expectations, they experience positive disconfirmation, which leads to increased satisfaction. However, when a customer's actual experience falls short of their expectations, they experience

negative disconfirmation, which leads to dissatisfaction (Fournier & Mick, 1999). This is an important tool for marketers and businesses to understand how customers evaluate their products and services, and how they can manage customer expectations to increase satisfaction and loyalty (Lankton et al., 2014). Therefore, the disconfirmation paradigm forms the central aspect of the framework (Karimi et al., 2015). The expectations congruency model, which is part of the disconfirmation paradigm, explains how students assess their satisfaction by comparing what they expected with what actually happened. In the context of peer evaluation, students form expectations about how fair, accurate, or helpful the feedback will be, often based on past experiences or personal beliefs. After receiving peer feedback, they reflect on whether the feedback met, exceeded, or fell short of their expectations. This perceived difference, between what they hoped for and what they received, is what shapes their level of satisfaction. If the actual feedback is better than expected (positive disconfirmation), students feel more satisfied. If it's worse than expected (negative disconfirmation), they feel dissatisfied.

While past studies have used Equity Theory or Expectations Disconfirmation Theory independently, few have combined them to examine student satisfaction with peer evaluation. This study addresses this gap by proposing an integrated dual-theory framework.

Theoretical Framework

This study integrates Equity Theory and Expectations Disconfirmation Theory to explain student satisfaction with peer evaluation. While Equity Theory focuses on perceived fairness in team contributions, EDT accounts for how satisfaction arises from the match between expectations and actual experiences. Combined, these theories offer a complementary framework for understanding satisfaction with peer evaluation in team-based learning within engineering education.

Research Model

Based on the theoretical foundations explained in the previous section, Figure 1 shows a conceptual model providing a framework for investigating the factors that influence students' satisfaction with PE. There are multiple factors that can influence a student's satisfaction with peer evaluation, including PE Outcome Expectations (OE), PE Outcome Expectations Congruency (OEC), Performance, Personal Equity Evaluation (PEE), and Team Members' Equity Evaluation or Group Equity Evaluation (GEE).

PE Outcome Expectations

According to the disconfirmation paradigm in the context of peer evaluation, students form outcome expectations about the evaluation process and the feedback they will receive from their peers. These expectations serve as a benchmark for comparison and are critical in determining their satisfaction with the process and feedback. This process is similar to the disconfirmation paradigm in marketing, which relies on expectations as the primary scale for comparison. Just as customers form expectations about a product or service before using it, students form expectations about the peer evaluation outcome before it occurs. In both cases, the size of the difference between expectations and actual experience or feedback received is critical in determining satisfaction.

The satisfaction of students with peer evaluation and its correlation with their expectations are determined by four fundamental elements including peers' grade expectations (Chen & Lou, 2004), individual member's performance expectations (Beatty et al., 1996; Saavedra & Kwun, 1993), team's performance expectations (Friess & Goupee, 2020; ONeill et al., 2020), and team's dynamic expectations (Chen & Lou, 2004; O'Neill et al., 2020), that can impact the usage of PE in several ways (Ion et al., 2019; Seifert & Feliks, 2019):

