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Measuring Student Learning in Peer Tutoring Dyads

Annie Donahue, EdD

University of New Hampshire, Manchester NH

Abstract: The object of this study was to measure the impact of the reciprocal learning environments created in peer tutoring dyads on the peer research mentors who participated in the UNHM Research Mentor Program. The UNHM Research Mentor Program, a collaboration between the library and the college writing center, incorporates a credit-bearing tutor development course whereby all peer writing tutors receive focused information literacy instruction thereby enabling them to support student research across the entire cycle from topic selection, to information gathering (identifying need, building effective search strings, evaluating results, and incorporating information effectively), through multiple drafts to completion of the research assignment. This study utilized both qualitative and quantitative methodology to explore the impact of participation in the program from the research mentors' perspective. The participant sample (six women and two men) was drawn from among the students who completed the Tutor Development course between fall 2004 and spring 2013 and served at least one semester as a research mentor. The data collection methods included semi-structured interviews, a survey adapted from the Survey Regarding Satisfaction, Learning and Development of Peer Mentors in Higher Education (Posa, 2011), and document reviews of interview transcripts and Tutor Development course syllabi. Three effects of program participation were identified: 1) participants expressed uncertainty and self-doubt in their abilities to succeed initially as a research mentor; 2) participants acknowledged a perceived increase in learning and personal development; and 3) participants attributed increased learning and personal development to the reciprocal learning environment engendered in the peer-to-peer dyads. Participants in this study noted that both reciprocal environments, the peer tutoring dyads and the tutor development course cohorts, were instrumental for advancing their own learning and skill development. These collaborative learning environments supported good research practice and prepared research mentors to be effective in the one-on-one tutorial.

Keywords: Peer-assisted learning; information literacy; student learning; peer writing tutors; research skills, sociocultural learning theories.

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1. Introduction

The University of New Hampshire Manchester (UNH Manchester) is a commuter campus located in the city of Manchester, New Hampshire and is one of the 11 colleges and schools that make up the state's flagship university. The college serves approximately 750 undergraduate and another 300 graduates. The college population is a mix of first-year admits and transfer students who balance full-time course work with the demands of 30+ hours of work each week, family responsibilities, and military or other service obligations. Degree programs incorporate a Discovery layer (liberal arts core) with an applied component in the form of internships and service-learning opportunities. Experiential learning, small class size, teaching excellence, and an 11:1 student-faculty ratio are just a few of the attributes that differentiate the college experience at UNH Manchester.

In order to respond to the research needs of this diverse population, the UNH Manchester librarians met with the director of the Center for Academic Enrichment (CAE) and the composition program coordinator to propose a joint strategy. The idea involved adding information literacy training to the Tutor Development course (a credit-bearing course) enabling peer writing tutors to support students across the entire research cycle. A pilot project was developed in spring semester 2003 and the Research Mentor Program was born. Initially, the program focus was on supporting students in first-year writing courses (White & Pobywajlo, 2005). The Research Mentor Program has successfully evolved over the 14 years of operation in response to results from classroom assessments and an eighteen-month study assessing student learning in first-year composition courses (Donahue, 2015). Further program improvements responded to changing leadership in the CAE and to the introduction of the Association of College and Research Libraries (ACRL) *Framework for Information Literacy* (Gamtso, Vogt, Donahue, Donovan & Jefferson, 2017).

In crafting the Research Mentor Program, two underlying assumptions about learning framed the criteria, expectations, and outcomes for the program. These assumptions were: 1) that employing peer-to-peer learning and scaffolding instruction across the semester in small segments, instead of in a single information-rich instruction session, supported deep learning; and 2) that establishing peer tutoring relationships created a reciprocal learning environment whereby students learn from each other.

This concept of reciprocity as applied to learning, teaching, and tutoring in the professional literature (Annis, 1983; Fantuzzo, Dimeff & Fox, 1989; Fantuzzo, King & Heller, 1992; Foster and Rotoloni, 2005; Griffin and Griffin, 1997; Riggio, Fantuzzo, Connelly & Dimeff, 1991) refers to an exchange between peers in which the potential for both individuals to advance exists. Based on the fundamental role of dialogue in cognitive development (Vygotsky, 1978), reciprocal learning environments employ cooperative learning, scaffolding

techniques, and think-aloud strategies to reinforce understanding and advance metacognition.

The Research Mentor Program aligns with Vygotsky's (1978) sociocultural theory of a student-centered collaborative approach to learning. The dyads developed between first-year students and research mentors form the medium whereby a strategy for development and learning that Vygotsky called the *zone of proximal development* can be realized. He defined the zone 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 under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86).

