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Teacher and Peer Feedback in Collaborative Learning: Perceived Psychological Ownership, Perceived Quality, and Perceived Learning Outcomes

Michelle Chan Mei Gwen
Sunway University, Malaysia

Shalini Nagaratnam
Monash University, Malaysia

Shin Yi Chew
University of Malaya, Malaysia

Shamsiah Banu Mohamad Hanefar
INTI International University, Malaysia

Farah Naaz Abd Yunos
Sunway University, Malaysia

ABSTRACT

While collaborative learning can enhance outcomes, it may reduce learners' sense of ownership due to shared contributions and feedback. This study investigated the influence of teacher and peer feedback on perceived psychological ownership and learning in collaborative projects, assessing the mediating role of perceived quality and its impact on academic grades. Using a quantitative method with 132 Malaysian college students on a shared cloud platform, results showed that both peer and teacher feedback negatively influenced psychological ownership.

Perceived quality partially mediated the relationship between psychological ownership and perceived learning. Furthermore, psychological ownership correlated positively with cognitive learning, but not emotional learning. These findings provide empirical evidence for improving collaborative learning environments by highlighting the importance of feedback sources and perceived quality.

Keywords: Collaborative learning, discussion, feedback, perceived psychological ownership, perceived learning, perceived quality

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INTRODUCTION

Collaborative learning has evolved over time, but it remains the cornerstone of modern pedagogy, which involves students working together towards a common goal. The practice allows students to gain a more comprehensive understanding of the subject matter through the collective effort and input of the group (Johnson & Johnson, 2017). Recent research in teacher education also supports these principles, showing that students value interactive learning and respectful collaboration in diverse teams, which helps develop essential competencies (Eid & Al-Senaidi, 2025). It can also enhance student learning by promoting the development of metacognitive skills and presenting students with diverse perspectives and ideas (Chen et al., 2018; Kyndt et al., 2013).

Teachers play a central role in the success of collaborative learning. As an agent, their presence to act as a facilitator is essential for both cognitive and social presence to guide critical discourse and participation (Rapanta et al., 2020). However, while collaboration enhances individual learning and task outcome, a tension arises - the possible diminishment of a student's sense of ownership over their work.

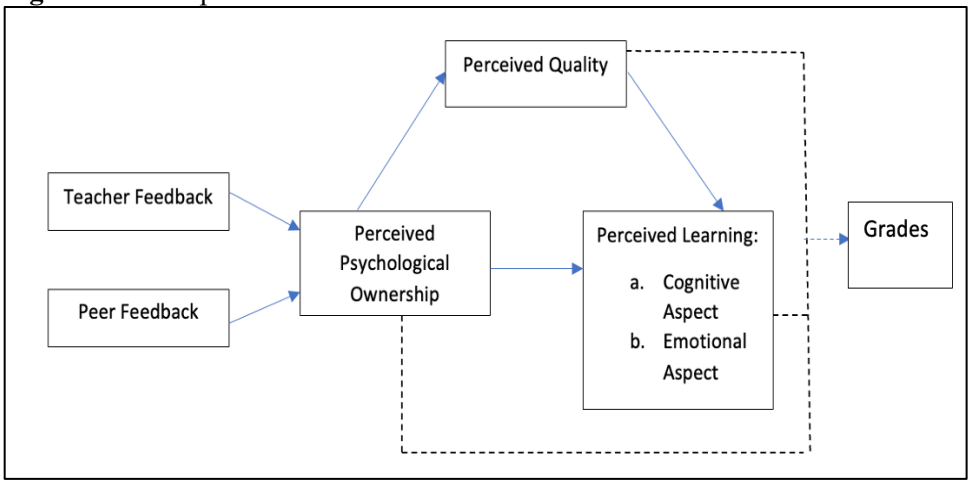
Psychological ownership has become increasingly prominent as an affective factor influencing motivation, participation, and accountability (Fei et al., 2025). However, in a collaborative environment, ownership can be challenged when students' individual contributions (Buchem et al., 2020) are integrated into a collective outcome. External feedback, mainly from teachers and peers, can adversely disrupt the harmony during collaboration. Although feedback is pivotal

to improving learning quality and work evaluation (Gillies, 2016), it may reduce students' sense of control or attachment to their contribution.

Technological tools to assist collaborative learning have become a common dynamic. Shared cloud platforms are often used as a primary tool for group projects, owing to their conveniences of real-time communication, content integration and management (Lim et al., 2015). These platforms offer more opportunities for collaboration, but also challenge the traditional concepts of authorship, participation, and ownership (Al-Samarraie & Saeed, 2018). Hence, the interaction of *feedback, psychological ownership, perceived quality,* and *perceived learning* would offer insights into this change. This understanding may further optimise future group learning experiences.

This study aims to address the gap in understanding the mediating role of perceived quality in the relationship between students' psychological ownership and their learning outcomes, within the context of scaffolded collaborative activities shaped by teacher and peer feedback. The study's aims and the relationships among the variables are illustrated in Figure 1:

Figure 1: Conceptual Framework



LITERATURE REVIEW

Psychological Ownership in Education

Psychological ownership is a feeling of possession that individuals experience towards physical and non-physical entities, such as ideas, artistic creations, and other intangible assets (Pierce et al., 2001). The sense of ownership is innate within humans and has behavioural, emotional, and psychological effects. It is rooted in every individual and satisfies the human motive both genetically and

socially (Dittmar, 1992). In the context of education, it can relate to students' academic work and information. (Man & Farquharson, 2015).

