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ORIGINAL RESEARCH

What Makes a Near-Peer Learning and Tutoring Program Effective in Undergraduate Medical Education: a Qualitative Analysis

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Abstract

Peer tutoring can benefit both learners and peer teachers that are distinct from the learning that occurs in expert-guided learning environments. This study sought to evaluate the peer tutoring program at a large public medical school to determine the strengths and weaknesses of a near-peer tutoring program and its benefits beyond students' typical classroom-based learning. This was a survey-based study of learners and tutors participating in the peer tutoring program. Fifty-six learners and 20 tutors participated in the survey; most learners received tutoring in the preclinical phase of the curriculum. Narrative responses were thematically analyzed to identify themes for both groups. Learners' responses about the benefit of the near-peer tutoring program were in three primary categories: creating a safe learning environment, direct coaching skills, and pitfalls around the need for individualized direction. Tutors' responses about what made a successful tutoring relationship centered around crucial activities used to engage with learners, beneficial intrinsic qualities of learners such as motivation, and qualifications of tutors that were most helpful such as knowledge base. Peer tutoring programs should emphasize individualized feedback for learners that focuses on metacognitive, content-based, and socio-emotional support. In doing so, such programs can provide a well-structured approach to improve learner success.

Keywords Medical education · Tutoring · Coaching · USMLE · Peer learning

Introduction

Peer learning has been used in undergraduate medical education to improve learner performance in multiple studies [1–7]. Peer tutoring is the most common form of peer learning discussed in the literature. The process of tutoring in medical education typically involves training advanced medical students (tutors, also referred to in the literature as near-peer tutors) to provide academic support to more junior students (learners) [5, 8].

Literature regarding peer learning programs has detailed benefits of these programs. Specifically, these programs have demonstrated improved academic grades amongst participating learners [6, 9], improved access to instruction [10], and professional development for peer teachers to learn teaching skills [1, 3, 6]. Most studies in the literature cite the availability of peer instructors and the benefit of non-expert communication between learner and instructor as benefits of peer education [3, 5, 11]; however, additional research is necessary to fully describe the benefit of these programs. These programs also allow tutors to enhance their content knowledge and teaching skills [2, 4, 6]. While there is good evidence for the programs' benefit, little is known about the specific programmatic components that best facilitate learning or confer benefits in these programs. For example, it should be explored whether worked examples, psychosocial support, critical reasoning, or some combination should be emphasized as the primary benefit of tutor/learner relationships.

Tutoring and peer-assisted learning are situated within social constructivism and draw on a number of educational theories and frameworks. The specific benefits of peer-assisted rather than expert-assisted learning lie in part in the cognitive and social congruence of the two individuals, as well as the ability to teach in an individualized setting,

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which would be impossible to scale in an expert-assisted learning model. The "cognitive congruence" of the two individuals engaged in peer-assisted learning means that the two individuals' levels of understanding are closer together than an expert and a learner [12]. That closeness, or congruence, is postulated to make it easier for the learner to traverse the relatively smaller distance from their knowledge towards attaining the level of knowledge of the tutor [13]. The relationship also draws on the concept of Vygotsky's zone of proximal development [14]. The tutor is close in knowledge and understanding to the learner, and so can relate to and more easily foster expansion of the learner's understanding within their zone of proximal development. Other benefits of peer-assisted learning include creating a "safe space" for questions with an individual who is not responsible for assigning grades, active participation given the 1:1 setting, and the opportunity for deliberate practice given the individualized nature of the interactions compared with traditional lecture and other large-group learning environments [12]. These educational theorems are well rooted in scholarly literature, but there remains a relative lack of contextual examples to demonstrate how they can be operationalized in different learning environments, such as the peer tutoring program (PTP) at the authors' institution.