Research mentors function as the more capable peer in these dyads by modeling good research behavior and guiding students through the research process from idea generation to final draft. A previous study (Donahue, 2015) found that first-year students demonstrated an increased knowledge of information literacy skills through the peer dyads but did these dyads create a reciprocal learning environment in which both tutee and mentor advanced knowledge? To answer this question a qualitative study designed to understand the experience from the mentors' perspective was conducted to determine if the reciprocal learning environment created through peer dyads impacted knowledge and skills.

2. Purpose of the study

This study formed the core of the author's doctoral dissertation (Donahue, 2014). The purpose of the study was to identify and describe the experiences of students who served as research mentors in the UNHM Research Mentor Program. The research question that guided the study was: What effect did participation in the Research Mentor Program have on the research mentors who participated? Employing phenomenological methodology, participants described their role as research mentors and ascribed their perceived meaning to that role. The data generated though this study provided a critical understanding of the effect participants attributed to their participation in the Research Mentor Program. The significance of this study had multiple trajectories. From a theoretical standpoint, this study generated data to determine, through an evidence-based analysis, that these dyadic relationships engendered reciprocal learning environments enabling research mentors to advance their own knowledge while guiding students through the research process. From a practical standpoint, this study generated information useful to an ongoing program evaluation of the Research Mentor Program.

Results of this study contribute to the fledgling body of literature among academic library professionals who are examining the intersections between Vygotskian learning theory and information literacy instruction (Bhavnagri and Bielat, 2005; Wang, 2007). Vygotskian theories, specifically scaffolding, collaborative learning, and the zone of proximal development, have been

explored in peer tutoring literature for several decades (Brown and Campione, 1990; Deci and Ryan, 1985; Fantuzzo, King & Heller, 1992; Nelson, 1995/96; Palinscar, 1986; Rogoff and Wetsch, 1984; Thorkildsen, 1993; Wood, Bruner & Ross, 1976; Wood and Wood, 1996). The results of this study move the conversation beyond the writing center by focusing on the positive benefits possible when peer tutors and librarians collaborate to provide a holistic approach to supporting the research process.

3. Literature Review

The original review of literature focused on three distinct areas of interest: 1) collaborations between academic libraries and college writing centers; 2) student participation in academic library reference and instruction services; and 3) applications of Vygotsky's sociocultural learning strategies in academic libraries. For this article, the second and third foci identified above will be briefly provided.

Several academic libraries have incorporated undergraduate students in their instruction programs. The role of these students varied from facilitating small group discussions (Gruber, Knefel & Waelchli, 2008) to roaming the classroom to provide assistance during hands-on activities (Deese-Roberts and Keating, 2000) to teaching mini-seminars on specific library resources (Holliday and Nordgren, 2005). As the demand for library instruction in lower-division general education courses grew to unsustainable levels, librarians at California Polytechnic State University implemented a "student-based solution" (Bodemer, 2013, p. 578). Undergraduate students serving as reference assistants received additional training in instructional design, were designated as peer instructors, and worked alongside the librarian in the classroom.

Scholars are exploring the intersections between Vygotsky's sociocultural learning theories and the adult learner in order to assess the impact of a Vygotskian framework on the teaching and learning experiences among college students and faculty. The findings associated with these explorations entered the professional discourse through paper presentations at various conferences (Kuhlthau, 1996; Wang, 2006), but also through a growing number of journal articles (Huong, 2007; Vare, 1993; Torres, 1996; Warford, 2010; Wass, Harland & Mercer, 2011; Williams, 2001). The scholarly dialogues focused on the effects of utilizing sociocultural learning theories and collaborative learning strategies to create a more effective learning environment for adult learners. Academic librarians applying these theories and strategies to information literacy instruction particularly emphasize the practice of scaffolding and peer-to-peer interactions (Bhavnagri and Bielat, 2005; Fourie, 2013; Gruber et al., 2008; Kuhlthau, 1996; Wang, 2007, Wang, Bruce & Hughes, 2011).

4. Methodology

The study setting was the University of New Hampshire Manchester (UNHM). The participant sample was drawn from among the students who completed the Tutor Development course between fall semester 2004 and spring semester 2013 and served at least one semester as a research mentor. Fifty-eight eligible students were identified and invited to participate. Twenty students (a 38% response rate) replied to the invitation to participate; two students declined to participate.

A representative sample pool of eight students was determined based on the following criteria:

1. Replication of the gender distribution in the target population (25% male and 75% female),
2. A variety of students who completed the Tutor Development course in different semesters,
3. A mix of freshman and transfer admit status, and
4. A mix of students who completed First Year Writing at UNHM and those who completed that course prior to admission at UNHM.