Four domains encompass this feeling: self-efficacy with the drive to complete a task (Graham, 2022; Avey et al., 2009); accountability to self and others (Pierce et al., 2003); belongingness is to be accepted and valued (Slaten et al., 2016); and self-identity is the extension of self (Hietanen et al., 2017). Each of these domains encourages promotive psychological ownership (Muthu et al., 2021). Research shows that students' affective experiences, such as satisfaction and sense of belonging, can significantly influence their learning outcomes. In their study, Kenney and O'Halloran (2025) found that undergraduate science majors with higher levels of satisfaction and belonging achieved better academic performance. Despite this positive outcome, there's also preventive ownership from the need to establish territories and boundaries (Brown & Zhu, 2016).

Collaborative Learning and Ownership Tension

Most studies focus on the outcome of collaborative learning from the cognitive (Zambrano et al., 2019; Sills et al., 2016) and social aspects (Huang & Lajoie, 2023; Williams et al.,2019), but many studies focus on these aspects separately.

Teachers play a crucial role in balancing these aspects. They intervene by being the guide, facilitator, instruction setter, task designer, and model for professional growth (Anto & Coenders, 2019; Fung, 2022; Voogt et al., 2019). Students influence group ownership socio-emotionally as a contributor, a leader, a manager, and to offer peer support (De Backer et al., 2021; Heinimäki et al., 2021; Saqr & Lopez-Pernas, 2022; Saqr et al., 2024).

Despite the roles supporting collaborative learning, tension arises, however, when students avoid collaboration to maintain personal ownership or to reduce peer ownership. This creates a trade-off between quality collaboration and the psychological factors that influence it. (Caspi & Blau, 2011).

Technology and Cloud-Based Collaboration

The most common technological tool to assist collaborative projects is shared cloud platforms. As computer-mediated communication tools, these platforms encourage both group and individual participation, providing convenient content management that integrates individual ideas and knowledge sharing (Baanqud et al., 2020; Barrett et al., 2021; Jeong et al., 2019; Pahayahay, 2025; Storch, 2019). Being on shared platforms mitigates common issues in face-to-face group discussions, such as group domination (Strauß & Rummel, 2021; Verster, 2024). When applied to collaborative writing, conflicts arise in co-authoring regarding content and language editing (Caspi & Blau, 2008; Veniati et al., 2023; Zabihi, 2022).

A number of studies have focused on the quality of writing and collaborative discourse (Gillies, 2019; Guzdial & Carroll, 2023; Webb, 2010). Nonetheless, there is a lack in factoring the influence of feedback (teacher/student) and the affective factors, such as ownership and motivation, on collaborative learning.

Teacher and Peer Feedback

Feedback from both teachers and peers is central to learning, as it helps students identify learning gaps, receive guidance, foster active learning and critical thinking, and motivate them to learn (Li & Gao, 2016; Van Hoe et al., 2024; Vattøy & Gamlem, 2024). Building on this, recent studies have shown that online peer feedback significantly enhances students' self-regulated learning compared with teacher-only feedback in an online environment (Öztürk et al., 2025). For feedback to generate such positive learning effects, it must also be specific, timely, and actionable, thereby ensuring that students can understand, apply, and respond effectively to the guidance provided (Brand et al., 2020; Fong et al., 2021).

However, its impact on psychological ownership is complex. While feedback is beneficial for enhancing learning quality (Han & Xu, 2020; Tian & Zhou, 2020), it also reduces students' sense of ownership (Caspi & Blau, 2011). In collaborative settings, feedback involves cognitive tasks and socio-emotional interactions that are intertwined (Isohätälä et al., 2020). Hence, it is also important to understand how teacher feedback interacts with peer feedback to influence perceived learning and perceived quality.

Perceived Learning and Perceived Quality

Perceived learning is used as an indicator to measure students' cognitive outcomes, such as acquisitions of new knowledge, problem-solving skills, and analytical abilities (Anderson et al., 2001; Khan et al., 2023), and socio-emotional outcomes such as enjoyment, frustration, self-efficacy, and personal fulfilment (Alqurashi, 2019; Linnenbrink-Garcia & Pekrun, 2011).

Perceived quality is as vital as self-assessment for evaluating students' standards of work, efficacy, accuracy, and analysis (Aminu et al., 2021; Yan et al., 2023). These two constructs motivate student satisfaction, motivation, and engagement (Joksimović et al., 2018). Perceived learning and perceived quality are variables that help explain ownership, along with feedback, providing a fuller picture of collaborative learning experiences.

Research Gap

There is extensive literature on collaboration, feedback, and ownership, but few studies integrate these variables into a single framework for education. Öztürk et al. (2025) found that online peer feedback positively influenced students' self-regulated learning, with experimental group students achieving higher levels

than those in the control group. Similarly, Durak and Arslantaş (2025) reported that socially shared metacognitive (SSM) support in online and flipped classrooms increased group metacognition, cohesion, belonging, and motivation.

Gal and Ryder (2025) found that collaborative learning enhances students' participation, enjoyment, comprehension, and interest, while also reducing anxiety and providing immediate peer feedback. While their study focused on students with special needs, these findings highlight the broader benefits of collaborative approaches, including supporting diverse learning needs and promoting engagement factors that are relevant to general higher education settings.

