Wilkinson, I. A. G., Doepker, G. M., & Morbitt, D. (2012). Bringing service-learning to scale in an undergraduate Reading Foundations course: A quasi-experimental study. *Journal on Excellence in College Teaching, 23* (2), 93-122.

Bringing Service-Learning to Scale in an Undergraduate Reading Foundations Course: A Quasi-Experimental Study

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This study documents the effects of service-learning as it was introduced and brought to scale in an introductory undergraduate course in Reading Foundations for students seeking to become early and middle childhood education teachers. Participants included multiple cohorts of students in multiple instantiations of the course taught with and without service-learning over five years. Results from within- and between-instructor comparisons showed that the service-learning experiences had beneficial effects on students' ability to make connections between theory and practice and on their overall experience of the course. These effects were observed both in the initial pilot of service-learning and when service-learning was brought to scale in subsequent quarters. Results showed, however, that the service-learning had no effect on students' content knowledge related to reading processes and pedagogy.

I take it that the fundamental unity of the newer philosophy is found in the idea that there is an intimate and necessary relation between the processes of actual experience and education. (Dewey, 1938, p. 20)

Service-learning is becoming increasingly popular as an approach to instruction in teacher education programs (Anderson, Swick, & Yff, 2001; Flores & Yee-Sakamoto, 2006; Root, 1997). Service-learning is well suited to teacher education because it provides students with real-world learning experiences that complement their textbooks and classroom-based learning experiences (Gordon, 2006). Mayhew and Welch (2001) argued that service-learning in teacher education is a distinct pedagogy from more traditional field-based placements in that "The focus of service-learning should be on the accomplishment of tasks which meet human needs while promoting educational growth" (p. 211). In the study described in this article, the service in which students engage is to the needs of school children and their literacy development, and the students' educational growth is in the learning of academic theory and teaching methods.

Service-learning can be defined in a variety of ways. Erickson and Anderson (1997) wrote that it is most often defined as "a pedagogical technique for combining authentic community service with integrated academic outcomes" (p. 1). Shastri (2003) defined service-learning primarily as a pedagogical model to help students to bridge the gap between academic theory and practice. The service is directly linked to the needs of the community, while the learning is directly related to the knowledge gained by participants as they provide the service.

Service-learning embodies learning by doing, as proposed by Dewey (1938). Dewey argued that deep learning occurs when actual participation in socially situated events and subsequent reflection are coupled with the concepts being learned. He wrote,

> The social environment . . . is truly educative in its effect in the degree in which an individual shares or participates in some conjoint activity. By doing his [*sic*] share in the associated activity, the individual appropriates the purpose which actuates it, becomes familiar with its methods and subject matters, acquires needed skill, and is saturated with its emotional spirit. (Dewey, 1966, p. 22)

The goals of service-learning vary depending on the relative emphases given to its two components and the connections between them. According to Sigmon (1996), there is *service-LEARNING,* where the learning goals supersede the service goals; *SERVICE-learning,* where the service goals supersede the learning; and *service-learning*, where the service and learning are disconnected goals. There is also *SERVICE-LEARNING,* where service and learning are of equal importance and help to enhance the growth of both sets of participants.

An essential component of service-learning is reflection. Most examples

of service-learning in the research literature have required students to reflect on their experiences through writing, discussion, and/or presentations in class (Al Otaiba, 2005; Al Otaiba & Lake, 2006; Donahue, Bowyer, & Rosenberg, 2010; Gordon, 2006; James, & Iverson, 2009; Shastri, 2003; Theriot, 2006; Wade, 1995; Wasserman, 2009). Structured opportunities for reflection prompt students to relate the community service experience to the course material. Giving students opportunities to think, talk, and write about their service-learning experiences, provided the experiences are well connected to the academic curriculum, seems to be critical to enabling students to achieve a deeper understanding of the course material (Erickson & Anderson, 1997; Root, 1997).

Service-Learning in Teacher Education in Reading

The focus of our study is service-learning in preservice teacher education, where students are learning to teach reading in elementary and middle school settings. A large number of empirical studies have focused on the role of service-learning in preservice teacher education (for example, Donahue et al., 2010; James & Iverson, 2009; Shakir, 2003; Theriot, 2006; Wade, 1995). Few such studies, however, have investigated the relationship between service-learning and growth in the content knowledge and expertise of preservice teachers (for example, Markus, Howard, & King, 1993; Spencer, Cox-Petersen, & Crawford, 2005; Wade, 1995). There have been fewer studies still in which researchers have investigated the relationship between service-learning and growth in preservice teachers' knowledge and expertise related to the teaching of reading (Al Otaiba, 2005; Al Otaiba, & Lake, 2006; Gordon, 2006; Wasserman, 2009).

