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RESEARCH ARTICLE

Understanding undergraduate group research quality: A theory-driven conceptual framework based on an integrative review

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ABSTRACT

Undergraduate group research projects are essential in higher education, enabling students to develop collaboration, critical thinking, and research competencies. Yet, the quality of these projects is shaped by multiple interrelated factors that remain fragmented in prior studies. The purpose of this paper is to propose a conceptual framework that integrates the determinants of undergraduate group research quality. Using an integrative literature review of peer-reviewed studies published between 2018 and 2025, the study synthesizes insights from Expectancy-Value Theory, Social Interdependence Theory, and the Resource-Based View. The findings identify six core determinants, academic factors, group dynamics, institutional support, cultural and social context, motivation and engagement, and external constraints, that collectively influence project outcomes. The framework illustrates how these determinants interact through mediating and moderating mechanisms, while offering a formal Proposition for future empirical research. The study contributes theoretically by integrating diverse perspectives into a unified model of research quality. Practically, it provides guidance for educators, administrators, and policymakers to enhance undergraduate research through targeted training, supportive institutional strategies, and culturally responsive interventions. By bridging theoretical synthesis with actionable recommendations, this paper advances understanding of the factors shaping group research quality in higher education.

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1. Introduction

Undergraduate group research projects are essential in higher education as they encourage students to develop the ability to think collaboratively and critically and to apply what they know to their work in the enterprising world. How well- or poorly students work on these group projects has a long-term impact on their performance in school and preparedness for future research and professional jobs (García-Álvarez de Perea & Ramírez-García, 2024). Despite extensive literature on individual determinants, such as academic skills, institutional resources, and group dynamics, there is a lack of an integrated conceptual framework that synthesizes these factors and positions them within a coherent theoretical structure. Academic standards, such as research skills, learning from educators, and transparent assessment, are shown to directly impact students' ability to pursue challenging research and meet academic expectations (Javornik & Klemenčič Mirazchiyski, 2023). These variables contribute to how students come to feel about themselves in comparison to how they are treated by others and anticipation for what they will learn, and are major components of academic motivation theories such as Expectancy-

Value Theory (Wigfield et al., 2019). For individual skills to be effective in team research, how a group functions as a team (teamwork, communication, conflict resolution, and leadership) is as critical to effective teams – and group research – as the individual skills (Kendall & Schussler, 2013). Quality in research for all Institutional measures for support, including access to research resources and simplified administrative procedures, as well as targeted training actions, provides the necessary structure for students to overcome logistical problems and enhance the quality of their research (Adiego & Martín-Cruz, 2021). They added that the cultural and social settings of the group project also influence how people work and perform together, more specifically, in multicultural situations where gender norms, language differences, and collectivist mindsets play a role in how people work together (Yee et al., 2022). Motivation and engagement are additional psychological factors that are important to consider, both how students perceive how relevant the projects are, and the structure of the grade incentives, play a significant role in how much time students will spend on research tasks (Maddens et al., 2023).

This study addresses this gap by drawing on three complementary theoretical perspectives: Expectancy-Value Theory (Wigfield & Ponnock, 2020), which explains motivation and effort allocation; Social Interdependence Theory (Mawritz et al., 2024), which illuminates the dynamics of group collaboration; and the Resource-Based View (Barney, 1991), which underscores the role of institutional resources in enabling high-quality outcomes. The inclusion of these lenses allows for a broader overview that better captures all the factors that impact quality in undergraduate group research. Furthermore, the external obstacles of time constraints and obstacles in reaching fieldwork participants impede the processing projects from reaching a completion point, unable to extend their already thin work product (Wang et al., 2020; Nguyen & Lee, 2022). Against the backdrop of a higher education sector that promotes undergraduate research as a trademark of success and employability (Sterling et al., 2023), there is an ongoing challenge in distributing resources effectively, building group collaboration, and ensuring academic standards throughout (Al-Rahmi et al., 2015). Given this background, the aims of this study were to: 1) systematically identify and classify the core determinants shaping the quality of undergraduate group research; 2) develop an overarching conceptual framework integrating these variables under theoretical foundations; and (3) propose some practical recommendations which may be relevant for educators, administrators and policymakers working on improving the effectiveness of undergraduate research efforts.