Oyarzun et al. (2025) highlighted that online collaborative group activities, including group size, formation, duration, and activity type, affect teaching and social presence. They also found that these factors influence students' perceptions of effectiveness. Gorham et al. (2025) showed that a mobile microlearning app improved students' peer and internal feedback skills, particularly benefiting those with initially lower performance in a communicative EFL speaking activity.

Despite these findings, the literature often studies cognitive, social, or affective factors independently, rather than examining the interplay between them. Also, there is limited research on teacher and peer feedback on psychological ownership, perceived learning, and perceived quality in a project-based setting.

Significance of the Study

This research emphasises the pedagogical importance of understanding the interplay between psychological ownership, feedback, and perceived quality in shaping students' learning experiences within collaborative environments. While many studies focus on how collaborative learning improves social and cognitive outcomes, there is limited research on the emotional effects resulting from external feedback and shared authorship, especially regarding their influence on students' sense of ownership and participation. By examining teacher and peer feedback facilitated through cloud-based platforms, this study demonstrates how collaboration and feedback can enhance learning quality and challenge the concept of individual ownership. The results offer valuable guidance for teachers and curriculum developers to create collaborative projects with feedback strategies that balance teamwork and individual contribution, fostering motivation, accountability, and emotional engagement among students.

RESEARCH METHOD

Research Design

This study employed a within-subjects repeated measures design involving two sequential feedback interventions. All participants completed the same collaborative project and received peer feedback during the peer discussion,

followed by teacher feedback one week later. Using the same participants for both interventions minimised errors from between-subject differences, but the fixed order may have influenced outcomes. Receiving peer feedback first could have shaped how students interpreted later teacher guidance (van Zundert et al., 2010), while teacher feedback in the second stage may have carried disproportionate weight (Nicol & Macfarlane-Dick, 2006). If the order had been reversed, students might have relied more heavily on teacher input and undervalued peer contributions (Cho & MacArthur, 2010). Although this limits the ability to isolate the effects of each feedback source, the sequence reflects typical educational practice (Carless & Boud, 2018), and a one-week interval helped reduce immediate carryover effects.

Participants

This study involved 132 students enrolled in a pre-university programme at a Malaysian private university. The participants, aged between 17 and 21, represented a mix of genders and were predominantly Malaysian. Their participation provided insights into how young adult learners experience collaborative learning, particularly in literature-based project tasks that involve multiple stages of group interaction and feedback.

Procedure

At the beginning of the assignment, students were given a list of literary texts to read in advance and were asked to select a text that interested them. Students were then grouped according to their chosen text and similar interests. The assignment was scaffolded in a project-based manner, consisting of two stages.

In the first stage, students worked in groups and shared their work on a Google document. They then completed an analysis worksheet on Google Docs, which received feedback from peers and the teacher.

In the second stage, students used another document, a planner, to delegate their parts and activities for the literature presentation. After the planning and delegation, students worked on their scripts and slides. Class time was given for discussion and practice for the final presentation, which was a video recording. At the end of the assignment, students submitted their video presentations, which were graded using a rubric with sub-scores for individual roles and overall group performance. The individual component included delivery, language, individual contribution and conduct. The group component was assessed based on understanding and interpretation, appreciation of the writer's choices, and the structure of the presentation. A team of language experts developed and validated the rubric for a Foundation Year programme. The scores of all 132 students were assessed by eight teachers, all of whom held degrees in Teaching English to Speakers of Other Languages. To ensure fairness and accuracy, the performance

grading was moderated by cross-checking 15% of the students' final performances. The inter-rater reliability score was above 90%.

Instruments

The measurement for perceived psychological ownership in this study was adopted from Caspi and Blau (2011). Items in the questionnaire are presented on a 5-point Likert scale, accompanied by a qualitative question. The items for perceived psychological ownership were classified into two groups and two subsets to measure perceived psychological ownership from peer discussion and teacher feedback. The two subsets were to acknowledge a measure of the student's analysis, as mine, and be responsible for their own analysis. The student learning outcome is measured by the perceived quality and perceived learning (cognitive and emotional).

Perceived Psychological Ownership

Perceived psychological ownership explored how strongly students felt the analysis was "theirs" and how responsible they felt for the final output. This was examined in two contexts: before and after peer discussions, and before and after teacher feedback. Students responded to items about their sense of ownership and accountability, providing insight into how external influences affected their connection to the work.

Perceived Quality

Students were asked to evaluate the quality of their group's analysis. Items focused on how good, comprehensive, accurate, and detailed the work felt to them. These evaluations captured the students' perceptions of how collaboration and feedback contributed to the depth and precision of their final analysis.

Perceived Learning

Perceived learning was captured through two dimensions: cognitive and emotional. The cognitive component assessed students' perceived gains in knowledge and analytical skills. The emotional component addressed how students felt during the learning process, whether they enjoyed it, found it frustrating, or felt personally fulfilled. Together, these dimensions helped illuminate the full spectrum of learning during the assignment.

Student Performance/ Grades

The student's collaborative work is assessed with 15 marks for individual performance (language and delivery) based on a recorded video presenting the students' analysis of the chosen literature and their individual contribution and conduct to the group. An additional 15 marks were awarded for a group performance based on the quality of analysis and structure. Participants have

generally demonstrated good collaborative skills and achieved satisfactory performance in the assessment, with an average of 28.18 and a standard deviation of 1.85. The minimum score was 23.

