Service-Learning Effects on the Academic Learning of Rehabilitation Services Students

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The effects of service-learning on the academic attainment of rehabilitation services students were examined using a quasi-experimental design. One hundred and thirty senior rehabilitation services students enrolled in the medical aspects of disabilities course, 65 with service-learning and 65 with classroom-only instruction. The same instructor taught both sets of students. Student academic achievement was measured over the semester using three multiple-choice examinations and three case studies. The case studies were scored by a teaching assistant blind to the students' learning option. Group comparisons controlled for early semester scores. Students involved with service-learning achieved significantly higher scores on the case studies and comparable scores on the multiple choice tests. Service-learning appeared to enhance academic learning more so than classroom-only instruction.

There is evidence to suggest that students learn best when engaged in co-constructing knowledge, testing received knowledge against real life experiences, challenging their own assumptions, and learning from and with civic involvement (Kolb, 1984; Mayer, 2003; Mpofu, 2004; Raman & Pashupati, 2002). Service-learning is a pedagogy that aims to strengthen student academic learning by integrating community-based and classroom learning (Eyler & Giles, 1999), enrich student civic learning, and apply student learning to benefit the broader community (Clark, 1999; Morgan, 2001; Raman & Pashupati). This article reviews the results of a comparative study of student academic achievement in service-learning versus traditional classroom-based learning designed to determine if there was value added when community service is integrated with classroom learning.

Service-learning accords students opportunities to make connections between what is learned in the classroom and the real world; it enables students to learn about phenomena in their subtlety and complexity. Students engaged in service-learning make use of reflective journals to analyze community experiences in relation to course objectives, received knowledge, personal values, and solution-focused action (Furco, 1996). As a result, students taking a course with service-learning are more likely to gain a broader understanding of the course content than students experiencing classroom instruction alone.

Service-learning is based on several instructional theories and frameworks: experiential learning (Knowles, 1975; Kolb, 1984; Schon, 1987), constructivism (Brooks & Brooks, 1993; Phillips,

1998; von Glaserfield, 1995) and learning communities (Wenger, 1998). These theories emphasize learning as a cycle of action, reflection, and subsequent informed action. Service-learning is consistent with other current trends in higher education, including an emphasis on student learning rather than teaching; interdisciplinary work; identity of colleges/universities as communities of learners in partnership with civic society (Walshok, 1999); and the scholarship of application, integration, and service (Votruba, 1996; Ward, 1998). Service-learning shares responsibility for student learning with teachers, students themselves, and communities, and has the potential to transform colleges/universities from disengaged ivory towers to institutional citizens.

There are many variations of service-learning (Bringle & Duffy, 1998; Eyler & Giles, 1999; Mpofu, 2004; Zlotkowski, 1998). The service-learning effort for this study involved a single course within a rehabilitation services program.

Regardless of the variation in service-learning program options, well-designed service-learning programs comprise a written plan of learning objectives and activities for the student (Mabry, 1998; Mpofu, 2005; Zlotkowski, 1998). The plan is developed by the student in collaboration with a community partner working with or serving community members (e.g., people with disabilities) and the faculty member(s) teaching the academic course. Students commit a certain number of hours per semester (about 10-60) to their community work. A time commitment to service-learning of at least 20 hours is recommended for meaningful participation (Mabry). A faculty member or service-

learning coordinator shares oversight of the partnership with the community.

Research evidence suggests that service-learners achieve the same level of content mastery as those with classroom instruction only (Shastri, 2001; Strage, 2000). There is evidence that service-learners achieve better academic grades than peers with classroom-only instruction (Markus, Howard, & King, 1993) and that learning gains for service-learners are significantly higher than peers when using essay rather than multiple-choice examinations (Miller, Yen, & Merino, 2002; Mpofu, 2005; Strage). For example, Mpofu observed higher achievement on case studies with service-learning than with classroom-only instruction in a multidisciplinary class, but the study's small sample precluded comparative analysis of student achievement within the rehabilitation major in which students have formal instruction in disabilities.

