

Article

From Uncertainty to Confidence: Peer-Led Research and the Formation of Medical Academic Identity

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Abstract: Background: Undergraduate research is vital for developing critical thinking and academic identity in medical students, yet traditional models often fail to overcome institutional and personal barriers. Peer-led approaches may offer more accessible, supportive environments that promote deeper engagement and leadership in research. **Methods:** This study evaluated medical students' experiences in a peer-led research initiative from 2022 to 2024. Students were then invited to complete a qualitative questionnaire reflecting on their perceptions towards research, development in research skills, confidence, and academic identity. **Results:** Code saturation was achieved after 9 responses (N = 15). Participants reported intrinsic interest, peer encouragement, and opportunities to publish as motivating factors. The peer-led model made research feel more approachable, fostering technical growth and academic confidence. Peer mentorship and a gradual learning structure were especially valued. While challenges such as workload and team dynamics emerged, students reported growth in resilience and self-reflection. **Conclusions:** Peer-led research initiatives can effectively support academic identity formation by integrating motivation, support, and skill development. Despite obstacles, students gained competence and confidence.

Keywords: peer-led research; medical education; medical students; perceptions towards research; academic identity



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1. Introduction

Evidence-based medicine underpins safe, effective clinical practice [1]. To contribute meaningfully, future doctors need to engage in research from early stages of their career, acquiring skills in data analysis, literature review, and scientific writing, all of which are critical for clinical reasoning and academic success [2–5]. Beyond skill acquisition, early research involvement promotes confidence, shapes academic identity, and encourages long-term scholarly engagement [2–4,6–8].

Yet, traditional research opportunities are often misaligned with student needs, being limited in number, inflexible and with inconsistent mentorship [2,6,8–12]. Students are motivated by aspirations for career progression, academic curiosity, and contribution to evidence-based practice [2,4–6,9–12]. Research experience enhances critical thinking, improves postgraduate competitiveness, and builds publication records [2,4–6,9]. However, systemic barriers such as including limited formal training, lack of supervised projects, and rigid curricula impede participation. On a personal level, time constraints, lack of confidence, and limited access to mentorship also hinder early research involvement [2,4–6,10–12]. Peer-led models in medical education may provide the solution by creating collaborative, low-pressure environments where students can explore research. They

offer informal mentorship, demystify academic practices, and support skill-building. These models foster autonomy, belonging, and sustained interest in research [13,14]. Existing initiatives demonstrate this potential; Patel et al. [15] describe the A.S.P.I.R.E. programme, offering peer mentoring, journal clubs, and flexible project dashboards. The National Medical Research Association's Peer-Led Research Teaching Series combined peer and faculty input to improve research literacy among junior doctors [15]. Academic libraries have also facilitated experiential learning through peer-assisted research services [16]. Similarly, inclusive peer-support structures in higher education broaden student engagement [13,17]. However, these programmes mostly enhance literacy rather than enabling students to lead and publish research. There's a significant gap in literature on student-led, publication-oriented projects, especially in-depth insights, limiting our understanding of how such experiences contribute to research identity and sustained engagement.

This project aims to address this gap by exploring medical students' perceptions of a peer-led research initiative, to assess its effectiveness as an accessible and supportive model for developing research skills, confidence, and emerging academic identity.

2. Materials and Methods

Between 2022 and 2024, an annual open call each April invited all University of Malta medical students to participate in peer-led summer research projects, focusing on narrative or systematic reviews. This timing aligned with prior survey findings showing that students preferred to conduct elective research during July–September due to fewer academic demands [18].

Academic collaborators were recruited beforehand to mentor students, ensuring methodological rigour. Participants attended a May orientation session to familiarize themselves with the programme and a peer-led June workshop on research methodology and academic writing. From July to September, students conducted research with flexible, on-demand virtual mentorship via Messenger and WhatsApp.

Students were involved in all review stages, i.e., literature search, screening, data extraction, synthesis, and writing, except topic selection, which was decided with mentors. Manuscripts were drafted collaboratively, reviewed by mentors, then submitted for publication in a peer-reviewed journal or as an abstract as part of conference proceedings. Students participated in journal/conference submissions to gain experience with peer review, journal guidelines, and academic dissemination.