RESULTS

Descriptive Summary

The Cronbach's alpha coefficients for the constructs ranged from 0.615 to 0.853. Indicating acceptable to high levels of internal consistency. In social science research, values above 0.6 are generally considered acceptable for construct reliability, especially when the study involves complex or multidimensional measures (Malhotra & Dash, 2016).

The questionnaire measured three primary constructs: perceived psychological ownership, perceived quality, and perceived learning, which were further divided into cognitive and emotional dimensions. The perceived psychological ownership construct consisted of nine items designed to capture students' sense of personal responsibility and connection to their work at various stages of the collaborative process. Items were framed to assess ownership before and after peer discussion and teacher feedback. Generally, students reported a higher sense of ownership and responsibility before peer discussion and teacher feedback (e.g., "Before peer group discussion, I feel I am responsible for my analysis," $M = 4.31$, $SD = 0.75$) compared to after these collaborative inputs (e.g., "After discussion and getting feedback from the teacher, I feel that my analysis is mine, even if others contributed to its development," $M = 3.07$, $SD = 0.94$). This suggests a possible diffusion of ownership when external contributions are introduced.

Table 1: Questionnaire Items and Descriptive Statistics

Construct	Item	Mean	SD	Cronbach's Alpha
Perceived Psychological Ownership	Before getting feedback from the teacher, I feel that my analysis is mine	3.86	0.89	0.615
	Before getting feedback from the teacher, I feel I am responsible for my analysis	4.27	0.71	
	Before peer group discussion, I feel I am responsible for my analysis	4.31	0.75	0.665
	Before the peer group discussion, I feel that my analysis is mine	3.94	0.92	
	After getting feedback from the teacher, I feel that my analysis is mine	3.44	0.86	0.7

	After getting feedback from the teacher, I feel I am responsible for my analysis	3.92	0.92	
	After discussion and getting feedback from the teacher, I feel that my analysis is mine, even if others contributed to its development	3.07	0.94	
	After peer group discussion, I feel that my analysis is mine	3.40	0.85	0.734
	After peer group discussion, I feel I am responsible for my analysis	3.93	0.92	
Perceived Quality	To what extent is your analysis of good quality	3.76	0.67	
	To what extent is your analysis comprehensive	3.77	0.70	0.832
	To what extent is your analysis precise/exact	3.72	0.69	
	To what extent is your analysis extensive (with sufficient elaboration)	3.83	0.73	
Perceived Learning (Cognitive)	After this experience, I know more things	4.33	0.70	
	After this experience, I know how to analyse a text	4.28	0.69	
	After this experience, my prior knowledge of literature analysis improved	4.26	0.69	0.853
	After this experience, I clearly understand the text and how to analyse it	4.27	0.79	
Perceived Learning (Emotional)	I enjoyed the experience	4.25	0.80	
	I loved the experience	4.05	0.89	
	I suffered from the experience (reversed)	2.39	1.22	0.731
	The experience annoyed me (reversed)	2.08	1.13	

Note. This table presents descriptive statistics for the questionnaire items used to assess the study's key constructs.

The perceived quality construct was measured using four items evaluating students' judgments of their analytical work. These included assessments of overall quality, comprehensiveness, precision, and elaboration. Responses indicated a moderate to high level of perceived quality, with means ranging from 3.72 to 3.83,

suggesting that students generally felt confident about the standard of their group's analysis.

The cognitive aspect of perceived learning was assessed using four items that reflected students' self-reported learning gains from the collaborative experience. Students strongly agreed with statements such as "After this experience, I know how to analyse a text" ($M = 4.28$, $SD = 0.69$), indicating a clear perception of academic skill development.

The emotional aspect of perceived learning included two positively framed and two negatively framed items. Students generally reported positive emotional experiences (e.g., "I enjoyed the experience," $M = 4.25$, $SD = 0.80$), and lower agreement with negative items (e.g., "The experience annoyed me," $M = 2.08$, $SD = 1.13$), suggesting an overall favourable emotional response to the collaborative project.

These items provided a comprehensive understanding of how students perceived their role, learning, and emotional engagement within a collaborative learning context.

Perceived Psychological Ownership

The perceived psychological ownership is measured after receiving the teacher's feedback and after a peer discussion. Two measures were used to elicit information on the teacher's feedback.

The first measure, '*Before Teacher's Feedback',* assessed perceived psychological ownership before receiving feedback from the teacher. Two items that are highly correlated, "Before getting feedback from the teacher, I feel that my analysis is mine" and "Before getting feedback from the teacher, I feel I am responsible for my analysis", are averaged to obtain the score. ($r=0.615$, $p<0.001$). The second measure, '*After Teacher's Feedback',* assessed perceived psychological ownership after receiving feedback from the teacher. This measure consisted of three items that were significantly correlated with each other, with a Cronbach's alpha of 0.7. The three items were "After getting feedback from the teacher, I feel that my analysis is mine", "After getting feedback from the teacher, I feel I am responsible for my analysis" and "After discussion and getting feedback from the teacher, I feel that my analysis is mine, even if others contributed to its development".

