Mediation Effect of Collaborative Learning for Student-Faculty Interaction

Lanlan Mu & Amy K. Ribera
Indiana University Bloomington, Center for Postsecondary Research

Abstract
Using National Survey of Student Engagement (NSSE) data from senior students (n=95,491), this paper presents an exploratory analysis of the interplay between two effective educational practices—student-faculty interaction (SFI) and collaborative learning (CL). Results from multi-group structural equation modeling show collaborative learning has a direct positive effect on SFI for self-reported gains in learning outcomes, but a negative mediation effect on SFI for overall college grades. Furthermore, we find frequencies of SFI and collaborative learning vary by academic disciplines as measured by Holland type.

Research Questions
This study explores whether engaging in collaborative learning mediates the effect of student-faculty interaction on senior students’ self-reported learning gains and overall college grades. Specifically, this study is guided by the following questions:
- Does collaborative learning with peer students mediate the effect of student-faculty interaction on senior undergraduates’ self-reported gains and grades?
- Do associations between student-faculty interaction, collaborative learning, and student learning outcomes vary among Holland academic fields proposed by Holland?

Background
Student-faculty interaction (SFI) has been a predominant topic of interest in higher education studies. It is well-documented and supported by extant literature for its positive effects on students’ academic performance as well as affective development (e.g., Komaraju, Musulkin, & Bhattacharya, 2010; Ku & Hu, 2001; Snow, 1973; Kim & Sax, 2011). However, some studies did not find significant or positive effects on certain learning outcomes (e.g., Ku, Pace, & Vesper, 1997; Hurtado, Eagan, Tran, Newman, Chang, & Velasco, 2011). For example, Hurtado and colleagues (2011) showed a negative correlation between SFI and cumulative GPA. Ku, Pace, and Vesper (1997) found SFI was not a significant predictor for academic gains for students attending baccalaureate and doctoral level institutions. They also tested two aspects of interactions and showed cooperation among students was the best predictor for self-reported gains, while SFI did not have significant influence.

According to Moore (1989) three basic types of interactions tend to occur in the learning process—learner-learner; learner-to-teacher; and learner-to-content. Few empirical studies have tested the association between these types of interactions. To gain a nuanced understanding of the dynamics of students’ interactions in higher education, it is necessary to do so.

To date, it is unclear to what extent collaborative learning fosters and encourages students to engage in conversations with faculty outside of class, thereby mediating the effect of SFI on learning outcomes. While studies have found a direct positive relationship with engaging in learning with peers on several learning outcomes (Smith, 1977; Twalle & Sanders, 1999; Whit, Edison, Pascarella, Nora, & Terenzini, 1999), little is known to what extent collaborative learning contributes to students’ learning and development through its mediating effects on SFI. Further, if this mediation effect varies by academic discipline.

Framework

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Methods
Sample:
- Senior respondents (n=95,491) of the NSSE 2014

Inclusion criteria:
- Mainly take course on campus
- Enrolled as full-time student

Statistical Method: Multi-group structural equation model

Student-Faculty Interaction:
- During the current school year, how often have you:
  - Talked about career plans with a faculty member
  - Worked with a faculty member on activities other than coursework
  - Discussed course topics, ideas, or concepts with a faculty member outside of class
  - Discussed your academic performance with a faculty member

Collaborative Learning:
- During the current school year, how often have you:
  - Asked another student to help you understand course material
  - Worked with other students on course projects or assignments

Self-reported Gains:
- How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?
  - Writing clearly and effectively
  - Speaking clearly and effectively
  - Thinking critically and analytically
  - Analyzing numerical and statistical information
  - Acquiring job- or work-related knowledge and skills
  - Working effectively with others
  - Developing or clarifying a personal code of values and ethics
  - Understanding people of other backgrounds
  - Solving complex real-world problems
  - Being an informed and active citizen

Grades: student’s most often letter grade from C- to A

Holland disciplinary fields:

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<td>Realistic</td>
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Results

Standardized Regression Coefficients in Multiple Academic Fields

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<tr>
<th>Effect</th>
<th>REA</th>
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<td>0.36</td>
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<td>GRAD on SF</td>
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<td>0.04</td>
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Indirect Effect of Collaborative Learning in Multiple Academic Fields

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Findings
- Student-faculty interaction has weak but positive indirect effect via collaborative learning on self-reported gains, and minimal negative effect on grades.
- The effects of student–faculty interaction and collaborative learning on learning outcomes also vary among disciplines. But the differences are more evident for effects on grades rather than self-reported gains.
- The frequencies of student-faculty interaction and collaborative learning vary among academic disciplines. Artistic majors have the highest student-faculty interaction frequency, but are the lowest on collaborative learning.

Discussion
Overall, this study explores the interplay between two effective educational practices on student learning and development. In theory and in practice, interaction with faculty and collaboration with other students are correlated by faculty’s efforts of approachability and collaborative learning pedagogies (Hurtado et al., 2011; Johnson, 1991; Umbach & Wawrzynski, 2005). It is possible by faculty emphasizing students to engage in collaborative learning, which involve individual’s willingness to share and engage in mutual respect (Panitz, 1999; Pascarella, 1980), this effective educational practice opens the door for students to approach faculty about other issues and advice.

References

- Aka (1992), New York, NY: Mandaray
- Snow (1973), American J. of Distance Ed., 39(3), 146-152.