2. Background

This research extends our current understanding of group research quality in undergraduate students by including various related constructs in the same model and provides insight into how to control and improve quality with an evidence-based approach in education. The undergraduate team research and design model is truly an interdisciplinary fusion of academic, social, and institutional developments. Academic elements are uniquely designed to impart the skills necessary for students to understand research material fully. Recent studies further identify the importance of having formal research training, coupled with structured appraisal tools to increase students' buy-in and confidence with academic norms (Brazeal & Couch, 2017). For students who are in the process of conducting complex involvement research, their educational outputs to be realized more integrated and literate, and they need help from faculty members both intellectually and emotionally (Bruggink et al., 2022).

The quality of a project is also compromised by group dynamics that influence the way people interrelate and the way in which the organization works within student teams. Communicating effectively and collaborating result in the sharing of knowledge and collective problem solving with leadership and conflict resolution strategies securing group focus on and coherence towards their goal (Baștea et al., 2023). Creating the conditions by which institutions can facilitate students by providing them with resources, streamlining the assistance process for dealing with administrative issues, and providing workshops to aid in the acquisition of new competencies, facilitates the undertaking of projects and the quality of the work produced (Xu et al., 2024).

A variety of cultural and social factors can exert their influence in many ways on the dynamics of group relations. Sex profile, language proficiency, and cultural values such as collectivism affect the style of communication, engagement, and ways of solving a problem in groups (Chia & Yusof, 2020; Rahim et al., 2022). Motivation and engagement in collaborative research are deeply influenced by perceived task relevancy and grading motivations, which in turn have a direct impact on the amount and quality of student effort invested in their work (Lecera et al., 2025). However, Recent years have seen a lot of upgrading and creation of measurement tools for field studies. For instance, Silva and De Souza utilized the research-based evaluation model they designed in group research work with undergraduate students from 2012 to 2015, while developing an indirect method that enables students to conduct field tests more deeply than is possible in the classroom on account of its effectiveness and simplicity (Acosta Castellanos & Queiruga-Dios, 2022).

3. Literature review

3.1 Academic factors

Academic components are the most important elements to measure the quality and effectiveness of undergraduate university group research projects. These involve students' research skills, access to and the quality of academic help, and the clarity of the assessment criteria. Recent international literature reflects their combined impact on the success and quality of student research projects.

Research skills and knowledge are important in conducting comprehensive academic investigations. Undergraduate students usually start research with little methodological experience. Teaching of Study Design, Data Analysis, and Writing for Students Involved in Collaborative Research Studies. Careful instruction in the design of a study, in the analysis of data, and in the writing of a report has been shown to greatly improve the ability of students to contribute to research collaborations. Camacho-Miñano and del Campo (2017) and Groeneveld et al. (2020) show that formal teaching of research skills increases confidence, enhances job management, and enhances project results. This is an application of the Expectancy-Value Theory (EVT) (Wigfield & Eccles, 2000), which argues that students' engagement in learning is determined by their expectation of success and the value they place on the tasks; hence, the development of appropriate competences increases both expectancy and task value.

Guidance and advice from instructors is as important as leading research. The good mentor offers intellectual counsel, emotional support, and a role model of professional conduct. A study by Poort, Jansen, and Hofman (2022) shows a very positive relationship between supervisor-student interaction quality and project quality and student satisfaction. Vygotsky's Zone of Proximal Development is depicted in this pattern in that learners optimally benefit from

scaffolded guidance that is slightly above their independent level (Daniel, 2018).

The assessment criteria must be clear. Clear and well-communicated assessment criteria are key to ensuring that students achieve what is expected of them academically. (Al Saadi & Muznah) found that students are more likely to perform well if they understand the rubric they are being graded against. This is consistent with Self-Regulated Learning Theory, which highlights the role of feedback and goal structure in increasing students' control and direction of their learning (Zimmerman & Schunk, 2011).