The two measures that were taken to elicit information from peer discussion are perceived ownership *before the peer discussion* and perceived psychological ownership *after the peer discussion before peer discussion* was measured by the average of two significantly correlated items ("Before peer group discussion, I feel that my analysis is mine' and "Before peer group discussion, I feel I am responsible for my analysis", $r=0.665$, $p<0.001$). *After peer discussion* Perceived psychological ownership after the peer discussion was measured by the average of three significantly correlated items with a Cronbach's alpha of 0.734

("After peer group discussion, I feel that my analysis is mine", "After peer group discussion, I feel I am responsible for my analysis" and "After discussion and getting feedback from the teacher, I feel that my analysis is mine, even if others contributed to its development").

Perceived Quality

The perceived quality was measured by the average of items ("To what extent is your analysis of good quality?", "To what extent is your analysis comprehensive?" "To what extent is your analysis precise/exact?" and "To what extent is your analysis extensive (with sufficient elaboration)?". The reliability of these items was strong, with a Cronbach's Alpha of 0.832.

Perceived Learning

Cognitive aspect: The cognitive aspect of perceived learning was measured by the average of four items ("After this experience, I know more things", "After this experience, I know how to analyse a text", "After this experience, my prior knowledge of literature analysis improved" and "After this experience, I clearly understand the text and how to analyse it"). The reliability of these items was strong, with a Cronbach's Alpha of 0.853.

Emotional aspect: Four items were averaged to capture the emotional aspect of perceived learning, two of which were positive ("I enjoyed the experience" and "I loved the experience") while the other two were negative ("I suffered from the experience" and "The experience annoyed me"). To capture the averages accurately, the negative items were negated. The Cronbach's alpha of 0.731 for the emotional aspect of learning is achieved.

Student Performance/ Grades

The student's collaborative work is assessed with 15 marks for individual performance (language and delivery) from a recorded video presenting students' analysis of the chosen literature, and individual contribution and conduct to the group. Another 15 marks were awarded for a group performance on the quality of analysis and structure. Participants have generally demonstrated good collaborative skills and achieved satisfactory performance in the assessment, with an average of 28.18 and a standard deviation of 1.85. The minimum score was 23.

Changes in Perceived Psychological Ownership

Teacher Feedback: The students' perceived psychological ownership before the teacher's feedback (M=4.06, SD=0.719, Skewness = -0.339) and after the teacher's feedback (M = 3.47, SD = 0.718, skewness = 0.090) were tested using the Wilcoxon Signed Rank Test. Given that the skewness of the data suggested a non-normal distribution for the change in perceived psychological ownership, the non-parametric Wilcoxon Signed-Rank Test was employed to compare the scores

before and after feedback. The test indicated that the perceived psychological ownership after the teacher's feedback is statistically lower than before obtaining the teacher's feedback, $Z = -7.667$, $p < 0.005$.

Peer Discussion: Students perceived psychological ownership before ($M = 4.13$, $SD = 0.77$, Skewness = -0.742) and after ($M = 3.47$, $SD = 0.730$, Skewness = -0.118) peer discussion which was tested using the Wilcoxon Signed Rank Test also indicated that the perceived psychological ownership is statistically lower after the discussion, $Z = -7.346$, $p < 0.005$. Students may feel that the work is less of theirs as the revisions after the discussion are more of a team effort.

Teacher Feedback versus Peer Discussion: We investigated the change in perceived psychological ownership between teacher feedback ($M = -0.590$, $SD = 0.72$, skewness =-0.70) and peer discussion ($M = -0.659$, $SD = 0.72$, skewness = -0.171). The Wilcoxon Signed-Rank Test indicated that statistically, there is no difference in the change of perceived psychological ownership after the teachers' feedback or after the peer discussion ($Z=-1.60$, $p > 0.05$).

Relationship between perceived psychological ownership, perceived quality, and perceived learning.

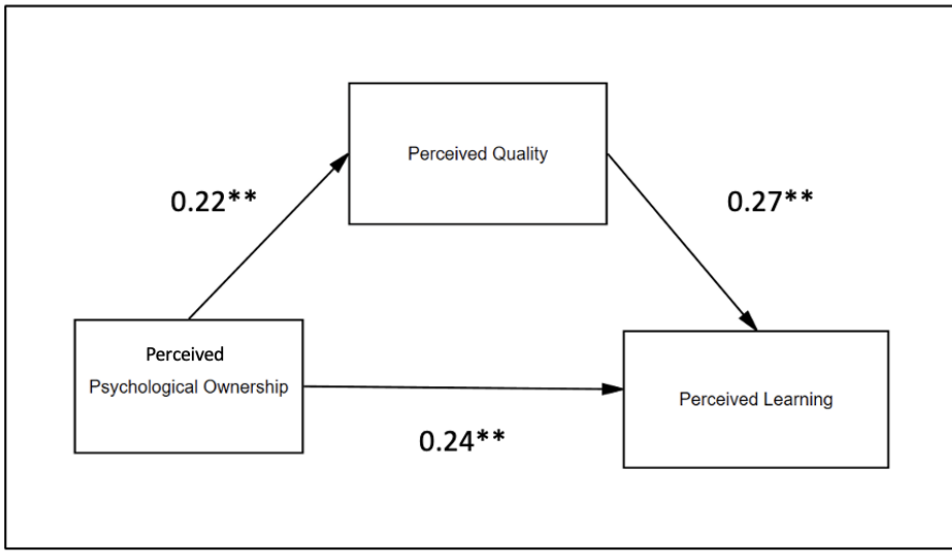
Perceived Learning Cognitive Aspect: The Pearson's correlation coefficient was used to examine the relationship between the perceived learning cognitive aspect ($M=4.38$, $SD=0.59$) and perceived psychological ownership. The results indicated a statistically significant positive correlation between the two variables, with a correlation coefficient of $r = 0.302$, $p < 0.05$. This suggests that there is a tendency for perceived cognitive learning to increase as the perceived psychological ownership score increases, and vice versa.