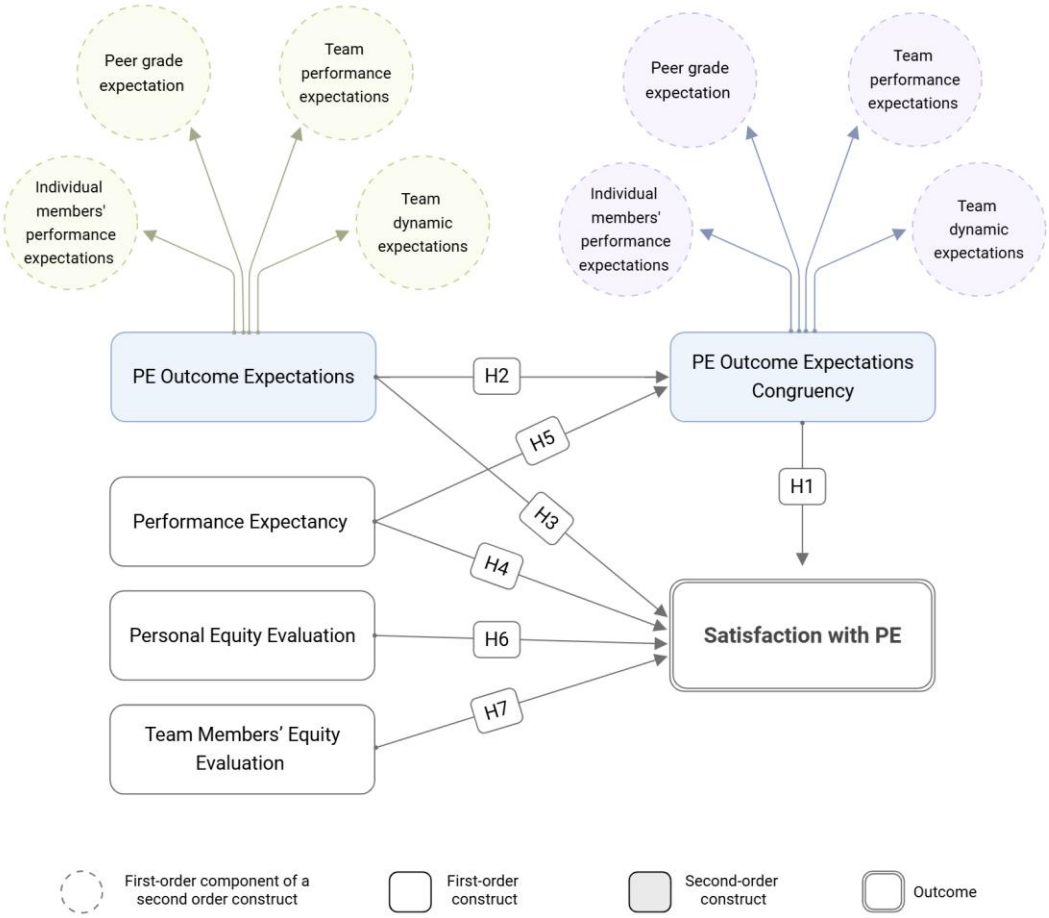

Figure 1: Conceptual Model of Students' Satisfaction with PE

Peer grade expectation refers to the anticipated level of performance and achievement that a student expects to receive from their peers' evaluation in the context of peer evaluation. It is the student's belief or prediction of the grade or score they will receive based on the evaluation and feedback provided by their peers. These expectations can impact a student's motivation and effort put into the evaluation process and ultimately affect their satisfaction with the outcome. When students expect that their grades will be affected by PE, they may be more motivated to use PE to assess and improve their own and their peers' work (Chen & Lou, 2004).

Individual members' performance expectations refer to the expectations that each student has for their own performance in the peer evaluation process (Beatty et al., 1996). Students who have high expectations for their own performance may be more motivated to engage fully in the evaluation process, while those with low expectations may be less invested in the process and provide lower-quality feedback (Saavedra & Kwun, 1993).

Team performance expectations refer to the expected level of achievement or success of the team's work or project. It focuses on the outcome or results of the team's performance (Friess & Goupee, 2020). When students have high expectations for their team's performance, they may be more motivated to use PE to evaluate their team's progress and identify areas for improvement (ONeill et al., 2020).

Team dynamic expectations refer to the expected level of health and functioning of the team in the areas of communication, adaptation, relation, and education. It focuses on the team's processes and interactions, and how effectively the team functions as a unit. When students have positive expectations for their team's dynamics, such as trust, cooperation, and communication, they may be more willing to use PE to evaluate and improve their team's collaboration and teamwork (O'Neill et al., 2020). In addition, team performance expectations relate to the output or outcome of the team's

work, while team dynamic expectations relate to the internal processes and interactions within the team during the peer evaluation process (Chen & Lou, 2004).

Expectations Congruency

Peer outcome expectations congruency is about the agreement between what students expect from their own, their peers', and their team's performance, and what is achieved through the use of peer evaluation (Loda et al., 2019). It measures how closely students' expectations match the actual outcomes that result from peer evaluation. Although both peer evaluation outcome expectations and peer evaluation outcome expectations congruency are related to students' expectations and outcomes when using peer evaluation, the former refers to the expectations themselves, while the latter refers to the level of agreement between expectations and actual outcomes and it includes peers' grade expectation congruency, Individual member's performance expectation congruency, team's performance expectation congruency, team's dynamic expectation congruency.

Overall, the disconfirmation paradigm provides a useful framework for understanding the role of outcome expectations in student satisfaction with peer evaluation. By examining these factors, the educators can better understand how to design effective peer evaluation processes that meet the expectations of students and promote their growth and success.

Performance Expectancy

The adoption and utilisation of peer evaluation may depend on students' perceived impact on performance. When students believe that using PE can improve their performance, they are more likely to use it. For students, the use of PE can offer valuable feedback on their performance, enabling them to recognise areas for improvement and adapt their learning approaches. Besides, PE can promote peer learning and collaboration, which can enhance students' overall performance (Herrera-Pavo, 2021). Investigating the effect of peer assessment on academic performance in primary, secondary, or tertiary students suggests that peer assessment improves academic performance compared with no assessment and teacher assessment (Double et al., 2020).

