

Enhancing Academic Writing Proficiency in Universities Through Peer-Led Mentoring and Collaborative Workshops

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Abstract: Formal academic writing is an important component of being successful academically, and many college students struggle with adjusting to formal academic writing. The effectiveness of a two-fold intervention of peer-led mentoring and collaborative workshops in developing writing skills in undergraduate students will be analyzed in the paper. According to the theory of social constructivism, the study will focus on how these student-centered interventions contribute to the establishment of a positive interdependence atmosphere and metacognitive development. The necessary support structure is attained through peer mentoring that relieves academic anxiety and enables first-year students to transition more easily, and collaborative workshops that can offer a more practical and interactive experience where students can strip away myths about writing, including patchwriting. The existing empirical data analysis indicates that students participating in collaborative writing show a higher level of improvement in the quality of individual writing, self-efficacy, and scientific reasoning than those who work individually. Also, as the results indicate, peer-led models not only help the mentees but also the mentors, who are able to acquire high-level professional skills and interpersonal abilities. The shift in the conventional, instructor-centered pedagogies to the facilitator-based approach will help the universities to establish a continuous learning process that fosters diverse student populations. The article finds that an organized synergy between peer mentorship and collaborative practice is needed to create a strong culture of academic literacy. This cohesive model is a long-term sustainable approach of institutions to enhance student retention, well-being, and long-term academic performance.

Key Words: academic writing, peer mentoring, collaborative workshops, higher education, social learning, student transition

(Received: 14 December 2024; Revised: 21 January 2025; Accepted: 19 February 2025; Published: 31 March 2025)

Introduction

Acquiring competence in academic writing is a critical need to succeed in the global higher education environment. In addition to mere grammatical correctness, academic writing is a complicated mental process, an integration of information, critical analysis, and specific disciplinary standards. In the case of university students, clear and persuasive expression of complex ideas is not only a necessity to complete the course but also the main condition to be able to integrate and become a part of the wider scientific community. Nevertheless, there is still a big disparity between the writing requirements of post-secondary institutions and the real-life skills of incoming students.

The first issue is related to the transition period of first-year undergraduates who usually experience the shock of the shift of the secondary school-level discourse to the university-level discourse. This is often accompanied by the so-called writing anxiety when the academic self-efficacy is reduced due to the pressure to do well in the new genres. Literature has shown that this confusion frequently results in problematic writing practices, including patchwriting, i.e., copying a source text and making small deletions or replacements, frequently not due to intentional academic dishonesty but as a result of insecurity

or lack of knowledge (Hammersley et al., 2019). Unless these early challenges are addressed in a specific manner, this may result in academic disengagement and poor health in the long run.

Top-down, traditional models of instruction are frequently not adequate to respond to these subtle difficulties. As a reaction, higher education institutions are moving more and more towards social-constructivist pedagogies in which interaction with the student is the priority. In this respect, peer-led mentoring and joint workshops have proven to be an effective intervention. As compared to the traditional faculty-based teaching, peer mentoring builds on the near-peer relationship, in which more accomplished learners offer relatable advice, thus promoting a sense of belonging and encouraging a successful transition to higher education (Carragher & McGaughey, 2016). At the same time, the interactive aspect of collaborative workshops offers an opportunity to consider writing as a communal, and not a solitary, activity. Collective drafting and peer-reviewing compel students to outsource their thinking processes and thus give them greater metacognitive awareness. Not only do such interventions enhance the quality of technical writing, but also affect the psychological condition of the student, alleviating concern and boosting motivation (Muslim & Rohmah, 2022).

The purpose of this paper is to examine the interaction between the two strategies and how an integrated model of peer support and collaborative practice can consistently improve academic writing competence among diverse populations in universities.