Perceived Learning Emotional Aspect: The relationship between the emotional aspect of perceived learning ($M = 3.95$, $SD = 0.76$) and perceived psychological ownership was tested using Pearson's correlation coefficient, $r = 0.071$, $p > 0.05$. This suggests that there is no statistically significant relationship between the emotional aspect of perceived learning and perceived ownership.

Perceived Learning: A significant difference between the cognitive and emotional aspects of perceived learning was found, $t(131, 1) = 5.206$, $p < 0.001$, with Pearson's correlation being significantly positive, $r = 0.448$, $p < 0.05$. Participants reported lower levels of emotional aspects of learning compared to their cognitive aspects. To investigate the relationship between perceived learning and perceived ownership, a model (shown in Figure 4) was proposed in which perceived quality mediates the relationship.

Perceived Quality: The relationship between perceived quality and perceived psychological ownership was tested using Pearson's correlation coefficient, $r = 0.219$, $p<0.05$. This indicates that there is a significant correlation between them.

Figure 2: The Mediating Effect of Perceived Quality on Perceived Psychological Ownership and Perceived Learning



The cognitive aspect of the perceived learning model fit is sufficient, RMR=0.057, GFI=0.912, AGFI = 0.825, RMSEA = 0.001. The mediation effect is statistically significant, suggesting that the mediation of perceived quality occurs between the relationship of perceived psychological ownership and perceived learning.

Table 2: Mediating Effect of Perceived Quality on the Relationship between Perceived Psychological Ownership and Perceived Learning

Relationship	Direct Effect	Indirect Effect	Confidence Interval		p-value
			Lower Bound	Upper Bound	
PO > PQ > PL	0.244***	0.06***	0.06	0.37	0.005

To test the mediating role of perceived quality, we examined: (a) the direct effect of psychological ownership on perceived learning (the c path), (b) the effect of psychological ownership on perceived quality (the a path), and (c) the effect of perceived quality on perceived learning while controlling for psychological ownership (the b path). The indirect effect was calculated as the product of the a and b paths. As both the direct effect (0.24, $p < 0.01$) and the indirect effect (0.06, $p < 0.01$) were significant, this indicates a partial mediation. The results revealed a significant indirect effect of psychological ownership on perceived learning, which was positive and statistically significant. Furthermore, the direct effect of psychological ownership on perceived learning in the mediator's presence was also

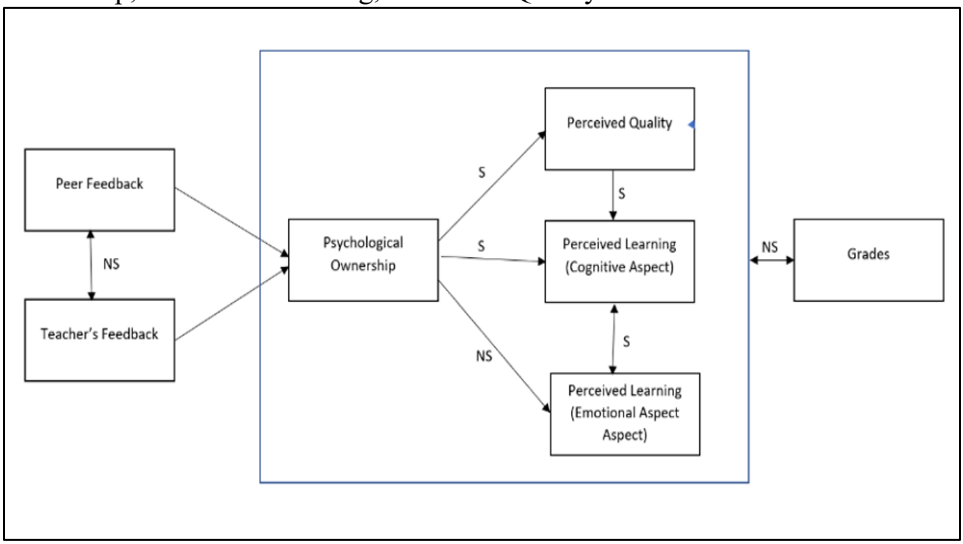
significant. Hence, the perceived quality partially mediated the relationship between psychological ownership and perceived learning.

Relationship between perceived ownership, perceived quality, perceived learning, and grades

The study further investigates the effect of psychological ownership, perceived quality, and perceived learning on grades.

Based on the correlation analysis, none of the predictors significantly impacts students' performance (grades). The central finding of this study is that both teacher and peer feedback, while perceived as beneficial to the quality of the work, significantly reduce a student's perceived psychological ownership. This suggests a critical paradox for educators - the very tools used to guide and improve student work may also be distancing students from it.