Al Otaiba (2005) conducted a case study of eight preservice special education teachers serving as reading tutors for at-risk readers who were English language learners. The preservice teachers tutored the children for 10 to 15 sessions over 10 weeks to fulfill a service-learning requirement. The author measured the preservice teachers' knowledge of the structure of the English language and of reading prior to and after the tutoring sessions using a standardized, multiple-choice test. The preservice teachers also completed reflective journal entries after each tutoring session. Al Otaiba found that preservice teachers' knowledge about language structure and reading improved to nearly 100% mastery after participating in the service-learning. She reported that the preservice teachers' reflective journal entries revealed that the "service-learning experience grounded their understanding of scientifically based reading research, helped them learn to apply their knowledge, and supported them in developing a

repertoire of strategies to differentiate instruction guided by progress-monitoring data" (p. 252). The study results also showed statistically significant increases in the English language learners' reading as measured by standardized measures of word attack, sound matching, and passage comprehension.

In a subsequent study, Al Otaiba and Lake (2006) examined growth in 18 preservice special education teachers' knowledge and preparation to teach reading as a result of a similar service-learning experience. The teachers tutored 14 struggling second grade readers weekly over one semester to fulfill the service-learning requirement of an undergraduate reading methods course. As in Al Otaiba (2005), the researchers measured teachers' knowledge of the structure of the English language and of reading prior to and following the tutoring sessions using a standardized, multiple-choice test, and the teachers completed reflective journals. Al Otaiba and Lake also administered a questionnaire to the teachers asking them about their preparedness to teach reading. They found that the preservice teachers' content knowledge of how to teach struggling readers and their sense of preparation to teach reading increased as a result of the service-learning experience. To evaluate the tutored children's growth in reading, Al Otaiba and Lake included a comparison group of students who received small-group, Title 1 instruction. The results showed that the tutored children demonstrated greater gains on standardized measures of decoding, word identification, and oral reading speed and accuracy than those of students in the comparison group, although they showed smaller gains on a standardized measure of reading comprehension.

Gordon (2006) examined whether service-learning affected the content knowledge of preservice teacher education students who were enrolled in a semester-long reading methods course. As part of the course, the preservice teachers were required to complete 20 hours of service-learning in a local elementary school, working with students who were English language learners. They conducted reading and language arts assessments, taught at least two lessons, and created a literacy profile on the students. The preservice teachers completed reflective journals to document how their service-learning experiences helped them to make connections to the course material. Gordon reported that the "journal entries revealed that the teaching credential candidates were able to refine their emerging professional competencies in phonemic awareness instruction, phonics instruction, vocabulary instruction, fluency instruction, and comprehension skill development through practice teaching . . . and reflective writing" (p. 8). This study did not include direct assessment of the preservice teachers' content knowledge.

Although results of these studies are suggestive of the benefits of service-learning for preservice teacher education in reading, they permit only limited conclusions to be drawn. All of them involved only single-group research designs. Because the studies did not employ a comparison group of preservice teachers who did not participate in service-learning, the reported gains in attitudes, knowledge, or competencies cannot be attributed solely to the service-learning experiences. Some gains might have occurred as a result of the course even in the absence of service-learning. Moreover, only Al Otaiba (2005) and Al Otaiba and Lake (2006) tested participants' content knowledge directly. Gordon (2006) relied on participants' self-reports of their content knowledge gained as a result of the course.

In our review of the literature, we identified only one study of service-learning in preservice teacher education that focused on the teaching of reading and included a comparison group. Wasserman (2009) examined the effects of two literacy courses on 24 elementary teacher candidates' sense of self-efficacy regarding their ability to teach reading and on their teaching practices. The courses were held from 8:30 a.m. to 3:00 pm for two full weeks. One course included a service-learning component that required 12 preservice teacher education candidates to practice newly learned pedagogies with children at a designated low performing, highly diverse elementary school. The other course did not include service-learning; instead, 12 candidates role-played sample lessons with their classmates. The same instructor taught the courses at the same university, with all other factors held constant. Data were collected from the candidates' daily reflective journals and coded for words and phrases that indicated their sense of self-efficacy for teaching reading. Five months after the course, all candidates were observed twice and interviewed twice to determine the extent to which they were implementing newly acquired teaching practices in their student placements. The candidates also met monthly with the instructor over the five-month follow-up period to discuss their experiences in the field. Results showed that the candidates who participated in the service-learning demonstrated a greater sense of self-efficacy in their journals and greater implementation of the course content in their student teaching than did the candidates who role-played with their peers.