In 2018, the University of North Carolina School of Medicine (SOM) relaunched and expanded its PTP, in which more senior medical students provide tutoring services to junior students. In this program, and for the purposes of this manuscript, tutors are defined as near-peer as they are more advanced in the curriculum than the learners they work with but have not yet attained a status as trainees that gives them inherent authority over (i.e., intern, resident, junior faculty). Before 2018, the PTP consisted of 4–6 student tutors and was intentionally expanded over two years to meet the student-body needs to over 45 tutors, each working with 1–5 learners.

Learners with academic performance that is 1.5 standard deviations below the mean on their exams are contacted by the faculty from the SOM Office of Academic Excellence (OAE) and are matched with tutors. Learners are encouraged but not required to engage with tutors and may participate in the PTP for as long as they feel it is academically beneficial. Tutors are selected by faculty from the OAE based on academic success on standardized assessments, personal interest on the part of the tutor, and personal interactions. Tutors are trained by faculty in the OAE to practice and model good metacognitive and test-taking strategies with learners in their sessions. Tutors also attend regular meetings with the OAE and other tutors to develop their tutoring skills, discuss common issues amongst tutor/learner pairs, and connect with faculty. Tutors are reimbursed at an hourly rate for their services and are provided with access to question banks and other resources for use in their sessions.

To continually improve this program, this study explored the tutors' and learners' perceptions of PTP and the specific benefits it confers. The research question guiding the study is: What characteristics of the PTP are effective based on tutor and learner insights? The primary aims were to determine what specific characteristics tutors and learners felt made tutoring sessions most useful.

Materials and Methods

The methods of this study were reviewed and approved by the Institutional Review Board of the University of North Carolina at Chapel Hill (UNC), which determined it to be exempt from federal human subjects' research regulations (IRB Study 21–0125).

The authors designed the survey instrument (ESM Appendix) used in this study to collect narrative feedback from tutors and learners participating in the PTP. The survey instrument was written by one author and then distributed to the group for feedback and revision in order to validate the mechanism to achieve the desired outcomes. The tutee survey asked during what phase of their education students received tutoring, for how long, the most helpful activities they did with their tutors, qualities that were most helpful in their tutor, and how the program could be improved. The tutor survey asked similar questions including what activities they found were helpful or not helpful, study strategies and test-taking techniques they taught their tutees, and qualities that were most important for a tutor.

Once consensus was achieved on the wording of questions, the anonymous survey link was distributed via electronic mail to all active participants in the PTP using Qualtrics XM (Qualtrics, Provo, UT). Figures were generated using STATA BE Version 17.0 (StataCorp LLC, College Station, TX).

After the survey window closed, all results were downloaded. Incomplete responses were removed from the analysis. Qualitative action research methods guided our inductive analysis of the data. Action research is a strategy to evaluate and implement promising practices in a program [15]. Learner responses were analyzed by one team (SMA, KLS, NH) and tutor responses by another team (MB, GLBD, CS). Both analysis groups individually coded their responses and then met as a group to identify common themes by cohort group and emerging patterns until they reached sufficiency. The groups then reconvened to discuss overarching similarities and differences between the responses of both groups. The authors elected to focus predominately on a qualitative analysis of the narrative responses to the survey rather than quantitative analysis given the relatively low number of responses (N) for both response groups, and particularly the tutor group ($N=20$). The sample is therefore inadequately

powered to draw any substantive comparisons until further data can be collected from individuals who participate in the PTP.

Results

The survey was sent to 184 learners, past and present, and 45 tutors. Twelve tutor surveys and 15 learner surveys were incomplete and eliminated from review. Of the learners, 54 (29.3%) completed the survey. Twenty of the 45 tutors completed the survey (44.4%). Quotations pulled from survey responses are written throughout in italicized text.