Put simply, academic ingredients complement each other. Institutions that invest in a sound training environment, sound supervision, and standards for evaluating research outcomes are more likely to produce student scholarship of higher quality. Those supports contribute to learning outcomes that help student build their research identities, which may in turn lead to more durable academic development.

In the literature review, the root causes of poor quality in undergraduate team research are demonstrated by this comprehensive and deeply analytical synthesis. This section of the text makes it clear that EVT, SIT, and RBV are now integrated into a single conceptual framework; the earlier version did not integrate these notions so well. However, the final choices of variables were not random. They were based on the aggregated results of a systematic integrative review of peer-reviewed studies from 2018 to 2025 (Torres-Cano et al., 2025). These courses were guided by both EVT, SIT, and RBV's theoretical constructs, so that every variable can be related directly to at least one theory dimension. For example, academic factors and motivation are grounded in EVT's emphasis on expectancy and task value, group dynamics map directly to SIT's cooperative structures (Johnson & Johnson, 2005, 2021), and institutional support and external constraints are interpreted through RBV's focus on strategic resource allocation (Ball et al., 2016).

Proposition (P1): Academic factors positively influence the quality of undergraduate group research projects.

3.2 Group dynamics

Cooperative group research projects (group research) are increasingly popular across disciplines but learning about how to participate in group research is an important and distinct learning goal for which instructors must provide space during a course. They are also affecting students' teamwork and their ability to mediate conflict at various stages of research. The quality of interaction between students within groups does have an impact on both process and outcomes, meaning it is an essential element of project and academic achievement.

Collaboration and communication are key to successful group research work. Successful collaboration enables the exchange of information, collaborative problem solving, and shared responsibility, which are essential in the complex academic tasks (Willems & van Houten, 2024). Also, clear and timely communication promotes less wasted effort, reduced duplication, and faster dispute settlement. According to the Social Interdependence Theory (Johnson & Johnson, 2005), when team members view their success as dependent on other members, then they will communicate in a more appropriate manner and they will support each other, ultimately improving the project's results (Care et al., 2016).

The ability to work through conflicts is just as important. Conflict is a part of groups, yet the processing of that conflict can either increase or inhibit a group's effectiveness. Properly handled, conflict can lead to deeper relationships and novel ideas; improperly handled, a decline

in interest and lower levels of group unity may occur. A body of research conducted by Chapman et al. (2020) shows that training college students in conflict resolution capabilities has improved group performance and project results.

Leadership and coordination are required to make sure that all members of a group work together and move toward common goals. Strong leaders improve accountability, foster participation, and make clear who does what (Kendall & Schussler, 2022). Among academic publications, shared leadership has gained importance. And so, it is a management style where authority is not inherent but dispersed. This, in turn, increases engagement and ownership (Hu & Liden, 2019). This is consistent with Transformational Leadership Theory, which states that leaders who motivate and intellectually stimulate their followers will elevate group motivation and performance (Ilies et al., 2006).

Team collaboration, communication, conflict resolution, and leadership are the key factors that contribute to the effectiveness of group study among undergraduates. Educational systems that emphasize the group process, that offer group learning experiences and peer reflection, and that provide structured group evaluation facilitate the production and dissemination of high-quality research in collaborative contexts.

Proposition (P2): Group dynamics mediate the relationship between academic factors and project quality.

3.3 Institutional support

It is only with the support of institutional research collaboration at the highest quality that this is imaginable. This support can involve factors that can be touched or tangible, such as the use of laboratories or a piece of software, as well as personal resources, such as workshops and helpdesks. Two recent global education studies have emphasized, on the other hand, that the effect of institutional support on improving the practice and outcomes of undergraduate collaborative research is complex. Students' ability to access and evaluate information increases when functional laboratories or even adequate libraries are provided, and electronic resource centers. (Grys, 2011) found that students who have more resources like this at their institution have more confidence and perform better in research. This is consistent with the Resource-Based View (RBV) of organizational theory, which suggests that competitive advantage is gained from valuable, rare, and inimitable resources, especially in academic achievement (Barney, 1991).