Figure 3: Overview of the Relationships between Perceived Psychological Ownership, Perceived Learning, Perceived Quality and Grades



Note: S Significant relationship, NS Insignificant relationship

Qualitative Analysis

The qualitative data provide a compelling explanation for this phenomenon. Students reported that after feedback, the work was no longer seen as 'mine' but as a collective effort - a 'shared responsibility'. While this is the goal of collaboration, it highlights the psychological cost of external input.

The respondent answered five (5) open-ended questions:

a. Out of the 97% of the respondents who provided feedback on "*Do you feel your analysis is less yours and you feel less responsible for it after peer*

group discussion? Why?", about 62% reported that the improvement from peer discussions was not seen as belonging to any individual but rather a result of the group's efforts for better outcomes.

b. Out of the 87.4% of the respondents who provided feedback on "Do you feel your analysis is less yours and you feel less responsible for it after teacher feedback? Why?", 47.5% reported that they have partial ownership of the work because the teacher's comments improved the original idea, which they are responsible for.

c. All respondents provided feedback on "How do you feel about the quality of your analysis and contribution after working on it as a group?" Most expressed satisfaction with the work's quality after receiving feedback from teachers and peers, and found working together to be fulfilling.

d. From the 81.5% of respondents who gave feedback on " What about learning to analyse literature has been effective for you as an individual, with peer group discussion, and teacher feedback?", 35.5% reported improving their analytical skills, and 27.1% reported learning from the feedback received.

e. The final open-ended question, "Share about your learning experience in learning as a group and with teacher feedback," received 134 responses. Most of the responses indicated a positive experience learning with peers regarding communication and enjoyable learning. Some responses were positive about teacher feedback regarding its role in providing guidance and instructions.

Based on the transcript analysis, the major themes identified were quality evaluation, diversity and teachers' guidance.

1. Responses related to quality were as follows:

   "I feel that the quality would improve because of cross-checking and giving opinions on weaker details of the other group members."

   "The quality of my analysis increases. The reason is that everyone contributes a little and comes out with the final analysis. Everyone will make mistakes, and group members can help to correct each other's mistakes."

"There is an adjustment to the analysis as different ideas are fused to give a better overview"

"... Although some of the ideas were initially mine, my peers and the teacher contributed to helping me develop the idea into something more solid; therefore, I feel that it is a shared responsibility and ownership."

"...I also don't feel less responsible after peer group discussion because it is also my responsibility to complete my work; the feedback and suggestions I received from peer group discussions are beneficial to me and crucial for me to reorganise my thought process to improve my work."

"...After peer group discussion, I realise there are mistakes and will need to redo the analysis to make it more suitable."

"...there is an adjustment to the analysis as different ideas are fused to give a better overview"

"After peer group discussion, I feel my analysis is still mine but less mine. However, I am still responsible for it. Because after the discussion, my analysis, which did not really match, was corrected by my team members, and I also helped to correct others' analyses to make our analysis stronger and relevant."

2. For diversity of ideas and opinion, the following are a few of the responses:

"I feel happy and satisfied with the quality of my analysis and contribution after working on it as a group. The whole group managed to complete the analysis swiftly and successfully because everyone contributed and raised different points of view, which complement one another"

"I felt that there would be an increase in accuracy in our analysis as a group because there are four ideas compared to one of mine, so it comes with all sorts, which I am willing to accept."
"I feel like the group project would end up being diverse and an amalgamate of ideas from various people"
"Good, this is because we can compare and combine our information and opinions after working and discussing as a group. For example, we combined our themes to form a theme that can cover the whole story.

Hence, it allows us to ensure the quality of the work is good and reduce the mistakes."

"I definitely feel more confident in my analysis after working on it as a group, as by that time, I would've gotten my team member's opinion and critique on my work, giving me feedback and possibly a new angle of seeing things/my work when I would not have seen otherwise."

3. Participants' responses to the teacher's guidance are as follows:

"…teacher's feedback helps us to know that we are on the right track."

"The teacher's feedback was effective, as it has been useful for learning to refine and narrow my analysis to be more straightforward."

"Teacher feedback provides a more seasoned, professional opinion on the analysis, pointing out objective strengths and flaws of the analysis."

Similarly, in peer group discussion, when it comes to the teacher's feedback, there would be changes in my own analysis as I may feel that I should add some points or change them. Thus, my final analysis does consist of some of my teacher's ideas and point of view, which I feel makes my analysis better."

Since the teacher has given feedback on it, I'll make relevant changes according to the feedback. After the changes, the analysis combines my opinion and the teacher's idea."

"Yes, to a minor extent, the teacher corrected some of it, gave advice on a better context to talk about, therefore contributing to my analysis and influencing the final product"

"Usually, the teacher will pinpoint your errors, and it's more of a rectifying process which follows. You will still need to be responsible when fixing the errors correctly and verifying them for yourself. I believe this reduces your responsibility by a tiny bit, as you'll still need to understand where you went wrong and try identifying some mistakes your teacher missed out on."

This is a crucial finding, as it suggests that the psychological and perceptual benefits of collaborative learning operate independently of traditional

performance metrics. It cautions against over-reliance on grades as the sole indicator of successful learning and highlights the importance of fostering a sense of ownership and perceived learning for their intrinsic benefits (Caspi & Blau, 2008).

DISCUSSION AND CONCLUSIONS

This study examined the impact of collaborative work on perceived psychological ownership. It explored the potential trade-off between collaboration and perceived ownership, specifically examining the influence of perceived quality, perceived learning in the emotional aspect and perceived learning in the cognitive aspect.