The rest of the paper is structured as follows: Section II synthesizes current research about students moving academically to other levels; the metacognitive effects of working collaboratively on writing; how supporting one's classmates helps lessen anxiety associated with schoolwork. In Section III, we provide a theoretical basis for this study, focusing on how utilizing the facilitator model along with developing a sense of trust among peers creates metacognitive awareness and self-monitoring as they write. In Section IV, presents a system for putting into practice authentic workshop design and building support systems that utilize global cultural adaptability during multiple ongoing mentorship cycles. In Section V, we explore how social support and technology complement and interact with each other regarding both academic institutions' needs for sustainable support systems and the need for strong training of all facilitators. Section VI summarizes the social-constructivist approach to developing a sense of professional identity among graduates while simultaneously providing them the communication skills necessary to succeed in the 21st century workforce.

Literature Review

The success of these social learning paradigms has been well documented in higher education, more specifically with regard to the use of peer-led mentoring and collaborative-invention paradigms. In this section a synthesis of the literature is provided regarding student transitions, collaborative writing processes and the psychological effects of peer support.

Peer mentoring is a significant connection to the students who need to cope with the complexity of higher education. Topping (Hammersley et al., 2019) developed a typological background of peer tutoring with a focus on the flexibility and efficiency of peer tutoring at various levels of education. In the case of first-year undergraduates, their transition to university is usually accompanied by academic and social difficulties, yet formal peer mentoring schemes have been found to facilitate positive adaptation and feelings of belonging (Carragher & McGaughey, 2016). In addition to social integration, such programs have a direct effect on academic achievement and literacy (Scager et al., 2020). Recent research highlights

the importance of mentoring on student motivation and well-being, with a safe space being a key to academic development (Wood et al., 2018).

Group writing changes the emphasis from an individual struggle to a social process. Dobao (Yilmaz et al., 2022) proved that group work and pair work tends to have better results than individual writing activities. This advancement has been attributed to metacognitive development, as the learners will have to negotiate the meaning and express their linguistic decisions (Comfort & James McMahon, 2014). Moreover, collaborative work enables students to work with complicated archival evidence and interdisciplinary studies, and results in the writing process becoming more genuine and publication-worthy (Paulino et al., 2023). In the most specialized areas, collaborative writing can assist students in the transition between simple descriptions and sophisticated scientific arguments and logical modeling (van Mil et al., 2013). These advantages are carried over to the new virtual communities of practice in the modern digital world, where collaborative writing can lead students through collaborative knowledge construction (Neville, 1999).

Mechanical and ethical challenges are dealt with in specific workshops, especially those run by writing centers. As an example, the workshops devoted to the unmasking of the confusion of patchwriting give students the necessary empirical tools to uphold academic integrity (Dobao, 2012). The facilitator and his/her role in these environments is central; the shift in the model of teaching to a model of facilitator of problem-based learning will enable the students to become more engaged (Pham, 2023). Even institutional culture is a factor, as ongoing learning atmosphere promotes positive peer mentoring practices and permanent skills acquisition (Topping, 1996). The advantages of peer-led models are more than a paper. Integrative reviews show that peer mentoring can greatly lower stress and anxiety levels of students in high-pressure disciplines (Howell et al., 2024). There are also comparative studies that indicate that peer-led interventions may be more effective than conventional faculty mentoring in enhancing self-efficacy and clinical or academic comfort (Chen & Hapgood, 2021). More so, the near-peer tutors themselves benefit greatly in terms of professional and personal competency, indicating that these programs have reciprocal developmental advantages (Şahin et al., 2023). Global views affirm cross-cultural nature of these benefits but implementation has to be customized to match local institutional requirements (Kachaturroff et al., 2020).

Although much has been done on the overall advantages of peer mentoring and technical advantages of collaborative writing, there is a conspicuous gap in combined studies that investigate the synergy of peer-mentoring and collaborative workshops in particular on academic writing. The majority of literature considers mentoring a social support instrument and workshops as a stand-alone technical intervention. Little empirical work has examined the effect of a combined longitudinal model-setting, in which the mentor moderates the collaborative workshop, on improving the transition between undergraduate bewilderment and publishable research skills. Moreover, although the viability of peer-led models has been studied in the physical and clinical worlds, additional studies are necessary to record the particular paper flow and individual skill development in such a combined model in general university writing programs.

Theoretical Perspectives

The combination of peer-mentoring and collaborative workshops is based on a number of psychological and pedagogical theories. Such attitudes are what contribute to the conversion of social interaction to individual cognitive development and better writing skills.