Evaluation of the peer-led initiative followed a qualitative questionnaire (Supplementary Material S1) designed to explore students' experiences and insights, as it is difficult to capture these aspects quantitatively [19–21]. The questionnaire drew on literature in undergraduate research, peer-assisted learning, and prior work on factors shaping research engagement [2,3,6–8,18,22–28]. Open-ended questions encouraged in-depth reflection [29]. To reduce social desirability, recall, and confirmation bias, as well as the Hawthorne effect, a written questionnaire replaced interviews [30]. The questionnaire was distributed in January 2025 through a closed Facebook group, and responses were analysed using grounded theory. Open coding identified concepts, and axial coding formed broader themes. Data collection continued until coding saturation, usually 6–12 participants in homogenous groups [31,32], which ensured sufficient information power [33]. Saturation was defined as the point where no new codes or themes emerged [31,33].

Analysis followed a constructivist lens, examining how students interpreted their experiences, developed research identities, and built confidence guided using grounded theory [34,35]. Thematic interconnections and pattern recognition were explored to obtain deeper insights and develop conceptual logic models on how peer-led research may contribute to the formation of participant's academic identity [36–39].

Reflexivity was maintained to ensure transparency and analytic rigour [40]. Ethical approval was obtained by the University of Malta Faculty Research and Ethics Committee (MED-2025-00065).

3. Results

Over three years, 15 students participated in a peer-led research initiative, producing five publications and six conference presentations [41–51]. The participating students were all Maltese, with the majority being clinical medical students. Open coding of nine participant responses yielded 102 codes, grouped into 23 axial codes and eight overarching themes (Table 1). The full list of open codes is provided in Supplementary Material S1. Participants were primarily motivated by intrinsic interest, peer influence, and the opportunity to publish. One student stated, “I was very intrigued to join the programme; I was not very informed, and peer support motivated me to venture into it.” Another shared, “Being student-led made it much less overwhelming to start learning all about research.”

Table 1. Themes, axials coding, and open codes reflecting medical students’ experiences in peer-led research.

Theme	Axial Code
Entry Points and Motivation	Motivation & Initial Engagement
	Expectations vs. Reality
Learning and Skill Development	Learning & Skill Acquisition
	Research Process & Methodology
	Critical Thinking & Appraisal
	Soft Skills & Communication
Growth in Research Confidence	Confidence & Personal Growth
	Emotional Experience & Perspective
	Process Familiarity & Efficiency
Mentorship and Peer Support	Mentorship & Support
	Teamwork & Collaboration
Research Challenges and Barriers	Challenges & Barriers
	Time & Task Management
	Realism & Limitations
	Ownership & Role Clarity
Research Outputs and Future Pathways	Publication & Output
	Professional Identity & Future Impact
	Foundation & Future Growth
Clinical Application and Relevance	Application to Clinical Practice
	Barriers to Application
Programme Design and Structure	Program Design & Delivery
	Active Participation
	Desire for Improvement

Motivation, support, and identity formation were noted to be interlinked across participant responses (Table 2). Students highlighted the programme’s clear structure and gradual progression. One participant noted, “This opportunity provided a structured

approach,” while others identified learning outcomes such as “methodology of research, time management, teamwork” and “the steps and practical skills on how a ‘lit’ review is carried out.” Another described the experience as “more hands-on than I expected, but that was good.” Patterns of learning and development were identified through thematic analysis (Table 3). The programme impacted participants’ confidence and self-perception. One participant stated, “Not as daunting as I thought, now seems more manageable,” while another commented, “It made me more comfortable and competent in taking part in research initiatives.” Mentorship was described as consistently available throughout the programme. One participant noted, “Mentorship was always available at every stage, making me more comfortable at everything I found difficult.” Others mentioned that while faculty involvement varied, peer mentorship was active and supportive: “Lecturers weren’t that involved in my case—but the involvement by students was quite effective.” Participants reported barriers including workload, time constraints, and unclear expectations. Team-related challenges included uneven contribution: “Other members not doing their work on time [...] more strict deadlines would help.” Some students described learning experiences even in the absence of clear outcomes: “It was a learning moment [...] identifying a pattern even when there was no concrete evidence.”