Wasserman's (2009) study provides the best evidence yet of the benefits of service-learning for preservice teacher education in reading. Findings from the study are limited, however, by the small sample size and short duration. Because of the small number of participants and the focus on single courses taught over two weeks, results need to be interpreted care-

fully. Individual differences and novelty effects, among other factors, are potential threats to the validity of the findings.

The Study

The purpose of this study was to document the effects of service-learning as it was introduced and brought to scale in an introductory undergraduate course in reading education. We present the results of a multiple cohort's analysis of prospective teacher education students who were enrolled in a quarter-length course, *Reading Foundations*. The study employed a quasi-experimental design that compared the effects of the course taught with and without service-learning, involving both within-instructor and between-instructor comparisons, across multiple instantiations of the course from Winter quarter 2001 through Summer quarter 2006. We sought to examine the extent to which service-learning affected students' content knowledge related to reading processes and pedagogy, their ability to make connections between theory and practice, and their overall experience of the course.

The rationale for incorporating service-learning into *Reading Foundations* was based on what Sigmon (1996) would classify as service-LEARNING. The primary goal of the service-learning was to enhance the learning experience of the prospective teacher education students. Based on the research reviewed earlier, we hypothesized that the course with service-learning would enhance the students' content knowledge of reading processes and pedagogy, their ability to make connections between theory and practice, and their overall experience of the course.

Method

Participants

Study participants comprised 16 cohorts of prospective teacher education students who were enrolled in the course *Reading Foundations* at a large Midwestern university between 2001 and 2006. There were, on average, 27 students per cohort, for a total of 424 students. Students were in the third or fourth year of their undergraduate program and were required to complete this course, among other literacy courses, to enter into a master's degree program to gain licensure as an elementary or middle school teacher.

The Course

Reading Foundations was developed by the first author in 2000 to introduce prospective teacher education students to theoretical foundations of reading and reading instruction (the second author was an instructor for the course; the third author was the service-learning coordinator). The original course did not incorporate a service-learning component, but instead employed lectures, videos of classroom instruction, and exercises designed to make connections to classroom practice. The aim of the course was to introduce students to the theories and practices of teaching and learning of reading for children aged 3-14 years. It was a foundation course in reading education intended, in part, to fulfill the requirements for state licensure standards for students seeking to become teachers in early and middle childhood education.

The service-learning component of the course was introduced as a pilot in one section of the course in spring quarter 2002, and in other sections of the course in subsequent quarters. The primary rationale for incorporating service-learning into the course was to help prospective teacher education students to apply their knowledge of theory to practical classroom situations. Students were required to perform three to four hours per week of literacy-related community service in local elementary and middle schools, for a total of at least 30 community service hours over the quarter (for reasons described below, we later reduced this amount to at least 25 hours). Students were asked to work with children in one-to-one, small-group, and whole-class settings to engage the children in a range of activities to foster literacy development. Typical literacy activities included listening to children read and prompting use of reading strategies, supporting children's comprehension through guided questioning and story retelling, creating opportunities to write, reading stories aloud to children, and using activities to motivate children to read. As a part of the course, students also were required to conduct a Running Record (Clay, 2002) of a child's oral reading of a story or informational text and to assess the child's comprehension of the text. The intended benefit of the service-learning component of the course for prospective teacher education students was understanding how theoretical ideas about reading and reading instruction were applied in the classroom; the intended benefits for teachers and their students was increased support for the children's literacy development.

We made adjustments in class contact time and the scheduling of service-learning hours as we scaled up the course with service-learning. When we introduced the service-learning component, we made a com-

mensurate reduction of in-class time from four contact hours per week to two and one-half contact hours per week. This reduction in contact time was necessary to accommodate the service-learning component of the course and to meet university requirements. In the Spring 2002 pilot version of the course, we required students to complete at least 30 hours of service-learning. In subsequent quarters, we reduced this requirement to at least 25 hours in response to students' concerns (see below).

Initially, we required students in every quarter to complete the service-learning component. In the Summer quarter, in place of doing service-learning in elementary and middle schools (which were not in regular session), students worked with children who were experiencing reading difficulties in a one-to-one tutoring situation at a local church. We found, however, that students derived little benefit from working in this tutoring situation—for our purposes, service-learning needed to be embedded within the context of structured classroom activities for the prospective teacher education students to benefit from the experience. Thereafter, we limited the service-learning version of the course to the Autumn, Winter, and Spring quarters. The summer course followed the original version without service-learning and required four hours of contact time using lectures, videos, and exercises.