The qualitative and quantitative data collection methods utilized in this study included semi-structured interviews, a learning and development survey, and document reviews of interview transcripts and Tutor Development course syllabi.

Guiding questions for the interviews were crafted based on Seidman's (2006) approach for creating a context for the participant's experience. First, the participant is asked to articulate their life history prior to the experience studied; second, the participant is asked to reconstruct a detailed description of the experience itself; third, the participant is asked to reflect on the meaning of that experience. These questions were used to lead participants through an abbreviated form of this approach in a single interview. Interviews were audio-recorded and each interview was transcribed. A copy of the transcript was sent to each participant. Participants were encouraged to review their transcripts and provide either clarifying or augmenting comments.

The survey used in this study was adapted from the *Survey Regarding Satisfaction, Learning and Development of Peer Mentors in Higher Education* (Posa, 2011). This survey was developed to quantitatively measure satisfaction and perceived learning and development of university peer mentors. Posa authorized modification and use of her survey, which involved removal of the demographic and satisfaction questions then revision of the core learning and development questions by substituting questions related to development of information literacy skills for the questions pertaining to leadership development.

The documents reviewed in this study were the interview transcripts and the Tutor Development course syllabi. Syllabi for courses offered between spring semester 2004 and spring semester 2013 were reviewed. These documents provided a context for understanding participants' interview comments about preparedness for the role of research mentor and recorded how the course content evolved over time.

5. Limitations

This study contained several limitations: self-reported data collection; small sample size; generalizability; and researcher bias. Interview and survey methods required participants to self-report perceptions, attitudes, and activities. Participants relied on memory to recall and articulate descriptions. Some participants were several years removed from actively serving in the research mentor role and expressed difficulty remembering details of their experiences.

Survey response rates were high across all categories which could be attributed to participants offering positive perceptions of their own abilities rather than an accurate reflection of increased learning. The high scores could also reflect a desire on the part of participants to help the study achieve a positive outcome. The survey and interviews relied on retrospective perceptions of the research mentor experience; there was no pre-participation baseline against which to measure change.

The study's sample was made up of individuals who self-selected to participate, so although specific criteria was used to determine the final pool it is likely that participants who held the program in high regard were motivated to volunteer for the study. The small number of participants may not reflect the experiences of all research mentors who participated in the Research Mentor Program.

This research study was conducted at one specific location, the University of New Hampshire Manchester, and for one specific program, the Research Mentor Program. Although findings of increased learning and personal development skills align with the findings in other research studies (Conrady, 2007; Harmon, 2006; Posa, 2011) these results are not generalizable to other programs in other locations.

The researcher's previous connection to the Research Mentor Program required an awareness of the potential for bias. It was critical for the researcher to refrain from asking leading questions that might unduly influence the participants' responses. By consistently and consciously striving to suspend any preconceived ideas, the researcher was able to allow each participant to describe their unique experience as a research mentor and extract the shared connections to identify the effects of participation in the program.

6. Findings

The results of this study demonstrated that research mentors acknowledged their own learning had advanced, noting stronger research and writing skills. These participants identified increased levels of self-confidence, a stronger sense of self-awareness with respect to communication and organizational skills, and an ability to better adapt their own study skills to be more academically successful. As one participant declared: "Because we learned that the research and the writing go together, I stopped just
spending three hours doing research without thinking about where any of the research was going. So I started doing what I told my students [to do], doing some research and figuring how it fits in…and I became much more efficient at the research process" (Donahue, 2014).

Secondly, the data confirmed that study participants credited participation in the Research Mentor Program as instrumental in effecting the perceived increase in learning and personal development skills. The peer tutoring dyads and the tutor course cohort model created learning environments wherein learning was fluid thereby creating reciprocal opportunities for peer-assisted learning. One participant aptly summed up what this reciprocal environment meant to her when she said:

> "I think the most valuable part of this program is that I was a student as well. We were
> students in the class and we learned to help other students, and I think that type of relationship is so important to have when you are in college. It was helpful to me as the mentor, but it was also
> helpful to the students to have somebody that maybe wasn't in the faculty sphere…somebody closer to them that they could talk to and relate to on more of a friendship basis. Being able to talk to your peers about writing and having somebody who knows a little bit more than you about that process is definitely helpful" (Donahue, 2014).

Finally, participants articulated concern that they occasionally lacked confidence to be able to fulfill the role of research mentor. One participant shared her concerns in this way: "I was really honored to be asked…going through the training and having people look up to me, it was really nice but also scary. What if I didn't know, what if I said the wrong things? (Donahue, 2014). These participants shared a sense that tutees expected them to be "experts" when working together in tutorials. They expressed discomfort with their preparedness and found the tutees expectations daunting. Upon further reflection, most participants acknowledged that these feelings of inadequacy diminished as they gained more practice with the support role of research mentor. The chart below uses participants own words to give voice to the three thematic findings of the study.