Positive Interdependence

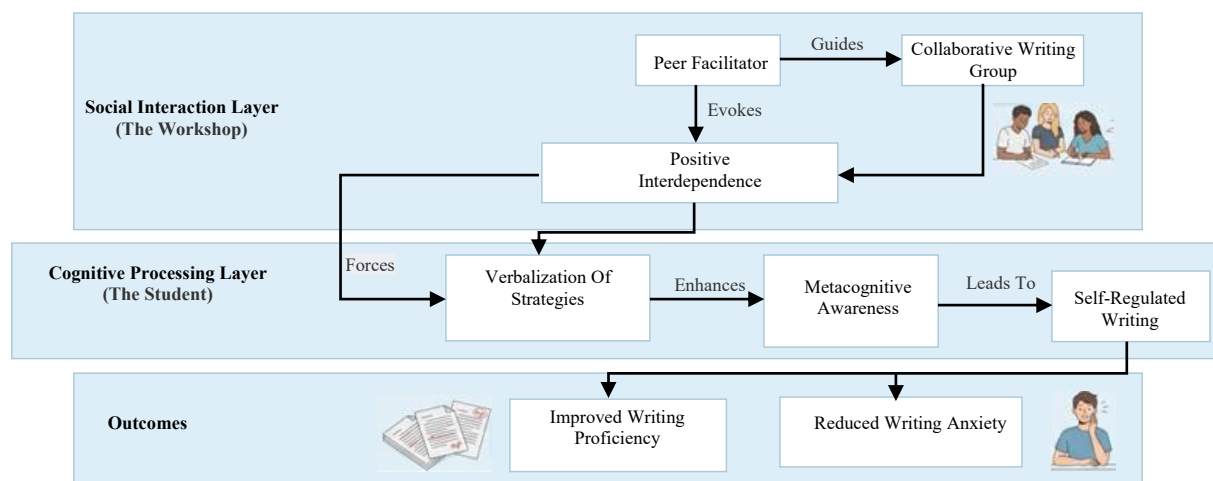
One of the key principles of effective collaborative writing is the notion of positive interdependence. Scager et al. (Alvarez & Schultz, 2019) suggest that positive interdependence happens when students believe that there is an association with other students in a way that the students cannot achieve success without their group members achieving theirs and vice versa. This establishes a special psychological impulse in the setting of academic writing workshops. In collaborative tasks, there must be a shared mental image of the writing objective, unlike in individual assignments, where the student is left alone with the sole responsibility of the assignment. Such dependence motivates students to give their best efforts, provide positive feedback, and work harder on the content because the success of the final text will be shared.

The Facilitator Framework

A redefinition of authority is needed as a teacher-centered model changes to a student-centered one. Neville (Pham, 2023) considers the task of the tutor, or in this instance, the peer mentor, not to be that of an instructor who gives answers, but as a facilitator. The peer mentor facilitates the process of problem-based learning, probing, group dynamics, and critical reflection. In acting as a facilitator, the mentor reduces the power distance that lies in conventional classrooms. The near-peer type of relationship enables the mentees to feel freer in acknowledging confusion, which is imperative to unmasking writing challenges such as patchwriting or structural anomalies.

Metacognition and Self-Regulation

Group writing is an effective trigger of metacognition. In their argument, Chen and Hapgood (Comfort & James McMahon, 2014) believe that students who write collaboratively are compelled to externalize their writing strategies. A student may be creative with the stylistic or structural decisions in a lonely environment, but in a workshop, it is required to explain their decisions to other students. This social negotiation compels students to keep a track of their writing, assess and control their writing in real time. The ability to explain their arguments transfers students out of passive writing towards a self-regulated set of writing in which students are consciously aware of how to build meaning and scientific arguments.



*Note: Figure 1 demonstrates the flow from the Facilitator Framework (Pham, 2023) through Positive Interdependence (Alvarez & Schultz, 2019) to the final state of Metacognitive Self-Regulation (Comfort & James McMahon, 2014).