An important feature of the course version taught with service-learning was the opportunity for reflection. As part of the regular requirements for the course, students were required to complete journals throughout the quarter in which they kept a record of their service-learning experiences and reflected on those in relation to course content. The reflective journals prompted students to make connections between theoretical concepts presented in the course and the practices they participated in and observed in their service-learning. We asked students to comment on the challenges they encountered and the insights they gained about the reading process, the processes of teaching and learning, instructional approaches for fostering and promoting children's reading development, classroom assessment, strategies for meeting the needs of children of diverse backgrounds and abilities, and the use of technology to support children's reading development. The reflective journals also served as a basis for in-class discussions about theory-to-practice connections. The service-learning experiences were thought to be fundamental for students to make connections between theory and practice, and the reflective journals helped to document these connections.

A total of 23 schools participated in the service-learning program, and the mean number of schools participating in any one year was 10. Five schools continued with the service-learning program from the beginning

of the program to the last quarter for which we collected data. One elementary school that began with one teacher participating in 2002 expanded its participation to 18 teachers in 2007. Four language arts teachers from a middle school and four teachers from an elementary school participated over the entire five years for which we have data.

Design and Data Collection

The design of the study was quasi-experimental and involved both within-instructor and between-instructor comparisons. For the within-instructor comparisons, we conducted a successive cohorts analysis of students' experiences in six versions of the course, three taught before the introduction of service-learning (Winter 2001, Autumn 2001, Winter 2002) and three taught after its introduction (Spring 2002, Autumn 2002, Winter 2004). The same instructor (the first author) taught all of these versions of the course, and topics, textbooks, and assignments were held constant. As indicated, the course versions before the introduction of service-learning relied on lectures, videos, and exercises; the versions after the introduction of service-learning incorporated the use of reflective journals and discussions to prompt students' reflection on their service-learning experience. At the end of each these versions of the course taught by the first author, students completed a final exam comprising 40 multiple-choice items and four constructed-response items that required students to write short answers, for a total possible score of 50 points. This exam assessed students' declarative knowledge of course content and comprised items selected from the instructor test booklet that accompanied the text.

Two thirds of the way through four of these course versions (Autumn 2001, Spring 2002, Autumn 2002, Winter 2004), a faculty member from the university's office of teaching development was invited to the class to conduct focus groups to solicit students' feedback about the course. The faculty member sought students' responses to three open-ended questions: *What are the strengths of the course and instructor that assist you in learning? What things are making it more difficult for you to learn?* and *What specific changes would you recommend to the instructor that would assist you in learning?* Students first completed a questionnaire individually, and then they formed small groups to discuss their responses. After a 10-minute discussion, the groups shared their comments with the class to reach a general consensus on each question. These evaluations were limited to only four versions of the course because of the intensive nature of the feedback exercise. The instructor was not present during these evaluations, and service-learning was not explicitly mentioned as the subject

of the evaluation, nor were students aware that different versions of the course were being compared over time.

We coded students' ($n = 96$) responses to the three questions asked in the focus groups to identify the strengths of the course, students' difficulties in learning, and recommended changes. We coded only students' individual responses, because these provided the richest source of data and were not influenced by other class members. We coded students' responses in terms of categories within four general themes: content, teaching methods, assignments, and use of time (these themes were used in the office of teaching development's analysis of students' responses, though we conducted our own analysis of the data). A given response could be coded in terms of multiple categories. To establish inter-coder agreement, one of the four versions of the course was randomly selected and two coders independently coded all students' responses. Across the responses of 20 students, the coders agreed on a mean of 87.3% of the codes for strengths, a mean of 90.0% of the codes for difficulties, and a mean of 93.3% of the codes for changes. Where coders categorized a response in terms of multiple categories, they typically disagreed on only one out of two to five codes.

For the between-instructor comparisons, we compared students' experiences in 11 versions of the course: four versions taught *without* service-learning (two in Summer 2003, one each in Summer 2004 and Summer 2006) and seven taught *with* service-learning (three in Autumn 2003, four in Winter 2004) taught by a total of nine instructors, all doctoral students in education with experience teaching reading in elementary or middle school. Again, within limits, topics, textbooks, and assignments were held constant (new editions of the textbook were used as they became available, and some instructors modified the details of the assignments or incorporated additional assignments). At the end of each version of the course, the instructors administered a survey soliciting students' perceptions of the course. We developed this end-of-course survey from a database of items made available by the university's office of teaching development. We selected those items that most directly assessed the quality of the students' learning experiences. Our survey comprised 17 Likert-scale items to which students could respond on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) (see Appendix A). In addition to the Likert-scale items, there were two constructed-response items: *How did the way in which the course was designed help or hinder your learning?* and *Are there any learning experiences that could be added or dropped to increase course effectiveness?* Again, none of the items explicitly asked about service-learning, and students were not aware that different versions of the course were being compared.