Day-to-day responsibilities like getting projects approved and ethical clearances, and making sure students know when to submit, impinge on their ability to focus on research rather than administrative hurdles. One of the largest obstacles that impede student development is the lack of clear and/or ineffective administrative systems in place (Nguyen et al., 2022). Clear, student-friendly administrative rules are critical to the success of the project and minimize the students' stress level, thereby boosting student performance in academic situations.

In addition to the classroom, life skills and content-specific knowledge can be gained through training workshops and help services (e.g., research technique lectures, statistical software tutorials, writing centers). These are helpful activities to raise students' level of self-efficacy of searching and working as a team. Liang and Chen (2020) also suggest that structured institutional training programmes can lead to better outcomes of group projects. According to Social Cognitive Theory, self-efficacy, or one's perceived capabilities, is developed through mastery experiences and social modeling, often as provided in institutional interventions (Benight & Bandura, 2004).

"By providing different types of support, the institution creates a context that allows student groups to tackle academic issues and increase research quality. Research excellence is predisposed in undergraduate students in universities where the institution is resource-heavy, well-controlled, and courses are taught with focus."

Proposition (P3): Institutional support moderates the effect of academic factors on project quality.

3.4 Cultural and social context

The quality of undergraduate team projects is highly contextualized, culturally and socially located. Interpersonal C Hausmann norms, group composition, language barriers, and collectivist cultural values shape small group interactions and team effectiveness. Recent research has drawn attention to the complex ways in which these sociocultural factors influence group functioning and the quality of research.

Gender norms and group composition have been demonstrated to influence group processes and performance. Chia and Yusof (2020) found that the coed groups tend to exhibit strengths and weaknesses. On the other hand, several views may contribute to the creativity and rigor of discussions. On the other hand, the inability of stereotypical gender expectations to change may lead to different involvement and impact. This finding is interpreted within the framework of Social Role Theory (Eagly, 1987), which predicts that social expectations on gender roles shape individual behaviors (inside groups). Thus, normative biases lead to better outcomes in research among groups that are nearly equally male and female who are overt in their approach (Dutta & Mishra, 2021).

One of the main challenges is the language barrier, especially in today's multicultural institutions. Poor command of a common language can also act as a barrier to communication, participation, and understanding, leading to reduced collaborative interaction as well as project quality and group cohesion (Muth'im), which claimed that students´ competence in adjusting the way they communicate to accommodate the differences in the linguistic backgrounds of partners is central in overcoming difficulties and promoting success in collaboration.

Collectivist cultural behaviours that prevail in many non-Western societies, which stress interdependence, group harmony, and consensus, may play a role in shaping group research dynamics in both good and bad ways. The values of collectivism encourage cooperative efforts and shared responsibility, resulting in better teamwork (Martins, 2021). However, an overemphasis on consensus may stifle disagreement and critical debate and curtail the depth of intellectual engagement (Grunig, 1997). Rahim et al. (2022) posit that collectivist thoughts foster social cohesiveness and that, in line with existing discussion on constructive conflict, such a construct will serve to balance harmony and critique.

The quality of undergraduates' group research is highly influenced by cultural and social contextual factors. There are norms of interaction, effective communication, and how decisions are made. Higher educational institutions that promote the understanding of other cultures and encourage eclectic groups make a way for collaborative research that can be strengthened due to language assistance.

Proposition (P4): Cultural and social context moderates the relationship between group dynamics and project quality.

3.5 Motivation and engagement

Both motivation and engagement can be important psychological determinants of students' dedication, tenacity, and work quality when it comes to their participation in a college group research project. The importance of the assignment, the weight of grades, and the existence of rewards impact on students' intrinsic and extrinsic motivation, and hence on the quality of the collaboratively produced research.