Learner Responses

Of the 56 learners who completed the survey, the largest percentage (42/54, 77.8%) received tutoring in the 18-month Foundation (Pre-clinical) Phase of the SOM curriculum that precedes the United States Medical Licensing Exam (USMLE) Step 1 (Fig. 1). Following this phase, students take the USMLE Step 1 after a dedicated 2-month study period and, if they are determined to be at risk of failure, an extended study period. After taking the USMLE Step 1, students are able to advance to the Application (Clerkship) Phase of the curriculum during which they take standardized subject (Shelf) exams prior to taking the USMLE Step 2 Clinical Knowledge exam. All but six respondents (11%) had participated in the PTP for greater than 1 month (Fig. 2). Most respondents meet with their tutor at least weekly (40/54, 74.1%).

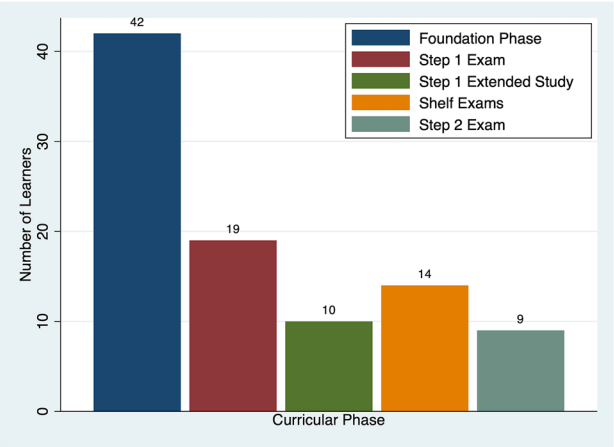

Fig. 1 Responses to the prompts "During what phase of the curriculum did you receive tutoring? (Select all that apply)" (Learners, $N=94$) and "What areas of the curriculum have you tutored? (Select all that apply)" (Tutors, $N=57$). Note that respondents were allowed to select more than one response resulting in a larger number of responses than participants

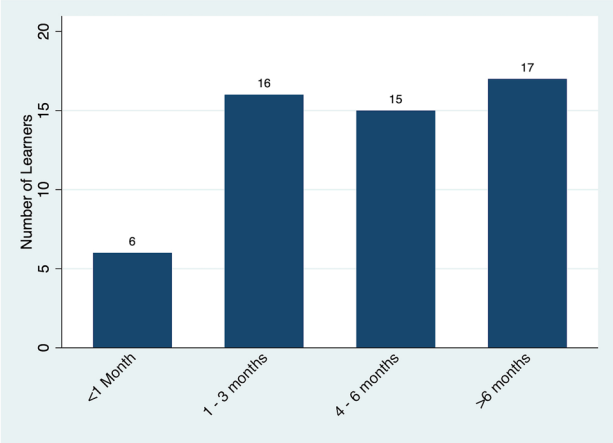

Fig. 2 Responses to the prompts "For how many months total did you receive tutoring?" (Learners, $N=54$) and "During what phase of the curriculum were you in primarily while serving as a tutor?" (Tutors, $N=20$)

The research team identified seven codes in the learners' responses describing aspects of the PTP. These codes coalesced around three overarching themes: creating a safe learning environment, direct coaching skills, and pitfalls. These themes are described in more detail below. Additional examples of exemplar quotes are in Table 1.

1. ***Creation of a Safe Learning Environment***

Learners commented on multiple interpersonal qualities that made tutors well suited for the role. They emphasized the benefit of having tutors that were "*kind*," "*encouraging*," or "*compassionate*." Initially, the team coded these responses into those about interpersonal skills (such as kindness, honesty, friendliness) separate from those directly related to the learning environment and tutoring work (encouraging, patient, flexible, etc.). The more responses that were compared, the more the two codes intertwined. Interpersonal relationships appeared to inform the learning environment because of peer tutoring and how individualized it can be when done well:

> *"There was this perceived stigma that was associated with having a tutor in medical school, that was often isolating. I appreciated that my tutor would share with me times when they didn't get topics and needed a bit more help AND then offering the strategies that helped them."*

2. ***Direct Coaching Skills***

Learners identified multiple tutoring activities that were beneficial in the PTP. Many learners found it helpful to