We conducted a content analysis of students' written responses to the two constructed-response items on the end-of-course survey. Students' responses to the two items overlapped. We, therefore, coded students' responses in terms of what they "liked" and "disliked" about the course as well as what learning experiences they wanted to see "increased" or "decreased." We coded the students' open-ended responses in terms of seven features of the course: the service-learning experience, the service-learning hours, the in-class discussions about service-learning, practical experience, learning how to do the Running Records, expectations for assignments, and the textbook. Two coders independently coded a randomly selected sample of 40 students' responses to these items, and results showed 80% agreement in their coding of the responses.

In addition, we collected students' anecdotal comments from their reflective journals related to their overall experience with service-learning. We did not explicitly ask students to make comments about the overall value of the service-learning experience in their journals. Nevertheless, many students spontaneously offered evaluative comments in their final journal entries. While the comments we collected from the journals are illustrative of the comments we received about the service-learning, they should by no means be viewed as representative.

Results

Within-Instructor Comparisons

Table 1 shows students' ($n = 183$) final examination scores before (Winter 2001, Autumn 2001, Winter 2002) and after (Spring 2002, Autumn 2002, Winter 2004) the introduction of service-learning. Results of independent samples *t* tests show no significant differences between groups in students' scores on the multiple-choice or constructed response items. Students' content knowledge of reading theory and instruction remained at the same levels before and after incorporation of the service-learning experience.

Table 2 shows students' responses to the first focus group question provided by the office of teaching development: *What are the strengths of the course and instructor that assist you in learning?* Before the introduction of service-learning (Autumn 2001), features of the course that students most frequently identified as strengths were the handouts, overhead slides, and outlines used to provide structure for the course (60.71% of students), the videos (28.57%), the examples (21.43%), and the relevance of the content to course goals (21.42%). It is interesting to note that, before the introduction of service-learning, no students mentioned that connections between

Table 1
Mean Scores on Final Exam Before and After the Introduction of Service-learning (standard deviations in parentheses)

Item	*Before*	*After*	*t*	*df*
Multiple-Choice	31.88 (3.77)	32.06 (3.26)	0.35	181
Constructed Response	6.85 (1.91)	6.53 (1.86)	1.14	181

theory and application/practice were a strength of the course. By contrast, after the introduction of service-learning in Spring 2002, the feature that was most frequently mentioned as a strength was the service-learning component (80.00% in Spring 2002, 30.77% in Autumn 2002, 81.82% in Winter 2004). Handouts, overhead slides, and outlines remained popular, but not to the extent that they were before service-learning was introduced (40.00% in Spring 2002, 26.92% in Autumn 2002, 31.82% in Winter 2004). After the introduction of service-learning, the connections made between theory and application/practice were also frequently mentioned as a strength of the course (35.00% in Spring 2002, 11.54% in Autumn 2002, 22.73% in Winter 2004). Videos were consistently mentioned as a strength throughout (25.00% in Spring 2002, 19.23% in Autumn 2002, 36.36% in Winter 2004). These patterns of responses are less clear in the Autumn 2002 version of the course; nevertheless, the trends are apparent. We believe the declines in Autumn 2002 were due to difficulties that students experienced in scheduling their service-learning hours in conjunction with their classes and in understanding the rationale for the service-learning experience (we were more explicit about the rationale for service-learning in the Spring 2002 pilot). In subsequent quarters, we sought to minimize scheduling difficulties and to emphasize the relevance of their experiences in schools to the knowledge and understanding they gained from the course.

Table 3 shows students' responses to the second focus group question provided by the office of teaching development: *What things are making it more difficult for you to learn?* Before the introduction of service-learning, features of the course that students most frequently identified as presenting difficulties for their learning were making connections between theory and application/practice (17.86% of students), lectures (17.86%), and the length or frequency of the class sessions (17.86%). After the introduction of service-learning, the frequency of responses in these categories changed substantially. No students mentioned that making connections

Table 2
Students' Responses to Focus Group Question No. 1: "What are the strengths of the course and instructor that assist you in learning?" (percentage of students)