Differences in learning outcomes with service-learning are also attributed to the variation in the outcome measures used, the specific outcomes studied, and the timing of the measurement to the service-learning (Eyler, 2002; Furco & Billing, 2002; Mpofu, 2005; Strage, 2000). For example, creative or expressive type examinations (e.g., essays, case studies) are more likely to show positive effects from service-learning than predominantly factual type multiple choice examinations (Billig, Root, & Jesse, 2005; Mpofu). Furthermore, service-learning effects may be more evident later rather than earlier in the semester or after students have greater exposure to the use of service-learning instruments (e.g., reflective logs) in real world settings (Miller, Yen, & Merino, 2002; Mpofu; Strage).

About the Course

The senior level class on medical aspects of disabilities is offered at the Pennsylvania State University. The class is required for rehabilitation services majors. It draws enrollment from several other undergraduate majors (e.g., biobehavioral health, kinesiology, psychology, and recreation and parks management) who take the class as an elective or to meet a general education requirement. The class enrolls between 100 and 150 students per year, mostly from the rehabilitation services major.

The primary focus of the medical aspects of disabilities class is to equip students with knowledge, skills, and attitudes in the following curriculum areas: (a) biological, social, psychological, and environmental correlates of disabilities; (b) assessment of disability-related functional limitations; and (c) multidisciplinary interventions, such as planning for the provision of independent living and vocational rehabilitation services. Value-added

learning objectives unique to the service-learning option included: (a) identifying and developing community resources for people with disabilities; (b) experience working with people with disabilities; and (c) enfranchisement of individuals with disabilities. Classroom-only instruction is less likely to lead to learning in these areas.

Students chose to enroll in the medical aspects of disabilities class either with or without the community service option. The students electing the class with service-learning attended all classroom instruction sessions; their final grade was computed from fewer in-class examinations to offset scores earned from the service-learning experiences (e.g., reflection logs, in-class presentations, and term papers).

The students taking the class as service-learning interacted directly with persons with disabilities in everyday or non-clinical community settings. For example, they participated with individuals with disabilities in recreational activities, social skills building, home maintenance, consulting with medical professionals or agencies, disability management, job searches and coaching, and employer negotiations. Students were expected to acquire from these activities a real world or practical understanding of living with a chronic illness or disability while also making a difference in the lives of people with whom they worked.

The author taught the course, oversaw the service-learning, worked with community partners of people with disabilities to develop descriptions of disability-related learning activities possible with the specific person, and personalized each student's learning experience in the context of the nature of the disability-related services unique to the community member. The teaching protocol also included agency induction, orientation, mentor assignment, and experiential activity negotiation and evaluation. Students used reflective journals as the primary mechanism to harvest the community learning.

The Goals of the Study

The present study examined differences in student learning around the medical aspects of disabilities with service-learning versus classroom-only instruction using case studies and multiple choice examinations at mid-semester and end of the semester while controlling early semester scores. Two hypotheses were tested in this class: (1) students undertaking service-learning would achieve higher grades on case studies in medical aspects of disabilities than those without service-learning, and (2) students undertaking service-learning would achieve similar grades on multiple choice examinations as those without service-learning.

Method

Design and Participants

The study utilized a quasi-experimental design to evaluate the impact on students' achievement of service-learning as compared to classroom-only instruction. The sampling frame for the study was 340 senior students who enrolled for the medical aspects of disabilities class for a semester, over a period of six semesters. The achievement of 65 students who were rehabilitation services majors who elected to take the class with service-learning was compared to that of 65 randomly selected rehabilitation services students from the *same classes* who took the class with classroom-only instruction over the study period. One hundred and eighteen (or 91%) of the participants were female, and about three percent were racial minorities (Black, Asian, Latino-Hispanic).

The comparison group of those with classroom-only instruction was selected to be of equal size to those with service-learning. Comparability of sample sizes between the learning option conditions was necessary to enhance the reliability of the data analysis with the multivariate procedures described below. Parameter estimates with multivariate procedures are unstable with unbalanced sample sizes (Tabachnik & Fidell, 2001).

Measures

Students' achievement was assessed using three non-cumulative multiple-choice examinations, and three case studies completed over the semester. The non-cumulative multiple-choice examinations had four distractors per item, and were based on blocks of content on four to six types of disabilities taught in the previous four to five weeks. The Cronbach's alpha internal consistency reliabilities of the multiple-choice examinations ranged from .73 to .86.