Figure 1: The Social-Cognitive Framework of Peer-Led Writing Interventions

Figure 1 summarizes the working mechanism of peer-led writing interventions. It shows how a structured social setting affects personal mental processing and learning outcomes of students. It starts with

a peer facilitator (the mentor) who is also trained to lead and not to tell a group of writers how to collaboratively write. The arrangement intentionally brings up positive interdependence, a psychological concept that learners feel their personal success is unconditionally related to the success of the group. The interdependence among students requires students to voice their strategies for writing. In the course of collaborating, it must justify and defend their language choices, structural rationale, and evidence this chose to present; this verbalization of their thoughts enhances their own metacognitive awareness, which allows them to transition from an unstated, intuitive way of writing to a stated and intentful understanding of their writing. This increased metacognitive awareness results in self-regulated writing whereby students are able to monitor, evaluate, and alter their writing strategies in an independent manner. Two mutually beneficial outcomes that result from the framework will be: improved writing skills (measured by a clear increase in the quantity and quality of written work) and reduced writing anxiety (resulting in increased confidence and well-being of the writer).

Implementation Framework

In order for peer-to-peer mentoring and joint workshops to be effectively executed, it requires formalization from being an ad hoc to an institutionalized arrangement. The execution depends on the real task design, continuous sustainable learning environment and global and cultural flexible commitment to their delivery.

Workshop Design: Engaging Through Authenticity

The major drawback of old writing center models is the dependence on hypothetical prompts or emphasis on individual assignments once it has been completed. Proficiency can be effectively boosted by using real world, authentic academic tasks that will create intrinsic motivation in the workshops. According to Hammersley et al. (Paulino et al., 2023), an effective model of such involvement entails a number of essential elements. The workshops ought to be structured with a focus on the analysis and interpretation of already existing data, using archival data to have students actively create meaning based on evidence (Paulino et al., 2023), not merely practice writing. Production of a tangible, publishable manuscript (or substantial part thereof) should be the stated goal of the workshop. This increases the stakes of collaborative writing process and strengthens the role of scientific reasoning (Paulino et al., 2023; van Mil et al., 2013). The workshop facilitator in this structure is a senior editor or a project manager who leads various teams of peers who are writing. This resembles an academic Community of Practice, in which learners are introduced to the entire lifecycle of academic production (Neville, 1999). The workshops, by design, take students out of passive text-consumption state and into the active state of scientific and scholarly production; the writing is, not the goal of the intellectual work but the means.

Mentorship Cycles and Continuous Learning

Institutions need to introduce articulated Mentorship Cycles in order to transition to more sustained interventions and develop a sustainable culture of writing. These are not one-off training events but rather a process that goes on and on with students moving between being a novice mentee into a journeyman workshop participant and finally to an expert near-peer facilitator. To create a Continuous Learning Environment (Topping, 1996), this cyclical dynamic will require establishing an institution-wide comprehensive system. A continuous learning environment not only facilitates intrinsic development of mentoring behaviours, but also provides means to encourage and promote development through numerous components of the organization (for example, as well as being important, early stage mentoring is also crucial; older mentors require support to develop their skills further, including through reflectively

managing their practice); providing regular constructive feedback, such as through ratings provided by mentees of the clarity, accessibility and effectiveness of their mentoring for mentees in respect to every mentoring opportunity provided in workshops), and evaluating the data sets collected by the research from the participants regarding their experience in the mentoring programme, as this relates back to the mentoring framework. Finally, the organizational commitment to enable all of the above will ensure that the cyclical processes' effectiveness is maximized, and will enable writing centers to grow to become "machines" of producing academic literacy and developing leaders (Şahin et al., 2023).

Global and Cultural Adaptability

Academic writing and the peer support systems used to enable peer-to-peer support, are increasingly requiring that higher education institutions adopt a more diverse and more global concept of how it should function and develop their expectations regarding these systems. In order to make these programs effective and equitable, it needs to incorporate Global and Cultural Adaptability (Kachaturoff et al., 2020). The specifics of social and economic priorities of the various regions profoundly affect mentoring relationships (Kachaturoff et al., 2020).