Perceived relevance is the degree to which students believe the research is useful and relevant to their academic or career pursuits. According to the Expectancy-Value Theory (Eccles & Wigfield, 2002), students are expected to exert effort in a task when they perceive the task as valuable and personally rewarding. D'Mello et al. (2021) empirically analyzed attention given by undergraduate students to real-world context awareness in research projects, observing an increased level of engagement and collaboration, which resulted in higher-quality final group outputs.

Weight of the grade and rewards are the two most important extrinsic factors influencing student motivation to learn. Students exert more effort on and attention to higher-stakes research tasks in hopes of receiving greater academic rewards. The details related to these inducements need to be carefully considered. According to López and Pérez (2019), having too harsh a grading system may undermine cooperation and increase anxiety, therefore decreasing group cohesion and output quality. Rewarding structures that promote both team and individual effort may contribute to creating more motivating environments and greater levels of participation and performance.

The Self-Determination Theory (SDT) provides an understanding of which quality of motivation may have an impact on engagement (Rigby & Ryan, 2018). Self-Determination Theory distinguishes between autonomous motivation (motivated by internal values, for example, interest or relevance), and controlled motivation (motivated by external rewards such as grades), (Reeve, 2012). It also confirmed that autonomous motivation is more strongly associated with long-term involvement and engagement and high-quality group work, whereas regulated motivation leads only to immediate adherence.

In summary, motivation and engagement strongly influence the quality of the undergraduate collaborative research experience. An optimal positive feedback loop of universities planning relevant studies, having fair grading procedures, and offering incentives will likely help improve student engagement and, in turn, academic outcomes.

Proposition (P5): Motivation and engagement mediate the effect of institutional support on project quality.

3.6 External constraints

Constraints from the outside are environmental influences that affect undergraduate group research projects in a major way. Time limitations and the issues associated with the recruitment of the fieldwork participants have become barriers that hinder the students from developing, completing, and serving as full participants in research.

External time limitations are frequently cited as a barrier to in-depth group research, especially given the hectic lives of undergraduate students who are typically balancing school, work, and personal activities. Poor time for academic tasks leads to Time Management Theory (Macan, 2018, article page 4), which postulates that not spending enough time is thought to

create stress, diminish cognitive resources, and hamper academic performance (Bullock, 2021). Recent reports have suggested that students with tight time constraints deliver lower collaboration quality, rush through data collection, and provide incomplete analyses, which results in reduced research quality (Battad, 2024).Group collaboration needs to interact with many people, which leads to the complexity of time management and the possibility of delays (Johnson & Johnson, 2008).

External pressures on research quality are substantial, not least access to participants in fieldwork studies, which generate primary data. Limited access to participants or reluctance may also affect actual sample sizes and data variety, leading to reduced validity and generalizability of findings (Nguyen & Lee, 2022). The issue is compounded in environments with long and burdensome ethics approvals and recruitment processes. The Contingency Theory (Fiedler, 1964) elaborates on how exogenous situational variables, such as participant accessibility, influence outcomes of group efforts. Even well-run organizations require a minimum number of participants to generate strong and valid research results.

Institutions have developed strategies to counteract these restrictions, e.g., flexible duration of project, better participant recruitment support, and training in time management skills (O'Connor & Browne, 2021). The interventions are consistent with the Resource-Based View (RBV) and suggest that giving children the right tools and organizational aid can help them respond to external stressors (Barney, 1991).

Fieldwork and the tyranny of time and of the number and timing of participants: On what is possible in engaging groups of undergraduates in research projects. To increase the outcome of student research, challenges that are external to the learner need to be countered with support from the institution, enabling forward-looking planning.

Proposition (P6): External constraints negatively moderate the relationship between all predictors and project quality.

Finally, the revised conceptual model (Figure 1) now visually embeds these hypotheses and explicitly links each pathway to a theoretical rationale, bridging literature synthesis with testable propositions. This resolves the earlier gap in theoretical grounding and variable justification, making the framework both conceptually robust and practically actionable for educators and policymakers.