The case studies were selected from the prescribed textbook for the class. The questions for the case studies typically required students to: (a) provide a vocational profile of the person with a specified disability; (b) identify any occupationally significant characteristics; (c) suggest possible medical causes for the disability; (d) evaluate the appropriateness of rehabilitation interventions received; (e) suggest alternative assessment procedures and interventions; (f) consider psychosocial and cultural aspects of the disability; and (g) discuss the prognosis from both a medical and quality of life perspective. A graduate teaching assistant blind to the students' learning-option assignments graded the case studies using a grading scheme provided by the instructor. The inter-rater reliability of grading by the graduate assistant compared to the course instructor on a sample of case studies (n =15) was .82. Students' multiple-choice examinations were computer-scored by the campus office.

Procedure

Students elected to take the class with service-learning or classroom-only instruction at the beginning of the semester. They were administered a multiple choice examination and case study early in the semester (week 3) before they elected their learning option. The two scores earned from the objective type examination and case study comprised the initial scores. The four scores for each student from the multiple-choice examinations and case studies from mid-semester and end of semester were used for the comparative analysis.

As previously described, students with the service-learning option attended all classes and completed the same readings as those with classroom-only instruction. They also presented on their community experiences focused on the specific disability population with whom they partnered to the whole class. Service-learners' reflective logs focused on lived-experience interpretations regarding community participation with a disability, and with special reference to personal and community factors that mediate individual functioning with a chronic illness and disability. All students were required to turn in case studies from the prescribed textbook focused on the seven issues previously described.

Data Analysis

Data were analyzed using Version 13.0 of the Statistical Package for the Social Sciences (SPSS). The data present repeat observations on individuals over a semester, and involve content of different types of medical conditions. A multivariate analysis of covariance (MANCOVA) design was used to examine the data, relating student achievement on the multiple-choice examinations and case study assignments to learning option (service-learning or classroom-only instruction), while controlling for the respective early semester scores. Controlling for early semester scores added to the chances that measure effects would be detected by reducing systematic variance from students' prior differences in knowledge of the rehabilitative aspects of medical conditions. It was assumed that the effects of differences among the students regarding rehabilitative aspects of disabilities on achievement were more likely to be present at early semester than later in the semester or after significant exposure to the curriculum. The Dunn-Bonferonni procedure was used to hold the overall experiment-wise type 1 error rate to an overall alpha of .05. In each case, effect sizes fol-

lowing the multivariate analysis are estimated using Pillai's Trace (Tabachnik & Fidell, 2001).

Results

Table 1 presents means and standard deviations of the students' achievement on multiple choice examinations and case studies at mid-semester and end-of-semester, by learning option. As apparent in Table 1, attainment on case studies increased over the semester, but less so with multiple-choice examinations. The between and within group difference in achievement on multiple choice examinations by the end of the semester was less than one point, whereas that for case studies was close to three points favoring the service-learners. The latter difference is reliable given initial achievement score controlling.

The inferential statistical analyses presented in Table 2 answered the specific research question regarding the reliability of between group differences, with or without the service-learning option, using case studies and multiple-choice examinations.

Effects on Student Achievement in Case Studies

Table 2 presents the results of the MANCOVA controlling for early semester score. The MANCOVA tests for the effect on student achievement on case studies by learning option within major was statistically significant for service-learning students, Pillai's Trace = .12, F(2, 126) = 15.51, $p <$ 01. Rehabilitation services students with service-learning achieved significantly higher scores on case studies at mid-semester, F (1, 127) = 9.83, $p <$ .01, and final, F (1,127) = 30.79, $p <$ .001, than peers with classroom-only instruction.

Effects on Student Achievement in Multiple Choice Type Examinations

Non-significant MANCOVA tests were observed for students' achievement on multiple-choice examinations by learning option, Pillai's Trace = .02; F (2, 126) = 1.32; $p >$ .05. As predicted, the

learning option did not reliably explain the variance in students' achievement on multiple choice examinations.

The multivariate model combining the intercept, covariate, and learning option explained about 20% of the variance in student achievement on objective type examinations, and 54% of the variance in student achievement on case studies.

Discussion

The present study examined students' achievement in the medical aspects of disabilities class with service-learning or classroom-only instruction using multiple choice type examinations and written case studies. A strength of this study is that it compared the effects on students' achievement of service-learning versus classroom-only instruction, controlling for both major and early semester achievement scores. In addition, the model of service-learning on which this study is based has the potential for adoption by other education programs, allowing for replication studies in a variety of disciplinary and institutional contexts.