	Topic	*NO SL*[1] *Autumn 01*	*SL PILOT Spring 02*	*SL Autumn 02*	*SL Winter 04*
CONTENT	Repetition	0%	5.00%	0%	0%
	Interesting	7.14%	0%	0%	0%
	Theory-to-Application/Practice	0%	35.00%	11.54%	22.73%
	Relevance	21.42%	10.00%	0%	4.55%
	Organization/Clarity	10.71%	0%	3.85%	13.64%
	Amount of Material	0%	0%	0%	0%
	Challenging	0%	0%	0%	0%
	Pace[2]	7.14%	0%	0%	4.55%
TEACHING METHODS	Service-Learning	NA	80.00%	30.77%	81.82%
	Small Groups/Discussions	14.29%	20.00%	11.54%	18.18%
	Activities	0%	0%	0%	9.09%
	Examples	21.43%	0%	0%	13.64%
	Handouts/Overheads/Outlines	60.71%	40.00%	26.92%	31.82%
	Lectures	0%	10.00%	7.69%	4.55%
	Videos	28.57%	25.00%	19.23%	36.36%
	Workshops	0%	0%	0%	4.55%
	Application Cases	0%	0%	0%	0%

Table 2
Students' Responses to Focus Group Question No. 1: "What are the strengths of the course and instructor that assist you in learning?" (percentage of students) (*continued*)

	Topic	*NO SL*[1] *Autumn 01*	*SL PILOT Spring 02*	*SL Autumn 02*	*SL Winter 04*
ASSIGNMENTS	Exams	0%	5.00%	7.69%	0%
	Book/Reading Assignments	10.71%	10.00%	0%	4.55%
	Technology/WebCT	3.57%	0%	0%	0%
	Running Record	3.57%	0%	0%	4.55%
	Reflective Journal	NA	10.00%	0%	13.64%
	Feedback/Grading	0%	0%	11.54%	4.55%
TIME	Length/Frequency of Class	0%	0%	0%	0%
	Service-Learning Hrs./Schedule	NA	0%	3.85%	0%
	Course Load	0%	0%	0%	0%

Notes.
[1]SL = Service-Learning
[2]Pace refers to amount of content coverage per unit of time.

Table 3
Students' Responses to Focus Group Question No. 2:
"What things are making it more difficult for you to learn?" (percentage of students)

	Topic	*NO SL*[1] *Autumn 01*	*PILOT Spring 02*	*SL Autumn 02*	*SL Winter 04*
CONTENT	Repetition	3.57%	5.00%	19.23%	4.55%
	Interesting	10.71%	15.00%	23.08%	18.18%
	Theory-to-Application/Practice	17.86%	0%	0%	13.64%
	Relevance	7.14%	0%	0%	0%
	Organization/Clarity	0%	0%	3.85%	0%
	Amount of Material	10.71%	10.00%	0%	9.09%
	Challenging	0%	0%	3.85%	0%
	Pace[2]	14.29%	5.00%	0%	0%
TEACHING METHODS	Service-Learning	NA	0%	7.69%	9.09%
	Small Groups/Discussions	7.14%	0%	0%	4.55%
	Activities	3.57%	0%	0%	0%
	Examples	0%	0%	3.85%	0%
	Handouts/Overheads/Outlines	0%	0%	0%	0%
	Lectures	17.86%	20.00%	11.54%	4.55%
	Videos	3.57%	0%	0%	4.55%
	Workshops	0%	0%	0%	0%
	Application Cases	0%	0%	0%	0%

Table 3
Students' Responses to Focus Group Question No. 2:
"What things are making it more difficult for you to learn?" (percentage of students) (*continued*)

	Topic	*NO SL*[1] *Autumn 01*	*PILOT Spring 02*	*SL Autumn 02*	*SL Winter 04*
ASSIGNMENTS	Exams	0%	5.00%	0%	0%
	Book/Reading Assignments	7.14%	10.00%	7.69%	22.73%
	Technology/WebCT	0%	0%	7.69%	0%
	Running Record	3.57%	0%	3.85%	0%
	Reflective Journal	NA	0%	7.69%	13.64%
	Feedback/Grading	3.57%	0%	3.85%	22.73%
TIME	Length/Frequency of Class	17.86%	75.00%	69.23%	18.18%
	Service-Learning Hrs./Schedule	NA	30.00%	11.54%	0%
	Course Load	0%	5.00%	3.85%	9.09%

Notes.
[1]SL = Service-Learning
[2]Pace refers to amount of content coverage per unit of time.

between theory and application/practice was a problem in Spring 2002 and Autumn 2002, although 13.64% of students did so in Winter 2004 (a result for which we have no explanation). A number of students (20.00%) identified lectures as a difficulty in Spring 2002, but fewer did so in Autumn 2002 (11.54%), and fewer still in Winter 2004 (4.55%). A majority of students (75.00%) mentioned that the length or frequency of the class was a difficulty in Spring 2002, but fewer students did so in Autumn 2002 (69.23%) and fewer still in Winter 2004 (18.18%). In the Spring 2002 pilot, many students indicated that completing the required 30 hours of service-learning was difficult. As indicated earlier, in response to these comments, we reduced this requirement to a minimum of 25 hours in subsequent quarters. Thereafter, fewer students reported difficulty completing the required service-learning hours.