Table 1 – Participants' Responses Connected to Findings (Gamtso et al, 2016)

Expressed Concerns of Uncertainty and Self-doubt	**Increased Learning and Personal Development**	**Attribution of Reciprocal Learning Environment**
"It was really helpful to know the process but even if you don't, the students are not really dependent on you if you don't know the answer. You are not the end all, be all."	"I guess I'm just more confident overall. I am much more of a critical thinker."	"Being a tutor, I feel like it also helps my own school work because…when you are talking about it with other people, you start to apply it to your own papers."
"I think my first tutorial in the university setting was a little bit intimidating."	"It gave me a lot of confidence in my abilities to interact with people, to get my own research done."	"I learned a lot, so I was happy to help with the students learning as well."
"At first I was very nervous."	"I really feel I'm a stronger writer as well. I know how to look at my ideas, not just my grammar."	"Each student that I got to work with, I feel like I learned a lot too."
"My overarching thought was always am I good enough for this?"	"The research component was absolutely invaluable…it helped me so much in my own writing."	"In a way I was able to take the tools that I use as a tutor to work with other students and learn to apply them to myself."
"Will my experiences be helpful to students?"	"The program was valuable to help me be a better learner."	"I think I gained a lot from the classroom, in the tutor class, but also in engaging one-on-one with students."

7. Recommendations and Conclusions

This study confirmed that the dyadic relationships established in the Research Mentor Program created reciprocal learning environments that enabled the research mentors to advance their own knowledge while guiding students through the research process. However, more research is needed; due to the small sample size and the self-selection of participants these findings may not reflect the experiences of other research mentors in the program.

One recommendation is to further adapt the survey instrument, such as incorporating behavior frequency questions and eliminating irrelevant questions, and then administer it to all research mentors who participated in the program. Additionally, conducting two-to-three focus groups would allow an opportunity to delve deeper into survey responses to gain a better understanding of the

research mentors' experiences. These focus groups must be led by an individual not connected to the Research Mentor Program to increase study credibility. This follow-up study is necessary to determine if the current study's findings are consistent across all participants of the program.

A second recommendation is to identify other academic institutions providing research mentor programs and conduct a cross-institutional study. The literature review conducted for this study identified a small number of institutions offering similar programs. If the programs are on-going, then a starting point for further exploration and potential collaboration exists.

This study confirmed that reciprocal learning environments were created through the peer-to-peer dyads established between the research mentors and tutees and through the Tutor Development course cohort relationships. The effect of participation in the Research Mentor Program for the participating mentors was advanced academic knowledge and personal development which was attributed to the cooperative learning opportunities engendered in the peer-to-peer dyadic relationships.

All participants perceived an increase in their personal development and academic knowledge, specifically noting improvement in writing and research skills. Participants in this study identified examples of reviewing strategies for use in the tutorials that they regularly applied to their own learning. In modeling good research and writing practices, the research mentors internalized these skills and advanced knowledge.

Participants expressed uncertainty and self-doubt about their ability to initially succeed in the role of research mentor. This finding appeared at odds with the data supporting increased confidence and interpersonal communication skills acknowledged by the participants, yet it parallels the results noted by Pobywajlo (2004) that "tutoring is characterized by uncertainty and instability" suggesting that "some uncertainty was due to tutors' lack of practice with specific types of problems and [with] applying the tutoring strategies they were learning" (p.231-232). She recommended adapting the tutor training curriculum to include additional time for practicing strategies to lessen anxiety and increase confidence. Participants in this study recommended a similar approach; suggesting more hands-on opportunities in the Tutor Development class to practice potential tutee interactions and a clearer path for assistance and support when confronted with a question they felt underqualified to answer.

Participants attributed the growth in their academic knowledge and personal development to the reciprocal learning environments they experienced through the program. The effects of collaborative learning for advancing tutors' knowledge have been examined by scholars. Topping (1996) offered an extensive typology and review of the peer tutoring literature noting that some evidence of cognitive benefit for tutors existed while suggesting the need for

further research. Further scholarship (Conrady, 2007; Fallon, 2010; Griffin and Griffin, 1997; Langor, 2000; Nelson, 1995/96; Pobywajlo, 2004; Posa, 2011) confirmed that cooperative learning environments, such as the tutoring dyad, impacted the tutors' cognitive development. Working collaboratively with tutees and with each other, research mentors were exposed to new strategies and ideas that they internalized improving their own research process while supporting student learning in the one-on-one tutorials. This study affirms the Research Mentor Program's goal of creating reciprocal learning environments to further student success.

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