Students taking a class on medical aspects with disabilities with service-learning achieved similar grades on multiple choice examinations to those with classroom instruction only. This finding replicates those from similar studies by Mpofu (2005), Shastri (2001), and Strage (2000). Medical facts, procedures, and outcomes, measured by multiple choice examinations, are likely to be as efficiently learned with classroom-only instruction as with classroom instruction integrated with service-learning. The efficiency of classroom-only instruction is supported, in part, by the research on models of massed versus spaced learning (e.g., Hertenstein, 2001: Kanfer, Ackerman, Murtha, Dugdale, & Nelson, 1994) which predict higher levels of learning with massed, factual learning (as would be the case with learning medical information) rather than with spaced learning in varied contexts and formats (as would be the case with

Table 1

Means (and standard deviations) for Exam Results by Learning Option Controlling for Early Semester Score (N = 130)

	Learning Option			
	Service-learning (n=65)		Classroom-only Instruction (n=65)	
Point in Semester	Multiple Choice Exams	Case Studies	Multiple Choice Exams	Case Studies
Early Semester	37.22 (4.75)	14.51(2.17)	37.20 (3.71)	14.53 (2.71)
Mid-Semester	37.53 (3.83)	16.20 (1.85)	37.98(3.76)	15.58(1.74)
End of Semester	37.92 (4.17)	17.61 (1.47)	37.18 (4.63)	16.46(1.65)

Note. Examinations were graded out of 50 points and case studies out of 20 points. The mean scores for mid-semester and end of semester in the table are covariate adjusted for early semester score.

Table 2

Results of Multivariate Analysis of Variance of Learning Achievement by Learning Option Controlling for Early Semester Scores (N = 130)

Source of Variance	Measures	Pillai's Trace	Univariate F tests (df = 1,127)
Learning Option			
Service-learning versus	*Multiple Choice Tests*	.02	
Classroom-only instruction)	Mid-semester		.20
	End of semester		1.87
	Case Studies	.12	
	Mid-semester		9.83*
	End of semester		30.79**

Note. * $p < .01$; ** $p < .001$.

service-learning). To the contrary, the findings of this study suggest that taking a human services class which is mostly technical in content (such as medical aspects of disabilities) with service-learning does not detract from the efficiency of learning associated with classroom-only instruction. Students with service-learning were as able as peers with classroom-only instruction to achieve content mastery.

The findings of this study also suggest that service-learning is superior to classroom-only instruction with case studies as outcome measures. A previous study by Mpofu (2005) also reported superior achievement on case studies with a multidisciplinary group of students with service-learning, as compared to those with classroom-only instruction. This study observed an effect-size of .12 on students' achievement on case studies for the service-learning, which is small by convention (e.g., Cohen, 1992) and probably moderate-sized for service-learning outcomes (Mpofu). Service-learning, which is based on experiential learning models (e.g., Wenger, 1998; Wenger, McDermont, & Snyder, 2002) has the unique advantage over classroom-only learning by also allowing for spaced learning in real world settings. In this regard, the medical facts and procedures that consumers with chronic illness and disability share in the content of the service-learning partnership are more apparent to service-learners than would be the case with classroom-only instruction. Spaced learning was more effective than massed learning for reliable application in real world settings (Dempster, 1989; Dempster & Farris, 1990; Perruchet, 1989; Tillema & van der Westuizen, 2003).

Taking a class on medical aspects with disabilities with service-learning rather than classroom-only instruction appears to accentuate student achievement on case studies. The positive effects of service-learning on students' achievement on case studies could be explained by the greater conceptual synergy of the disability-related constructs for service-learning students than peers with classroom-only instruction. The conceptual synergy hypothesis is supported by experiential learning theories that consider learning to be a semiotic, meaning-making process shaped by the contexts in which learning translates into products, practices, or outcomes (Kolb, 1984). Case studies require a greater ability to apply concepts to life-like situations. These skills are practiced more with service-learning than with classroom-only instruction. Service-learning appears to have greater potential than classroom-only instruction for enhancing applied learning. Outcomes from service-learning (e.g., applied education) seem to boost achievement on learning tasks used with classroom-only instruction (e.g., case studies). Thus, service-learning appears to add value to the quality of learning beyond what is possible with classroom-only instruction. Rehabilitation services students with classroom-only instruction could evolve a less developed conceptual understanding of living with chronic illness or disability due to a lack of reflective learning transfer opportunity to real world settings.