Table 1: Systematized Implementation Framework for Peer-Led Writing Interventions

Implementation Component	Core Strategy / Focus	Key Actions and Characteristics
Workshop Design	Engaging through Authenticity	Rejects hypothetical prompts or completes assignments. Utilizes real-world academic tasks for intrinsic motivation. Analyzes and interprets existing archival data (Paulino et al., 2023). Focuses on producing a publishable manuscript, increasing stakes (Paulino et al., 2023; van Mil et al., 2013). Positions facilitator as senior editor/project manager (Neville, 1999). Guides students from passive text consumption to active scientific production.
Mentorship Cycles and Continuous Learning	Sustaining a Culture of Writing	Establishes articulated Mentorship Cycles (novice to expert) (Topping, 1996). Systems systematically stimulate the acquisition of mentoring behaviors (Topping, 1996). Refines mentoring through iterative training for senior mentors (Topping, 1996; Şahin et al., 2023). Incorporates embedded evaluation by mentees (Pham, 2023; Owen et al., 2018). Demands organizational dedication to back peer-led models (Topping, 1996). Transforms the writing center into an engine for building literacy (Şahin et al., 2023).
Global and Cultural Adaptability	Ensuring Effective and Equitable Programs	Rejects the one-size-fits-all method (Kachaturoff et al., 2020). Considers variables (educational systems, authority, conventions) (Kachaturoff et al., 2020). Accommodates Second Language (L2) students and respects first language skills (Comfort & James McMahon, 2014; Johannessen et al., 2012). Addresses cultural dissonance in the peer facilitator model (Pham, 2023). Suits particular university culture (resources, class size, priorities) (Topping, 1996; Kachaturoff et al., 2020). Ensures proficiency without erasing cultural/linguistic identity (Kachaturoff et al., 2020).

According to Johannessen et al. (Kachaturoff et al., 2020), effective models have to take into account a vast array of variables globally, regionally, and nationally. Students who come to the university with differing educational systems will all have different expectations on issues of authority, collaboration and

writing conventions, and need to know the various linguistic and educational backgrounds (Kachaturoff et al., 2020). One of the most crucial dilemmas is how to accommodate L2 (Second Language) students and respect their first language skills (Comfort & James McMahon, 2014; Johannessen et al., 2012). Moreover, the peer facilitator model, with less power distance, might be culturally dissonant with students with strong hierarchical educational histories, where mentors need to clearly address group expectations and cultural norms (Pham, 2023). Lastly, the effectiveness of mentoring and workshops usually relies on the suitability of the particular culture of the university, which can differ in terms of institutional structures such as resources, class size, and disciplinary priorities (Topping, 1996; Kachaturoff et al., 2020). Adaptability implies more than mere translations of materials. It demands cross-cultural competence on the mentor side, a belief in inclusive pedagogy in workshop design, and an awareness that in order to be proficient at academic discourse, the student needs to retain his/her own cultural and linguistic identity.

Table 1 introduces an implementation plan that will make ad-hoc peer mentoring a systematized university program by maximizing authentic workshop design, maintaining perpetual learning via mentorship cycles, and providing global and cultural adaptability.