Personal Equity Evaluation

Personal equity evaluation is when students assess their own performance, while peer evaluation lets them assess each other's work. This evaluation impacts the use of peer evaluation in various ways. Personal equity evaluation increases confidence and intention to use peer evaluation by helping students recognise their strengths and areas for improvement (Williams, 2022). Personal equity evaluation also motivates students to use peer evaluation by giving them ownership and control over their learning and allowing them to evaluate their own development. Additionally, personal equity evaluation promotes fairness and objectivity in evaluating their own and others' performance, leading to trust and use of peer evaluation. Teachers can promote personal equity evaluation by providing clear instructions and feedback, encouraging self-reflection and creating a collaborative learning environment (Wright, 2011).

Team Members' or Group Equity Evaluation

Team members' equity evaluation involves assessing each other's performance in teamwork, and it impacts the use of peer evaluation in several ways. From a social pressure perspective, peer evaluation can signal to others that it's valued and expected, influencing students' use of PE. Moreover, students are more willing to use peer evaluation if they perceive the evaluation process as fair and impartial. Finally, peer feedback can encourage students to use PE to improve their learning and performance. Teachers can promote team members' equity evaluation by providing clear guidelines, creating a supportive learning environment, and encouraging students to evaluate each other. This can increase the use of peer evaluation by promoting fairness, social influence, and learning gains (Usher & Barak, 2018; Wright, 2011).

Research Hypothesis

Seven hypotheses are proposed that examine the relationships between students' perceptions of expected outcomes, their own performance beliefs, and evaluations of fairness, both personally and

within teams. These hypotheses are intended to provide a structured basis for analysing how congruency between expectations and experiences influences overall satisfaction. The seven hypotheses guiding this study are as follows:

H1: PE outcome expectations congruency is positively related to student's satisfaction with PE.

H2: PE outcome expectations are negatively related to PE outcome expectations congruency.

H3: PE outcome expectations are positively related to students' satisfaction with CIS.

H4: Students' performance expectancy is positively related to students' satisfaction with PE.

H5: Student's performance expectancy is negatively related to PE outcome expectations congruency.

H6: Students' personal equity evaluation is positively related to their satisfaction with PE.

H7: Team members' equity evaluation is positively related to their satisfaction with PE.

This integrated framework guided the development of our conceptual model and informed the identification of key constructs and relationships examined in the study.

This framework informs our research approach by shaping the development of our conceptual model and guiding the identification of the key constructs used to investigate student satisfaction with peer evaluation.

Planned Methodology

To validate the proposed research model in this study, a survey-based method will be used. This method is chosen because it is appropriate for examining queries about participants' beliefs or behaviours, has the capacity to apply findings to a broader population, and employs statistical data.

To collect data on the effectiveness of peer evaluation in higher education, we will administer an online questionnaire to all students in the Faculty of Engineering and IT in a large public university in Sydney. The questionnaire is designed to capture students' perceptions of peer evaluation, including its usefulness, fairness, and impact on their learning outcomes. We will analyze the data collected using descriptive statistics and structural equation modelling to identify the relationships between the variables of interest.

The questionnaire will also capture demographic information such as gender, age, and year and field of study, to explore whether satisfaction with peer evaluation varies across student cohorts or levels of academic maturity.

Discussion and Conclusion

Peer evaluation is a widely used assessment method in higher education to encourage collaborative learning and improve critical thinking and communication skills. However, research on its effectiveness has produced mixed results, highlighting both advantages and challenges. To improve the implementation of peer evaluation, this study creates a framework using the equity theory and the disconfirmation paradigm to identify factors that affect student satisfaction with peer evaluation. According to equity theory, students' satisfaction and motivation in peer evaluation are influenced by their perception of fairness and equity. Constructive, specific, and relevant feedback can enhance the perceived fairness of the evaluation process and motivate students to improve their performance. Moreover, the expectations congruency paradigm suggests that students form expectations about peer evaluation outcomes before using it and compare their actual experience to their initial expectations, leading to satisfaction or dissatisfaction. By incorporating principles of equity and fairness with the congruency (disconfirmation) model based on perceived performance, this study introduced a framework for analyzing student satisfaction with peer evaluation in higher education. Ultimately, this can lead to better evaluation practices that enhance student satisfaction,

engagement, motivation, and learning outcomes and provide recommendations for future improvement.

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