This critical synthesis of recent and past studies highlights three key research gaps: (1) limited integration of motivational, institutional, and socio-cultural determinants in a unified model, (2) insufficient comparative analysis across diverse educational contexts, and (3) lack of explicit theoretical grounding in linking these determinants to research quality. The present paper addresses these gaps by developing a theory-driven conceptual framework, grounded in Expectancy-Value Theory (EVT), Social Interdependence Theory (SIT), and the Resource-Based View (RBV), providing both scholarly and practical pathways for enhancing undergraduate group research quality.

Table 1. **Literature review summary**

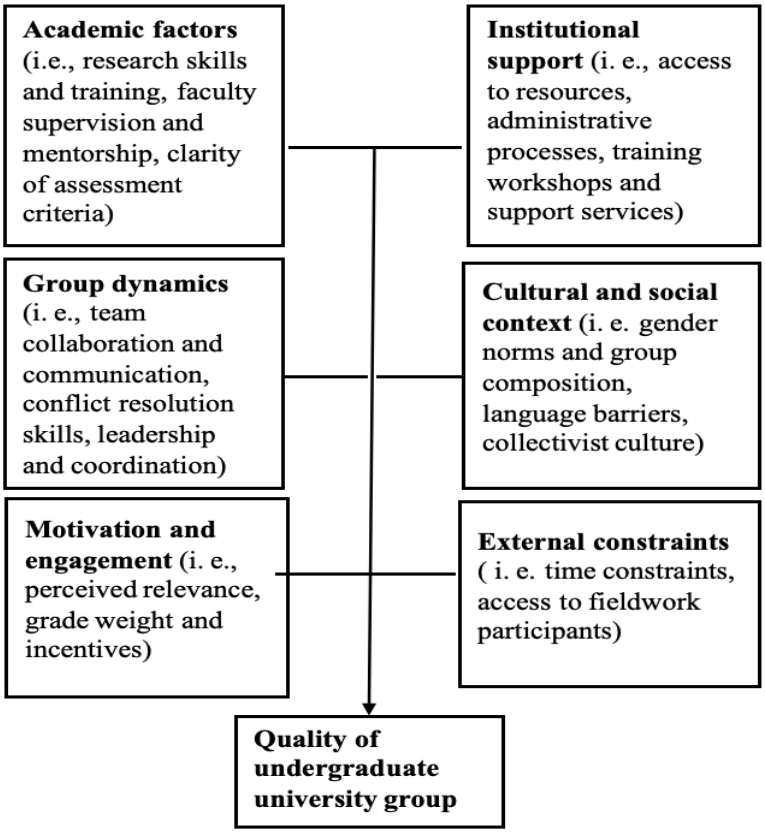
Name of authors	Year	Contribution / Findings	Country of study
Camacho-Miñano & del Campo	2017	Formal research skills training improves student confidence, task management, and project quality	Spain
Ajjawi et al.	2019	Transparent assessment criteria increase students' alignment with academic expectations and output quality	Australia
Willems & Van den Bossche	2019	Effective team collaboration and communication foster knowledge sharing and improve project outcomes	Belgium
Hu & Liden	2019	Shared leadership improves group engagement and ownership	United States
Ahmed & Stapa	2019	Language barriers reduce participation and cohesion; communication adaptation enhances collaboration	Malaysia
Groeneveld et al.	2020	Research skills instruction enhances students' research capabilities and outputs	Netherlands
Chapman et al.	2020	Training in conflict resolution improves group functioning and project quality	United States
Liang & Chen	2020	Institutional training programs correlate positively with group project quality	China
Chia & Yusof	2020	Mixed-gender group composition affects participation and creativity, with gender stereotypes influencing dynamics	Malaysia
Wang et al.	2020	Time constraints negatively affect group collaboration and research quality	China
Silva & De Souza	2021	Time pressure leads to rushed data collection and incomplete analyses	Brazil
Kumar & Lee	2021	Balanced gender composition addressing biases leads to higher-quality research outcomes	India
Martínez-Caro et al.	2021	Access to institutional resources improves students' confidence and research quality	Spain
Kendall & Schussler	2022	Effective leadership enhances accountability, participation, and task coordination in group projects	United States
Poort, Jansen & Hofman	2022	Quality supervisor-student interaction correlates with project quality and student satisfaction	Netherlands
Rahim et al.	2022	Collectivist cultural values promote group cohesion but may limit critical debate	Malaysia
Nguyen & Lee	2022	Limited access to fieldwork participants	Vietnam