Discussion

The combination of peer-based mentoring and group mentoring workshops within the university environment has shown that there is a deep level of synergy of both approaches as it goes beyond the ad-hoc support to an integrated, systemic learning approach. This paper will show that workshops equip the required mechanical, structural and logical tools to sound writing. As an example, unmasking the confusion of patchwriting (Wood et al., 2018) or creating publishable research with the help of archival data (Hammersley et al., 2019) workshops provide students with the technical side of scientific and academic thought (van Mil et al., 2013). Nevertheless, technical knowledge will not do. Peer mentoring establishes the vital social-constructivist "environment" of trust (Neville, 1999) and positive interdependence (Scager et al., 2020) necessary for students to effectively employ those tools. This balancing act enables the students to shift beyond surface-level corrections to modelling complicated intellectual explanations (van Mil et al., 2013; Şahin et al., 2023), thus successfully bridging the undergraduate perplexity-scholar expertise divide (Hammersley et al., 2019; Wood et al., 2018). To impact the institutions in the long term, it is important to address sustainability. Universities need to change the culture of ad-hoc support to specific mentorship cycles that are part of the institutional culture. A sustainable model is based on the process of moving older mentors to the role of developers of new peer facilitators to enable the development of a continuous learning environment that facilitates the development of both the mentor and the mentee (Howell et al., 2024). This organization enables sessions to prosper even with varying student enrolments (Topping, 1996). Moreover, to ensure viability and enhance global and cross-cultural flexibility, remote, virtual communities of practice can be employed by universities (Yilmaz et al., 2022; Johannessen et al., 2012), enhancing both accessibility and inclusion of diverse students. Lastly, it is crucial to deal with possible risks within the peer-led environment to ensure accuracy and academic rigor (Neville, 1999). In order to guarantee that near-peer guidance is also accurate (Alvarez & Schultz, 2019), programs should also have powerful facilitator-training pathways and built-in evaluation systems in which mentees are actively involved in evaluating the process of guidance (Neville, 1999). In such good management situations, peer-led mentoring networks are rather effective not only in high-pressure disciplines like nursing (Şahin et al., 2023; Kachaturoff et al., 2020) but also in the overall context of academic writing (Muslim & Rohmah, 2022; Pham, 2023).

Conclusion

The conclusion reached is that peer-led mentorship combined with collaborative workshops provides an extremely effective way to develop academic writing across the universities. This integrated social-constructivist method has been shown to connect the challenges faced by students with their academic success, by providing a rich combination of technical tools and a supportive social context. Rather than using a top-down faculty directed model, the approach is based on a dynamic near-peer facilitation and the construction of shared understanding, such as through metacognition and the self-regulated practice of writing. For these types of models to work, the institution must provide more than simply support mechanisms that are defined as remedial, but also provide institutionalized support in the form of peer mentoring networks. When viewed as an isolated skill, academic writing may be seen in terms of developing one's own cognitive and professional identity, whereas when academic writing is perceived as collaborative endeavours, it creates a foundation for providing the necessary support for a cognitive and professional identity to develop. Lifelong learning, gives the future work along with its concomitant evaluating and adapting to the cultural needs of the individual and institution, will be sustained in the form of academic literacy and will benefit both mentee and mentor. Finally, not only is creating a culture of collaboration in writing a way to get better marks, but it is also a way to equip the university graduate in the 21 st century with the tricky, conversational, and interpersonal challenges of professional communication.

References

- Alvarez, S., & Schultz, J. H. (2019). Professional and personal competency development in near-peer tutors of gross anatomy: A longitudinal mixed-methods study. *Anatomical sciences education*, 12(2), 129-137. <https://doi.org/10.1002/ase.1798>
- Carragher, J., & McGaughey, J. (2016). The effectiveness of peer mentoring in promoting a positive transition to higher education for first-year undergraduate students: a mixed methods systematic review protocol. *Systematic reviews*, 5(1), 68. <https://doi.org/10.1186/s13643-016-0245-1>
- Chen, W., & Hapgood, S. (2021). Understanding knowledge, participation and learning in L2 collaborative writing: A metacognitive theory perspective. *Language Teaching Research*, 25(2), 256-281. <https://doi.org/10.1177/1362168819837560>
- Comfort, P., & James McMahon, J. (2014). The effect of peer tutoring on academic achievement. *Journal of Applied Research in Higher Education*, 6(1), 168-175. <https://doi.org/10.1108/jarhe-06-2012-0017>
- Dobao, A. F. (2012). Collaborative writing tasks in the L2 classroom: Comparing group, pair, and individual work. *Journal of second language writing*, 21(1), 40-58. <https://doi.org/10.1016/j.jslw.2011.12.002>
- Hammersley, J. J., Waters, M. L., & Keefe, K. M. (2019). Use of peer mentoring, interdisciplinary collaboration, and archival datasets for engaging undergraduates in publishable research. *Frontiers in Psychology*, 10, 96. <https://doi.org/10.3389/fpsyg.2019.00096>
- Howell, J. L., Giuliano, T. A., & Hebl, W. I. (2024). Successfully publishing with undergraduate coauthors in psychology: Insights from faculty with top track records. *Collabra: Psychology*, 10(1), 94261. <https://doi.org/10.1525/collabra.94261>
- Johannessen, B., Unterreiner, A. M., Sitienei, I., & Zajda, J. (2012). Global and cross-cultural perspectives on mentoring in higher education. *Education and Society*, 30(2), 27-48. <https://doi.org/10.7459/es/30.2.03>