Table 1 Summary of themes and codes found within survey responses from learners with example quotes from survey responses listed in italics

Theme	Code	Example quote(s)
Creation of a Safe Learning Environment	Establishment of personal relationships between tutor and learner	"*Not just a great tutor, but a mentor and a good friend as well. I plan to remain in touch with this person for a long time*." "*My tutor is the kindest and most encouraging person I've had supporting me through my journey*."
	Creating a healthy environment	"*LAUGHTER*" *"I realized that I appreciated meeting* via *Zoom much more than meeting in person. This saved significant travel time and made my study time more efficient."* – reference to changes in response to the COVID-19 pandemic
Direct Coaching Skills	Requiring learners to verbalize reasoning	"*My tutor would ask me to speak out my reasoning with each answer choice and why I thought it was wrong or right… Sometimes I would cut corners, but my tutor was very disciplined and caught me when I tried doing so*."
	How to manage practice exam questions	"*The most helpful thing has definitely been working through questions together*." "*The most helpful thing my tutor did for me was help go through practice questions and help me with test taking strategies*."
	Studying and time management	"*…time management… organizing material, making and using flashcards*" "*…we talked about study strategies a lot too!*"
	Teaching and simplifying foundational concepts	"*How to simplify complicated topics*" "*She drew out things for me which was great*"
Pitfalls	Not meeting the learner where they are	"*Watching me answer questions after 40 min lost its impact… maybe a more mixed review style would be helpful*." "*It was not very effective when my tutor wanted to discuss content that we had not learned*."

review or complete practice questions from a question bank under the supervision of their tutor. Practice questions allowed learners to review the material and their thinking or medical decision-making processes with their tutor. Respondents often stated that their tutors would have them start "*…thinking aloud and [talk] through good and bad things that [the learner] did as [they] worked through the questions…*" in an attempt to facilitate deeper learning. This also provided the opportunity for tutors to "*…tell [learners] about important concepts [they were] missing…*" and reteach foundational concepts.

3. ***Pitfalls***

There were several examples of juxtaposed responses from other learners. For example, while many learners found practice questions completed under the supervision of their tutor to be a valuable learning experience, some students indicated that practice questions were "*time consuming*" and didn't support their learning. Some learners found sessions so structured that "*planning for tutoring [was] a little stressful*," while others reported that their "*tutor[s] did not really have any direction with their sessions*." These juxtapositions highlight learners' desire for sessions customized to fit their needs.

Tutor Responses

Of the 20 tutors who completed the survey, their experience tutoring was spread throughout the curriculum. The majority of tutors served during an academic leave of absence such as a research year, co-curricular master's degree, or Ph.D. program (8/20, 40%) or during the Individualization Phase of the SOM curriculum (the last 14 months of our curriculum) (9/20, 45%). Most tutor respondents (14/20, 70%) had been working in the PTP for over 6 months at the time of the survey.

The research team identified three overarching themes amongst several codes: tutoring activities, key characteristics of learners, and key characteristics of tutors. As before, these themes are described in more detail below. Findings are summarized in Table 2.

1. ***Tutoring Activities***

Tutors indicated that working on practice questions, reviewing content, and focusing on their learners' wellbeing were key activities during tutoring sessions. Practice questions allowed tutors to work on metacognitive strategies with learners and focus on knowledge gaps that they