Table 4 shows students' responses to the third focus group question provided by the office of teaching development: *What specific changes would you recommend to the instructor that would assist you in learning?* Before the introduction of service-learning, features of the course that most students recommended changing were the small-group discussions (25% of students), the activities (17.86%), and the assigned reading from the text (17.86%). After the introduction of service-learning, the frequency of responses in these categories declined (although 18.18% of students in Winter 2004 also recommended changing the assigned reading). The difficulties noted in Table 3 for the length or frequency of the class and completing the required service-learning hours were also apparent in students' recommendations for change. Many students initially responded that the length or frequency of the class was excessive and recommended that the number of required service-learning hours be reduced. By Winter 2004, following the reduction in service-learning hours from a minimum of 30 to a minimum of 25 hours, and our efforts to explain the rationale for the service-learning experience, these concerns were no longer apparent.

Between-Instructor Comparisons

Table 5 shows students' responses to the 17 Likert-scale items on the end-of-course survey administered to students in 11 versions of the course: four versions taught without service-learning and seven taught with service-learning. We used independent samples *t* tests to compare responses between the two groups and set the level of alpha to .001 to minimize family-wise Type-1 error. All differences are statistically different in favor of the course with the service-learning component with one exception: Students in both groups were either neutral or agreed with the

Table 4
Students' Responses to Focus Group Question No. 3: "What specific changes would you recommend to the instructor that would assist you in learning?" (percentage of students)

	Topic	*NO SL*[1] *Autumn 01*	*PILOT Spring 02*	*SL Autumn 02*	*SL Winter 04*
CONTENT	Repetition	0%	0%	3.85%	0%
	Interesting	3.57%	0%	3.85%	0%
	Theory-to-Application/Practice	14.29%	0%	3.85%	0%
	Relevance	10.71%	0%	3.85%	0%
	Organization/Clarity	0%	0%	3.85%	0%
	Amount of Material	3.57%	5.00%	0%	0%
	Challenging	0%	0%	0%	9.09%
	Pace[2]	3.57%	0%	0%	0%
TEACHING METHODS	Service-Learning	NA	5.00%	15.38%	9.09%
	Small Groups/Discussions	25.00%	5.00%	7.69%	4.55%
	Activities	17.86%	5.00%	3.85%	9.09%
	Examples	0%	0%	3.85%	4.55%
	Handouts/Overheads/Outlines	14.29%	0%	7.69%	0%
	Lectures	14.29%	15.00%	7.69%	4.55%
	Videos	3.57%	10.00%	0%	0%
	Workshops	0%	0%	0%	0%
	Application Cases	0%	0%	0%	0%

ASSIGNMENTS	Exams	7.14%	10.00%	3.85%	4.55%
	Book/Reading Assignments	17.86%	5.00%	11.54%	18.18%
	Technology/WebCT	0%	0%	30.77%	0%
	Running Record	0%	0%	15.38%	4.55%
	Reflective Journal	NA	0%	23.08%	13.64%
	Feedback/Grading	7.14%	0%	3.85%	31.82%
TIME	Length/Frequency of Class	3.57%	40.00%	19.23%	0%
	Service-Learning Hrs./Schedule	NA	75.00%	11.54%	0%
	Course Load	0%	10.00%	3.85%	0%

Notes.
[1]SL = Service-Learning
[2]Pace refers to amount of content coverage per unit of time.

Table 5
Mean Scores on End-of-Course Survey Items for Versions Without Service-Learning and With Service-Learning (standard deviations in parentheses)

	Without Service-Learning	*With Service-Learning*	t	df	ES
Relevance to goals	4.00 (0.78)	4.48 (0.65)	5.27*	263	0.62
Areas of knowledge	3.76 (0.93)	4.33 (0.77)	5.30*	263	0.61
Understanding	3.65 (0.82)	4.25 (0.79)	5.66*	262	0.73
Factual knowledge	3.80 (0.81)	4.25 (0.77)	4.35*	263	0.56
Skills, techniques	3.75 (0.87)	4.42 (0.71)	6.74*	263	0.77
Professional growth	3.40 (0.96)	4.26 (0.82)	7.55*	262	0.90
Assigned reading	3.48 (0.92)	3.65 (1.01)	1.34	263	0.18
Background knowledge	3.85 (0.77)	4.23 (0.77)	3.72*	261	0.49