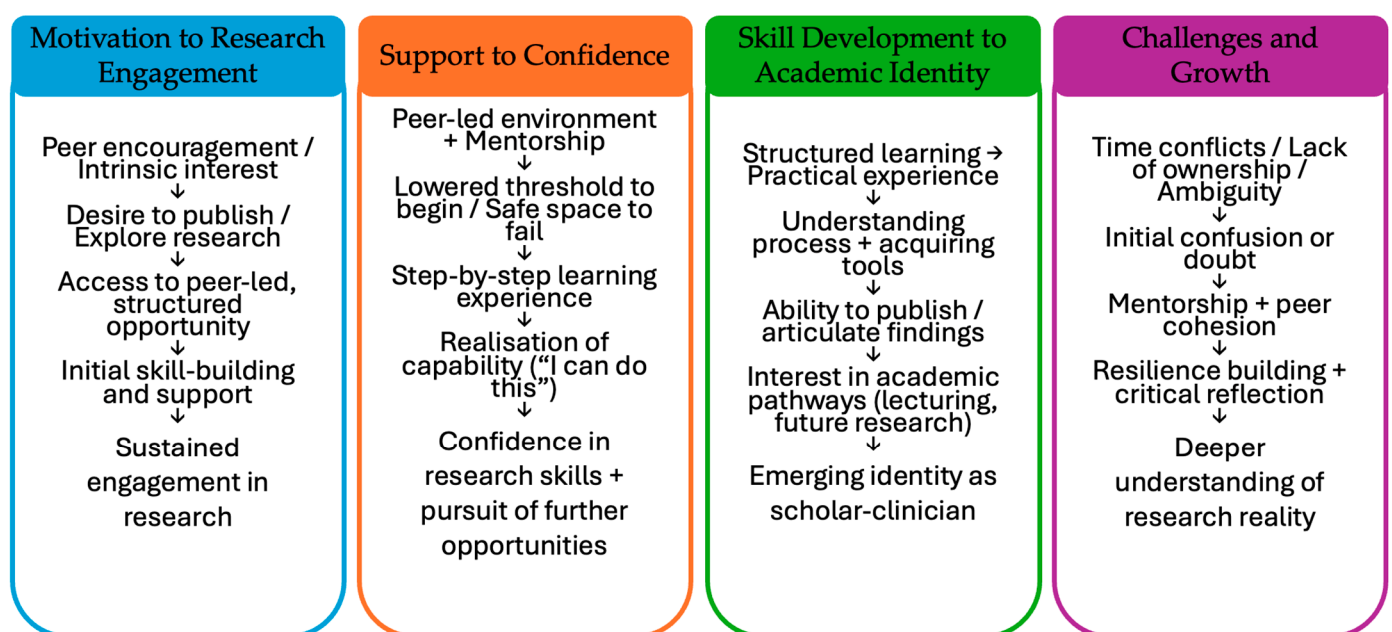
Table 2. Interrelationships Between Themes and Their Influence on Medical Students’ Research Engagement and Future Aspirations.

Interrelationship Between Themes	Interrelated Themes	Description of Relationship
Initial Motivations and Barriers	Entry points and motivation	Early uncertainties or interest (e.g., intrinsic motivation, peer encouragement) often set the stage for needing structured support, developing skills, and forming identity.
	Learning and Skill Development	
	Growth in Research Confidence	
	Mentorship and Peer Support	
Peer Support and Mentorship	Growth in Research Confidence	Mentorship helps participants translate motivation into confidence and aspiration. Peer-led nature also demystifies research.
	Research Output and Future pathways	
	Research Challenges and Barriers	
Skill Development and Process Learning	Growth in Research Confidence	Participants describe structured, practical learning experiences that enhance research literacy, which boosts self-belief and readiness to engage further.
	Research Identity	
	Research Challenges and Barriers	
Confidence and Identity Transformation	Research Challenges and Barriers	Increased confidence feeds directly into plans to publish more, explore academia, or apply research to clinical work.
	Clinical Application and Relevance	
Future Aspirations and Research Trajectory	Influenced by All Themes	Prior motivation, skill development, support, and confidence. Peer-led research may create a pipeline for academic/professional growth.