Table 2 Summary of themes and codes found within survey responses from tutors

Theme	Code	Subtopic (if applicable)	Example quote(s)
Tutoring Activities	Practice Questions	Metacognitive Practice	"*Going through questions is the single most helpful thing we do. This gives me a chance to see how they approach test taking and to work on improving test taking strategies while also modeling how to learn from practice questions*."
		Question Review	"*Practice questions were the most helpful*."
	Content Review	Didactic Teaching	"*Whenever I started to lecture people or tell people what to do, I needed to mentally stop myself. It was not my job to make them feel guilty or like they needed to do more. It was always the most helpful when I allowed them the opportunity to come up with their own solutions and find their own joy in learning and reason for studying*."
		Lecture Content Review	"*Going over lecture material*" *was not helpful*
	Well-Being Assessment		"*We also talk about study strategies, handling stress, and creating realistic goals*."
Characteristics of Learners	Openness to Change		"*Willingness to adapt to a new study schedule/routine*" *are most important*
	Acknowledge Knowledge Gaps		"*Being comfortable with getting things wrong and being able to say I don't know*," *is most important*
	Self-Motivation		"*Students who were self-motivated to engage with tutoring are generally more helpful than students who are more passively involved*."
	Active Engagement		See above
Characteristics of Tutors	Personal Traits	Patience	"*Patience*" *is important*
		Commitment	"*Dedication*" *is important*
		Enthusiasm	"*…enthusiasm (about the material and the students)*."
		Empathy	"*I think it is important for a tutor to be calm, empathetic, and a source of support when you are struggling*."
		Creativity	"*Creativity (to be able to explain things in different ways until something clicks…*"
	Professional Traits	Knowledgeable	"*Strong test scores*" *are important*
		Communication	"*Communication; Patience; Caring; organized*."
		Organization	See above

could then address. Question review allowed tutors to review effective test-taking strategies such as answer elimination and efficiently reading the question. Tutors commented that content review needed to be specific to the learner's needs and that more general review or "*lecture*" type sessions were unhelpful:

> "Going through questions is the single most helpful thing we do. This gives me a chance to see how they approach test taking and to work on improving test taking strategies while also modeling how to learn from practice questions and allows me to review relevant content from the questions…"

Aside from the more direct academic activities, tutors commented on emotional support as another essential part of their tutoring sessions. It allowed tutors to "*discuss* learners' *wellbeing/how they are coping with the stresses of medical school*…." Tutoring sessions allowed tutors to have open conversations with learners about their well-being with opportunities for support and referral to a faculty member in the OAE if necessary.

2. *Key Characteristics of Learners*

Tutors identified four characteristics of learners critical to a beneficial learner-tutor relationship: openness to change, acknowledging knowledge gaps, self-motivation, and active engagement. Having learners who were "*open and willing to get questions wrong*" was a helpful trait because it allowed tutors and learners to identify and address knowledge gaps. Tutors appreciated learners who were willing to adopt new study methods and routines in response to this feedback.

Willingness to change allowed tutors to help them more easily adapt to address shortcomings in their study strategies.

Self-motivation and active engagement, in several forms, were identified by tutors as beneficial learner traits. Multiple tutors indicated that frequent and active communication from learners about their studying, questions, and concerns was beneficial to their partnership. Tutors also indicated that engaging in sessions by showing up on time and ready to engage made sessions more enjoyable.

3. ***Key Characteristics of Tutors***

Two themes emerged from the responses regarding the traits a tutor needs to be successful. These themes involved either personal traits of the tutor or professional traits. Personally, tutors needed patience, commitment, enthusiasm, empathy, and creativity to connect with their learners. These qualities created an open learning environment where learners can thrive. One tutor commented: "*Your [learner] will always do their best with you when they feel comfortable around you and know that it is a safe space to get things wrong*."

Professionally, tutors felt that it was essential to be knowledgeable, organized, and communicate well. The tutor's knowledge base was identified as vital as it "*help[ed] lead the [learner] to the right answer*." Being organized and communicating with learners helped facilitate sessions and ensure that the learner-tutor relationship was beneficial.

Discussion

Our findings from the surveys of learners and tutors in a large PTP showed significant agreement between the two groups regarding what activities were most helpful (questions, content review) during tutoring sessions. The two groups varied slightly in the traits they chose to emphasize as being important in tutors and learners, with tutors focusing more on professional characteristics and the interpersonal aspects mentioned by both groups.