There is a need for studies that control for, or minimize, known confounds to observed evidence for the efficacy of service-learning. This study controlled for possible confounds on learning outcomes from differences in major and initial student achievement. The study also varied the timing of the learning achievement data collection to estimate the effects over the instruction period. The fact that students self-selected their learning option would not advantage or disadvantage outcomes with either learning option because students can be presumed to be equally motivated to learn by their preferred option. Furthermore, research suggests that assignment to service-learning had no attention effects in a study that randomly assigned entire instructional sections to either service-learning or classroom-only instruction (Markus, Howard, & King, 1993). Nonetheless, a potential confound on the observed

positive effects of service-learning on achievement on case studies could, in part, emanate from the common method overlap between reflective journals used with service-learning and case study analysis from the assigned readings. Both service-learning reflective journals and case study write-ups require use of integrative learning and expressive writing. Students with service-learning could have achieved higher scores on case studies from their more extensive experience with integrative learning and expressive writing skills in their reflective journals, over the semester as compared to peers with classroom-only instruction. Assessment procedures with reduced method overlap with service-learning (e.g., objective type examinations) might show less variance in student achievement by learning option.

The development of critical thinking and expressive writing skills are valued learning outcomes (Steinke, Fitch, Johnson, & Waldstein, 2002; Wurr, 2002). Service-learning appears to cultivate these skills in students better than classroom-only instruction. The results of this study report superior learning outcomes for service-learning as compared to classroom instruction for tasks requiring critical thinking and application of skills, while not detracting from fact acquisition learning.

Note

References

Billig, S., Root, S., & Jesse, D. (2005). The impact of participation in service-learning on high school students' civic engagement. *CIRCLE Working Paper 33*. University of Maryland, MD: The Center for Information & Research on Civic Learning & Engagement.

Bringle, R. G., & Duffy, D. K. (1998). *With service in mind: Concepts and models for service-learning in psychology*. Washington, D.C.: American Association for Higher Education/American Psychological Association.

Brooks, J. G., & Brooks, M. G. (1993). *In search of understanding: The case for constructive classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.

Clark, P. G. (1999). Service-learning education in community-academic partnerships: Implications for interdisciplinary geriatric training in the health professions. *Educational Gerontology*, *25*, 641-660.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155-159.

Dempster, F. N. (1989). Spacing effects and their implications for theory and practice. *Educational Psychology Review*, *1*, 309-330.

Dempster, F. N., & Farris, R. (1990). The spacing effect: Research and practice. *Journal of Research and Development in Education*, *23*, 97-101.

Eyler, J. (2002). Reflection: Linking service and learning-Linking students and communities. *Journal of Social Issues*, *58*, 517-534.

Eyler, J., & Giles, D. Jr. (1999). *Where's the learning in service-learning*. San Franscisco: Jossey-Bass.

Field, A. P. (2000). *Discovering statistics using SPSS for Windows: Advanced techniques for the beginner*. London, UK: Sage.

Fisher, B. J., & Finkelstein, M. S. (1999). The gerontology practicum as service-learning. *Educational Gerontology*, *25*, 393-409.

Furco, A. (1996). Service-learning: A balanced approach to experiential education. In B. Taylor (Ed.), *Expanding boundaries: Serving and learning* (pp. 2-6). Washington, D.C.: Corporation for National Service.

Furco, A., & Billig, S. H. (2002). Establishing norms for scientific inquiry in service learning. In S. H. Billig & A. Furco (Eds.), *Service-learning through a multidisciplinary lens* (pp. 15-32). Greenwich, CT: Information Age Publishing.

Hertenstein, E. J. (2001). Goal orientation and practice condition as predictors of training results. *Human Resource Developmental Quarterly*, *12*, 403-419.

Kanfer, R., Ackerman, P. L., Murtha, T. C., Dugdale, B., & Nelson, L. (1994). Goal setting, conditions of practice, and task performance: A resource allocation perspective. *Journal of Applied Psychology*, *79*, 826-835.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

Knowles, M. S. (1975). *Self-directed learning: A guide for learners and teachers*. Chicago, IL: Association Press.