Table 3. Thematic patterns identified from participant reflections on a peer-led research programme.

Pattern	Description
Peer involvement reduces barriers	Students consistently felt more confident and less overwhelmed due to the peer-led nature.
Confidence is cumulative	Confidence did not emerge instantly. It built progressively through support, skill acquisition, and participation.
Mentorship multiplies impact	Participants who mentioned regular mentorship described more positive outcomes, smoother workflows, and deeper understanding.
Exposure shifts perceptions	Initial fear or confusion gave way to curiosity and even enjoyment—a powerful identity shift.
Tension between time and task	Several responses reflect struggles balancing the project with clinical/study commitments.
Desire for visibility/ownership	Some students wanted more holistic engagement and visibility into the whole process.

A logic model was developed to visualise proposed pathways between peer-led engagement and academic identity formation (Figure 1). Thematic analysis identified four developmental pathways: (1) Motivation to Research Engagement via peer support; (2) Support to Confidence through guided practice; (3) Skill Development to Academic Identity; and (4) Challenges and Growth.

**Figure 1.** Logic model illustrating hypothesising causal pathways through which the peer-led research programme influenced the formation of academic identity.

Thematic and axial coding were conducted through a constructivist lens. Participant responses were analysed iteratively to identify consistent patterns while maintaining analytic rigor.

4. Discussion

This study contributes to a growing body of literature highlighting the potential of peer-led research initiatives to foster early engagement, build academic identity, and scaffold research competencies among undergraduate students, shaping students' research journeys and identity trajectories.

4.1. Motivation and Peer Influence

Participants were primarily driven by a blend of intrinsic curiosity and peer influence. This supports existing research that emphasises the powerful role of social context in shaping academic engagement [14,15]. The majority of students entered the programme with limited prior exposure to research but were encouraged by peers who had already navigated this unfamiliar terrain. The student-led structure was particularly effective in lowering psychological barriers, as it allowed for a more relatable and less hierarchical introduction to research practices.

This sense of social validation and shared purpose highlights the unique dynamics of horizontal mentorship models, which contrast with more traditional, faculty-driven structures that can feel exclusionary or intimidating [52]. As reflected in international studies [16,17], peer networks not only motivate entry but also provide ongoing reinforcement, creating a sense of mutual accountability and belonging.

4.2. Structured Learning and Skill Development

A clear, scaffolded progression was a defining feature of the programme and a critical enabler of learning. Students described gaining essential research skills through a gradual, experiential process. Rather than relying solely on theoretical instruction, the programme integrated active, hands-on engagement with real research projects, which was both empowering and educational. This approach reflects pedagogical principles of constructive alignment, where learning outcomes, activities, and assessments are coherently integrated [53]. As prior literature suggests, scaffolded opportunities for authentic practice are essential in fostering not only technical competence but also confidence and autonomy [4,5].

4.3. Confidence and Identity Formation

One of the most transformative outcomes was the shift in students' academic self-concept. Many began the programme with apprehensions about their ability to contribute meaningfully to research. However, through repeated, supported exposure to research tasks, students reported significant increases in confidence and self-efficacy. This evolution reflects a redefinition of self, from passive learner to active contributor, marking a key milestone in academic identity formation. These findings align with conceptual frameworks that link early engagement and success in scholarly tasks to longer-term academic persistence and achievement [14,15]. Confidence, in this context, is not simply a byproduct of skill acquisition but a dynamic and cumulative construct shaped by meaningful participation, feedback, and reflection. As students increasingly saw themselves as capable and legitimate researchers, they also expressed heightened aspirations for future academic and professional development.

4.4. Role of Mentorship

Mentorship emerged as a foundational pillar of the programme. The consistent presence of peer mentors created a supportive environment conducive to risk-taking and growth. Peer mentorship offered not only technical guidance but also emotional reassurance, helping to normalise struggles and demystify academic norms. This model aligns

with contemporary understandings of distributed mentorship, where non-hierarchical, reciprocal relationships enhance learning and belonging [16,17]. By offering accessible, culturally proximate role models, peer mentorship bridged gaps in understanding and confidence that traditional structures may overlook. Importantly, the programme's emphasis on near-peer support illustrates how mentoring relationships themselves can be sites of identity development.