Both groups emphasized key activities that made tutoring sessions successful. Namely, both groups emphasized practice questions and reteaching of foundational concepts as beneficial activities. In essence, this allowed the tutor to provide a constructivist framework for learning that focused on scaffolding learning within the zone of proximal development. Vygotsky defined the zone of proximal development as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving… in collaboration with more capable peers" [13–15]. Completing practice questions allows tutors to assess the learner's developmental level and then provide sufficient scaffolding in content review and feedback to help learners recognize their full potential for development [16–18]. For learners who found this aspect to be less productive, emphasis from tutors on teaching metacognitive strategies covered in their training explicitly may address learner concerns. Failure to acknowledge a learner's current developmental level and respond appropriately was identified by learners in the survey as one reason that tutoring sessions would be unproductive. While all tutors were trained to identify a student's individual zone of proximal development, some struggled with this.

Completing practice questions together also allowed tutors and learners to engage in metacognitive inquiry [20], emphasized in survey responses from both groups. Respondents consistently emphasized that working on practice questions allowed learners to see how they approached questions and reinforce good test-taking strategies. Metacognitive practice has been stressed as a beneficial way to improve and develop expertise [19, 20], the ultimate goal of medical education. The survey responses emphasized that tutors served as helpful guides in determining cognitive errors that learners may not otherwise pick up on, helping with metacognitive work.

Tutors and learners emphasized content review as an opportunity to simplify more complex basic science and clinical topics so that learners could comprehend them. While not previously clearly defined in the literature, this suggests that non-expert instruction can sometimes help learners better understand the subject matter. It is unclear whether this is the result of additional practice with tutors or whether peer instructors are better able to relate to learners and, thus, communicate complex material more effectively than expert instructors [3, 5, 11]. Further research would be necessary to analyze this theory.

In addition to academic practice, both groups emphasized good interpersonal dynamics as a critical aspect of the tutor-learner relationship. While both groups focused on personality traits that benefited the tutor-learning relationship, tutors were more likely to emphasize professional characteristics (timeliness, organization, communication, etc.). Supporting learners in a socio-emotional context was particularly important for both groups. This fits with ideas of situated learning described by Vygotsky in his cognitive learning theory, which posited that learning is inherently social and relies on cultural, linguistic, and other factors [21–24]. The interpersonal relationships between tutors and learners allowed them to establish a healthy, open, and productive learning environment. Emphasis on providing helpful socio-cultural learning contexts is an integral part of supporting all learners, especially those who are struggling [25–27].

There are several limitations to these findings. This single-center study occurred with participants from one academic year of tutoring. Response rates were about 50%,

which could introduce some selection and recall biases and limit the generalizability of the findings. The significance and impact of a PTP will also vary depending on the formal curriculum and the integration of tutoring as a component of that curriculum. Curricula that are largely lecture-based vs. small-group-based may leave different needs or gaps that a PTP can fill. Further evaluation at additional centers with alternative curricula would enhance the understanding of the most beneficial aspects of peer tutoring.

Conclusions

The findings of our survey of tutors and tutees enrolled in one PTP at a large, public medical school show that the most beneficial aspects of the program are rooted in accepted educational theories. Tutor training for future iterations of this program, and ones like it, should focus on providing individualized feedback to learners to support them at their developmental level with metacognitive discussions and breakdown of foundational material. These programs should also offer space for tutors and learners to establish supportive working relationships to support learners' development.

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Author Contribution All authors contributed to the study conception and design, material preparation, data collection, and analysis. The first draft of the manuscript was written by Seth Alexander, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Declarations

Ethics Approval The methods of this study were reviewed and approved by the Institutional Review Board of the University of North Carolina at Chapel Hill (UNC), which determined it to be exempt from federal human subjects' research regulations (IRB Study 21–0125).

Informed Consent Consent information regarding participation in this research was provided at the beginning of all surveys. Voluntary completion of the survey following this information constituted consent.

Conflict of Interest The authors declare no competing interests.

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