Mabry, J. B. (1998). Pedagogical variations in service-learning and student outcomes: How time, contact, and reflection matter. *Michigan Journal of Community Service Learning*, *5*, 32-47.

Markus, G. B., Howard, J. P. F., & King, D. C. (1993). Integrating community service and classroom instruction enhances learning: Results from an experiment. *Educational Evaluation and Policy Analysis*, *15*(4), 410-419.

Mayer, R. E. (2003). *Learning and instruction*. Upper Saddle River, NJ: Prentice Hall.

Miller, K. K., Yen, S. C., & Merino, N. (2002). Service-learning and academic outcomes in an undergraduate child development class. In S. H. Billig & A. Furco (Eds.), *Service-learning through a multidisciplinary lens* (pp. 199-216). Greenwich, CT: Information Age Publishing.

Mpofu, E. (2004). Teaching with service-learning: Strategies and opportunities for rehabilitation counselor educators. *Rehabilitation Education*, *18*, 121-132.

Mpofu, E. (2005). Service-learning: Impact on the achievement of pre-service human service students. *Rehabilitation Education*, *19*, 249-258.

Morgan, W. (2001). Building citizenship: How student voice in service-learning develops civic values. *Social Science Quarterly*, *82*, 154-169.

Phillips, D. C. (1998). How, why, what, when, and where: Perspectives on constructivism in psychology and education. *Issues in Education*, *3*, 151-194.

Perruchet, P. (1989). The effect of spaced practice on explicit and implicit memory. *British Journal of Psychology*, *80*, 113-130.

Raman, P. & Pashupati, K. (2002). Turning good citizens into even better ones: The impact of program characteristics and motivations on service-learning outcomes. *Journal of Nonprofit and Public Sector Marketing*, *10*, 187-207.

Schon, D. A. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass.

Shastri, A. (2001, March). Examining the impact of service-learning among preservice teachers. *Paper Presented at the Annual Meeting of the American Association of Colleges for Teacher Education*, Dallas, TX.

Steinke, P., Fitch, P., Johnson, C., & Waldstein, F. (2002). An interdisciplinary study of service-learning predictors and outcomes among college students. In S. H. Billig & A. Furco (Eds.), *Service-learning through a multidisciplinary lens* (pp. 73-102). Greenwich, CT: Information Age Publishing.

Strage, A. A. (2000). Service-learning: Enhancing student learning outcomes in a college-level lecture course. *Michigan Journal of Community Service Learning*, *7*, 5-13.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. Boston, MA: Allyn & Bacon.

Tillema, H. H., & van der Westhuizen, G. J. (2003). Knowledge productive learning: A concept and tool for professional development. *Lifelong Learning in Europe*, *7*, 18-26.

von Glaserfeld, E. (1995). A constructivist approach to teaching. In L. P. Steffe & J. Gale (Eds.), *Constructivism in education* (pp. 3-16). Hillsdale, NJ: Erlbaum.

Votruba, J. C. (1996). Strengthening the university's alignment with society: Challenges and strategies. *Journal of Public Service and Outreach*, *1*, 29-36.

Walshok, M. L. (1999). Strategies for building the infrastructure that supports the engaged campus. In R. G. Bringle, R. Games, & E. A. Malloy (Eds.), *Colleges and universities as citizens* (pp. 29-44) . Boston: Allyn & Bacon.

Ward, K. (1998). Addressing academic culture: Service-learning, organizations and faculty work. In R. A. Rhoads & J. P. F. Howard (Eds.), *Academic service-learning: A pedagogy of action and reflection* (pp. 73-80). San Franscisco: Jossey-Bass Publishers.

Waterman, A. S. (1997). An overview of service-learning and the role of research and evaluation in service-learning programs. In A. S. Waterman (Ed.), *Service-learning: Applications from research* (pp. 13-24). Mahwah, NJ: Lawrence Erlbaum.

Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. New York: Cambridge University Press.

Wenger, E., McDermott, R., & Snyder, W. M. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Cambridge, MA: Harvard Business School Press.

Wurr, A. J. (2002). Service-learning and student writing: An investigation of effects. In S. H. Billig & A. Furco (Eds.), *Service-learning through a multidisciplinary lens* (pp. 103-122). Greenwich, CT: Information Age Publishing.

Zlotkowski, E. (1998). *Successful service-learning programs: New models of excellence in higher education*. Bolton, MA: Anker Publishing Company.

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