4.5. Navigating Challenges and Building Resilience

Despite overall positive outcomes, students faced a number of challenges, including time constraints, uneven group dynamics, and ambiguous expectations. Notably, these obstacles were not experienced as failures but as opportunities for reflection and adaptive learning. Participants often reframed difficulties as formative moments that built resilience and problem-solving capacity. This aligns with literature emphasising the pedagogical value of struggle, particularly when students are supported in reframing and learning from setbacks [4,5]. The capacity to persist through ambiguity and challenge is increasingly recognised as central to research readiness. Moreover, the students' reflective stance evidenced in their ability to articulate lessons learned from adversity indicates a mature, metacognitive engagement with the research process.

4.6. Conceptual Contributions

A key contribution of this study is the development of a conceptual model linking four developmental pathways (Figure 1). This model is grounded in constructivist theories of learning and identity, which suggest that individuals become part of academic communities not through transmission of knowledge alone but through meaningful participation in practice [54]. The pathways identified in this study offer a practical and theoretical framework for designing future programmes that seek to democratise access to research and support underrepresented students in navigating the transition from learner to scholar.

These findings suggest several significant long-term outcomes of such peer-led research initiatives. Primarily, by fostering initial engagement and making research more approachable, these programs likely lead to sustained involvement in research beyond the immediate program duration. The observed increase in student confidence and shift in self-perception from apprehension to competence also strongly suggest continued engagement and a greater willingness to pursue further research opportunities. Furthermore, the structured learning and skill development, coupled with publication opportunities, cultivate an interest in academic pathways, contributing to the formation of an emerging scholar-clinician identity. Even when facing challenges, students demonstrated enhanced resilience and critical reflection, essential qualities for navigating the complexities of long-term academic and clinical careers. The immediate academic output (publications and presentations) further underscores the program's effectiveness in generating tangible contributions, setting a precedent for continued scholarly input and accelerating the development of future clinician-academics.

4.7. Limitations and Future Directions

This study is subject to several limitations. The small sample size and specific target population may limit the generalisability of findings. Participants who opted into the programme and the subsequent evaluation may have had pre-existing interest or motivation towards research, introducing potential selection bias. Additionally, as the initiative was conducted within a single institution and cultural context, the findings may not be directly transferable to other medical education settings. The use of a written qualitative questionnaire, while reducing interviewer bias, may have constrained depth of responses

compared to interviews. Finally, self-reported reflections may be influenced by recall and social desirability biases.

Future research could focus on longitudinal studies to track the long-term academic and professional trajectories of students who participate in such programs, providing more robust evidence of their impact on career progression and sustained scholarly engagement. Additionally, exploring the optimal integration of peer-led models within diverse medical curricula and investigating the specific mechanisms through which peer mentorship fosters resilience and mitigates challenges would offer valuable insights for curriculum refinement.

5. Conclusions

The findings of this study point to the potential of peer-led research models to transform how undergraduate medical students access and experience research. By shifting away from traditional, top-down approaches, this model positions students not merely as passive recipients of knowledge but as active participants in scholarly work from the outset of their training. Peer-led research programmes create an environment where students can explore research meaningfully and sustainably, on their own terms. This approach offers a scalable, low-resource strategy to embed research engagement into medical curricula without overburdening faculty or institutional infrastructure. It holds promise for widening participation, especially among students who may not see themselves reflected in conventional academic pathways. Moreover, its emphasis on publication and dissemination introduces students to the full research cycle early in their career, potentially accelerating the development of future clinician-academics. The implications are far-reaching: Institutions that invest in peer-led initiatives stand to cultivate not only research skills, but also a culture of collaboration, curiosity, and academic confidence. As pressures mount for medical education to produce graduates who are research-literate and reflective practitioners, models like this provide a compelling, learner-centered framework that aligns with both educational and professional priorities.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/ime4020022/s1>, Document S1: Qualitative questionnaire and full list of open codes.

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