Despite causing lower perceived psychological ownership, peer feedback (from peer discussion) and teacher feedback were not found to be statistically significant. This finding challenges the perception of Caspi and Blau (2011), who deem perceived ownership to be the lowest for comments from supervisors compared to peers. The participants in this study believed that collaboration enhanced their analysis. They valued the support and input of group members to elevate the value of their results through group evaluation of individual contributions and diverse opinions. Teacher feedback was seen as essential for guidance and correction to enhance the group's collective analysis prior to the final presentation.

Contrary to Caspi and Blau (2011), this study did not find a statistically significant difference between the impact of teacher and peer feedback on perceived psychological ownership. This could be due to the scaffolded nature of the project, where teacher feedback was presented as a supportive guide rather than a purely evaluative judgment. The qualitative findings support this, with students viewing teacher feedback as a way to get "on the right track".

The results yielded a statistically significant positive indirect effect of perceived psychological ownership on perceived learning, with perceived quality as the mediating variable. Moreover, a statistically significant direct effect of perceived psychological ownership on perceived learning was observed, even when controlling for the mediator. These findings support the conclusion that perceived quality partially mediates the relationship between perceived psychological ownership and perceived learning. This implies that while perceived learning has both cognitive and emotional aspects, evidence suggests that they are independent (Caspi & Blau, 2011).

The study also considers another variable, performance, which is represented by the grades received for the project, in its model. Notably, neither perceived psychological ownership, perceived quality, nor perceived learning had a significant impact on students' final grades.

This study provides unique insights into the dynamics of collaborative learning by examining the interplay between peer feedback (during peer

discussion) and teacher feedback, as well as the impact on perceived psychological ownership, perceived learning, and perceived quality. Prior research on psychological ownership has predominantly focused on organisational settings or other pedagogical approaches such as collaborative writing and experiential learning (Caspi & Blau, 2011, 2008; Cocieru et al., 2021). However, this investigation specifically explored these variables within the context of structured, scaffolded collaborative projects with distinct phases of peer and teacher feedback.

Findings indicate that peer discussion and teacher feedback reduce perceived psychological ownership in project collaboration. Nonetheless, from the open-ended question, participants reported valuing the combined ideas and diverse perspectives generated through these interactions, leading to an enhanced perception of work quality. While perceived quality directly influenced perceived psychological ownership, it also mediated between perceived psychological ownership and cognitive learning. An interesting observation was the independent operation of cognitive and emotional aspects of perceived learning, with only cognitive learning showing a positive correlation with perceived psychological ownership. The relationship between student performance (as measured by grades) and other variables remained inconclusive, suggesting that pre-existing skills or other unmeasured factors may be more influential in determining academic outcomes.

Several limitations are acknowledged. A primary limitation is the demographic homogeneity of participants, primarily pre-university students aged 17-21, which restricts the generalisability of findings to other age groups or educational levels. In addition, this study is limited by the relatively small sample size and reliance on a single higher learning institution. Data collection was also limited to a single point after the presentation. Future research could benefit from longitudinal data collection at multiple time points: before peer feedback, after peer and teacher feedback during the drafting period, and after receiving final grades. This would provide a more detailed understanding of how individual ownership evolves throughout the collaborative process, potentially capturing individual and shared group results. Positioning research in this way would establish a clearer roadmap for deepening knowledge of ownership dynamics in collaborative learning contexts.

In practice, these findings underscore the importance of designing collaborative learning environments that effectively leverage peer and teacher feedback without compromising students' sense of individual ownership.

IMPLICATIONS

The findings of this study provide valuable insights for teachers, instructional designers, and future researchers. For teachers, it highlights the importance of teacher training that moves beyond evaluative roles toward facilitative approaches.

Training should prepare teachers to scaffold collaboration, while students develop their agency and perceived ownership in collaborative learning by co-constructing knowledge, negotiating meaning, providing thoughtful feedback and taking shared responsibility for outcomes. They should foster clear opportunities for individual contributions and collective discussion, ensuring that students perceive feedback as enhancing the overall project quality rather than diminishing their personal input. Explicitly emphasising the value of diverse perspectives and facilitating constructive improvement-focused discussions may be beneficial. At the policy level, this underscores the need for professional development frameworks that equip teachers with collaborative pedagogical strategies, moving beyond traditional performance-driven evaluation. In addition,

For instructional designers, it is recommended that digital collaborative learning platforms be designed to make contributions visible, enable peer acknowledgement, and integrate collaborative reflection tools. Such initiatives not only align with twenty-first-century skills but also carry cross-cultural relevance, as they support diverse learners in contexts where collective responsibility, peer learning, and shared ownership are valued, thereby enriching both the cognitive and emotional dimensions of learning.

For future researchers, a multilevel modelling approach is recommended to account for the nested structure of data (classes and individual participants) and repeated measures. Such an approach would allow for a more detailed examination of individual, group, and class-level effects, potentially revealing more profound insights into the dynamics of collaborative learning. Exploring specific feedback types (e.g., constructive, critical, informational) and their differential impact on ownership and learning, as well as the role of technology, such as shared cloud platforms, are also valuable avenues for future investigation. These efforts can further refine pedagogical practices and optimise the collaborative learning experience.

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