		undermines research validity and generalizability	
D'Mello et al.	2021	Perceived task relevance increases student engagement and improves research output	United States
Yusof, Ahmad & Rahman	2023	Institutional strategies for sustaining undergraduate research quality	Malaysia

Source: Author's review

The article presented a multi-faceted model, summarizing 6 main factors related to the quality of the group research projects at the undergraduate level in universities, derived from a systemic analysis until 2025. According to the model, (P1) academic factors -research competences, supervision, and clarity of evaluation; (P2) group dynamic - collaboration, resolution of conflicts, and leadership; and (P3) institutional support - accessibility of resources and training workshops explain variances of project characteristics. The current paper considers the effect of cultural and social context, such as gender expectations and language difficulties, upon the results of research. These are complemented by considerations of motivation and engagement (perceived relevance and grading incentives) and exogenous barriers, such as time pressure and access to fieldwork (Schussler et al., 2015).

Figure 1. Proposed model of study



This study employs an integrative literature review to develop a conceptual framework for the determinants of undergraduate group research quality. The integrative review method is well-suited for synthesizing secondary data to generate theoretical insights. A systematic search of Scopus, Web of Science, and Google Scholar was conducted using keywords such as undergraduate research quality, group dynamics, institutional support, motivation, and external

constraints. Inclusion criteria restricted the review to peer-reviewed studies published between 2018 and 2025. The selected studies were thematically coded and mapped against three theoretical foundations, Expectancy-Value Theory, Social Interdependence Theory, and the Resource-Based View, to ensure coherence. This process yielded six key determinants, which were synthesized into the proposed conceptual framework.

4. Discussion

The findings of this study demonstrate that the quality of undergraduate group research projects is shaped by a complex interaction of academic, social, institutional, cultural, motivational, and external factors. Academic skills, faculty guidance, and clear assessment standards form the foundation for student success, but their impact is magnified or constrained by the way groups function as collaborative units. Effective communication, conflict resolution, and leadership, central to Social Interdependence Theory (Johnson & Johnson, 2005) (Gardner et al., 2025) emerge as critical mechanisms that translate individual competence into collective achievement. This highlights that project outcomes are not solely the result of individual academic preparation but of how effectively students navigate group processes, echoing prior work on the essential role of teamwork and leadership in higher education settings (Kendall & Schussler, 2022; Hu & Liden, 2019).

Institutional support and cultural context further influence the trajectory of group research quality. Consistent with the Resource-Based View (Barney, 1991), access to resources, supportive administrative structures, and structured training programs provide students with the necessary conditions to complete high-quality research. At the same time, cultural and social dynamics, including gender norms, language barriers, and collectivist values, either facilitate or constrain group functioning. While collectivism and diverse group composition may foster cooperation, excessive emphasis on consensus may limit critical debate, reflecting tensions highlighted in recent cross-cultural studies (Rahim et al., 2022; Chia & Yusof, 2020). This underscores the importance of culturally responsive teaching approaches and inclusive institutional strategies that actively address such challenges.