- Kachaturoff, M., Caboral-Stevens, M., Gee, M., & Lan, V. M. (2020). Effects of peer-mentoring on stress and anxiety levels of undergraduate nursing students: An integrative review. *Journal of Professional Nursing*, 36(4), 223-228. <https://doi.org/10.1016/j.profnurs.2019.12.007>
- Muslim, J., & Rohmah, G. N. (2022). Improving students writing skill by collaborative writing for students of XI IPA 2 in SMA Negeri 4 Kediri. *Wiralodra English Journal*, 6(1), 13-23. <https://doi.org/10.31943/wej.v6i1.150>
- Neville, A. J. (1999). The problem-based learning tutor: Teacher? Facilitator? Evaluator?. *Medical teacher*, 21(4), 393-401. <https://doi.org/10.1080/01421599979338>
- Owen, M. B., Kerner, C., Taylor, S. L., Noonan, R. J., Newson, L., Kosteli, M. C., ... & Fairclough, S. J. (2018). The feasibility of a novel school peer-led mentoring model to improve the physical activity levels and sedentary time of adolescent girls: The Girls Peer Activity (G-PACT) Project. *Children*, 5(6), 67. <https://doi.org/10.3390/children5060067>
- Paulino, P., Nogueira, S. I., Almeida, L., & Claro, M. (2023). Well-being, Motivation, and Adaptation of University Students: The Potential Influence of Mentoring Programs. In *Edulearn23 Proceedings* (pp. 4636-4642). IATED. <https://doi.org/10.21125/edulearn.2023.1236>
- Pham, V. P. H. (2023). The impacts of collaborative writing on individual writing skills. *Journal of Psycholinguistic Research*, 52(4), 1221-1236. <https://doi.org/10.1007/s10936-023-09939-2>
- Şahin, Ö. Ö., Aközlü, Z., & Taşdelen, Y. (2023). Pediatric nursing students' self-efficacy regarding medication administration and clinical comfort and worry: A pre-posttest comparative study of nurse mentoring versus peer mentoring. *Nurse education in practice*, 71, 103712. <https://doi.org/10.1016/j.nepr.2023.103712>
- Scager, K., Boonstra, J., Peeters, T., Vulperhorst, J., & Wiegant, F. (2020). Collaborative learning in college science: evoking positive interdependence. In *Active learning in college science: The case for evidence-based practice* (pp. 233-247). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-33600-4_16
- Topping, K. J. (1996). The effectiveness of peer tutoring in further and higher education: A typology and review of the literature. *Higher education*, 32(3), 321-345. <https://doi.org/10.1007/bf00138870>
- van Mil, M. H., Boerwinkel, D. J., & Waarlo, A. J. (2013). Modelling molecular mechanisms: A framework of scientific reasoning to construct molecular-level explanations for cellular behaviour. *Science & Education*, 22(1), 93-118. <https://doi.org/10.1007/s11191-011-9379-7>
- Wood, J., Roggenbuck, T., Doerschler, P., & Hicks, M. (2018). Sparking a transition, unmasking confusion: An empirical study of the benefits of a writing center workshop about patchwriting. *The Writing Center Journal*, 37(1), 101-130. <https://doi.org/10.7771/2832-9414.1867>
- Yilmaz, Y., Gottlieb, M., Haas, M. R. C., Thoma, B., & Chan, T. M. (2022). Remote collaborative writing: a guide to writing within a virtual community of practice. *Journal of Graduate Medical Education*, 14(3), 256-259. <https://doi.org/10.4300/jgme-d-21-01108.1>