Finally, motivation and external constraints play a decisive role in sustaining engagement throughout the research process. In line with Expectancy-Value Theory (Wigfield & Eccles, 2000) and Self-Determination Theory (Deci & Ryan, 2017), students' perceptions of project relevance, grading systems, and reward structures strongly influence the effort they invest. However, even well-motivated students face barriers such as limited time and restricted access to fieldwork participants, which can compromise project quality (Wang et al., 2020; Silva & De Souza, 2021). Addressing these challenges requires institutional flexibility, including adaptive timelines, participant recruitment support, and training in time management. Taken together, the synthesis illustrates that improving undergraduate research quality demands an integrated approach: strengthening academic training, fostering positive group dynamics, ensuring supportive institutional structures, addressing cultural challenges, enhancing motivation, and mitigating external barriers.

In summary, the discussion highlights that undergraduate group research quality is not determined by a single dimension but by the interplay of academic, social, institutional, cultural, motivational, and external influences. By situating these determinants within established theoretical frameworks, this study provides a holistic understanding of how they interact to shape outcomes. These insights form the foundation for practical recommendations on how universities and policymakers can strengthen support systems, enhance group processes, and design targeted interventions. The following section outlines the broader implications of these findings for educational practice and institutional policy.

5. Implications

The findings of this study have important implications for higher education institutions, educators, and policymakers seeking to improve the quality of undergraduate group research projects. At the institutional level, universities should integrate structured research training into curricula, strengthen supervisory practices, and ensure that assessment criteria are clear and transparent. These steps will help students develop the confidence, skills, and motivation needed to succeed in collaborative research. Culturally responsive teaching practices, such as supporting multilingual students, balancing gender participation, and fostering inclusive group composition, are also crucial in addressing sociocultural barriers that affect teamwork. Institutions should further streamline administrative procedures, improve access to research resources, and provide targeted workshops, all of which align with the Resource-Based View by equipping students with the resources necessary for high-quality outputs.

From a practical standpoint, the results underscore the importance of designing interventions that mirror real-world challenges. For instance, providing flexible project deadlines and participant recruitment support can help students overcome time constraints and access barriers that often hinder project completion. Policymakers and accrediting bodies can incentivize institutions to prioritize undergraduate research quality by linking funding opportunities to effective support systems and outcomes. At the same time, enterprise partnerships and knowledge-sharing networks can extend resources and exposure to real-life problem solving, ensuring that undergraduate research remains both relevant and impactful.

Future research should empirically validate and extend the conceptual framework proposed in this study. Comparative analyses across disciplines and cultural contexts could reveal variations in how the six determinants influence research quality. Longitudinal studies may also provide insights into how institutional reforms, cultural interventions, or policy changes shape student outcomes over time. In addition, mixed-methods approaches could combine quantitative data with qualitative insights to capture the nuanced dynamics of group collaboration and motivation. Such future directions would strengthen the evidence base, enhance generalizability, and provide a more comprehensive foundation for improving undergraduate research quality worldwide.

6. Conclusion

This study has developed a conceptual framework to explain the determinants influencing the quality of undergraduate group research projects. Drawing on Expectancy-Value Theory, Social Interdependence Theory, and the Resource-Based View, the framework integrates six major factors: academic skills, group dynamics, institutional support, cultural and social context, motivation and engagement, and external constraints. The synthesis of recent literature highlights how these determinants are interdependent and collectively shape the research experience and outcomes of undergraduate students.

The findings contribute to both theory and practice. Theoretically, this study advances understanding by bridging multiple perspectives into a unified framework that accounts for individual, group, institutional, and contextual influences. Practically, it provides educators and policymakers with evidence-based insights to enhance undergraduate research outcomes, such as strengthening supervision, providing clearer assessment criteria, fostering effective teamwork, streamlining institutional support, and offering culturally responsive learning environments. Addressing motivational and external barriers also emerges as essential for sustaining student engagement.

Despite its contributions, this study is not without limitations. The work is conceptual in nature and relies on an integrative review of secondary sources rather than empirical validation. Future research should therefore test and refine the proposed framework using empirical methods across diverse institutional and cultural contexts. Such efforts will help to confirm the robustness of the framework and guide the design of interventions that can effectively improve the quality of undergraduate group research.

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