Assignments – learning	3.71 (0.82)	4.26 (0.71)	5.65*	263	0.67
Assignments – interest	3.19 (1.06)	4.02 (0.89)	6.69*	263	0.79
Films/videos	3.28 (1.02)	3.97 (0.83)	5.75*	249	0.68
Assessment appropriate	3.53 (1.00)	4.21 (0.80)	6.03*	262	0.68
Assessment consistent	3.63 (0.88)	4.26 (0.73)	6.13*	262	0.72
Activities	3.40 (1.06)	4.23 (0.73)	7.45*	260	0.78
Attention	3.40 (1.09)	4.04 (0.87)	5.13*	260	0.59
Effort	3.46 (1.01)	4.10 (0.87)	5.30*	260	0.63
Receptive	3.68 (0.83)	4.38 (0.67)	7.37*	259	0.85

Note. 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree
*$p < .001$

statement "Assigned reading was important for understanding course material." For the items that showed statistically significant differences, effect sizes (calculated as the difference between means of the two groups divided by the standard deviation for the group without service-learning) ranged from 0.49 to 0.90. The highest effect sizes were found for the following items: "Course developed my understanding of concepts and principles," "Course helped develop skills, techniques, or views I need in this field," "Course contributed significantly to my professional growth," "Course assignments stimulated my interest in the course," "Assessment methods were consistent with course goals," "Activities were well chosen and well organized," and "I was receptive to the learning possibilities offered by this course."

Next, we consider results from our content analysis of students' responses to the two constructed-response items on the end-of-course survey. Response rates were low because not all students responded to the two constructed response items. Results show that, across the seven versions of the course taught with service-learning, a mean of 38% (range 20-52%) of students wrote that they liked the service-learning experience. A mean of 7% (range 0-13%) of students who experienced the service-learning wrote that they liked the expectations for the assignments. In line with data presented earlier, a mean of 8% (range 0-25%) of students who experienced service-learning wrote that they wanted to decrease the number of required service-learning hours. A mean of 8% (range 0-14%) of students who experienced service-learning also wanted to decrease the amount of reading from the text. By contrast, across the four versions taught without service-learning, a mean of 13% (range 0-32%) of students expressed dislike for the assignments, and a mean of 11% (range 0-18%) expressed dislike for the textbook. A mean of 5% (range 4-6%) of the students who did not experience service-learning suggested increasing the practical experience in the course (as noted earlier, before the introduction of service-learning, the practical experience simply took the form of in-class simulations, where students were asked to implement various reading strategies/concepts in class with their peers). A mean of 5% (range 0-13%) of the students who did not experience service-learning also suggested increasing the time devoted to the Running Records, another practical activity. There were no other noteworthy results from analysis of responses to the constructed-response items on the end-of-course survey.

Discussion

The purpose of this study was to document the effects of service-learning in an introductory course in reading education on students' content

knowledge related to reading processes and pedagogy, their ability to make connections between theory and practice, and their overall experience of the course. Results from within-instructor comparisons showed no change in students' content knowledge of reading processes and pedagogy before and after the introduction of service-learning. After the introduction of service-learning, however, students' focus group responses showed that service-learning was the most frequently mentioned strength of the course and that the introduction of service-learning was associated with an increased ability of students to make connections between theory and practice. When service-learning was first incorporated into the course, students experienced difficulty accommodating the service-learning hours into their schedules. This difficulty became less apparent, however, when we reduced the service-learning from a minimum of 30 hours to a minimum of 25 hours per quarter. We note that the reduction in concerns about the time commitment was probably also associated with improvements in our presentation and management of the service-learning component. As we gained more experience, we learned how to explain the rationale for service-learning, to integrate the service-learning into the curriculum, and to accommodate students' schedules.

Results from between-instructor comparisons showed students' responses to all aspects of the course, with the exception of the assigned reading from the textbook, were overwhelmingly more positive after service-learning was incorporated into the course. The pattern of responses suggested that the incorporation of service-learning made the course content more meaningful for students and helped further their understanding of concepts and principles as well as their professional growth in areas relevant to practice in the field.

This study used direct assessment of students' content knowledge and included comparison groups of preservice teachers who did not participate in service-learning. On the basis of prior research on service-learning in teacher education in reading (Al Otaiba, 2005; Al Otaiba & Lake, 2006; Gordon, 2006), we had hypothesized that service-learning would enhance prospective teacher education students' knowledge of reading processes and pedagogy. Results on the final exam did not support this hypothesis, however. Nevertheless, the students' content knowledge did not suffer despite the reduction in class contact time with the introduction of service-learning. One explanation for this "null" finding is that the final exam simply assessed students' declarative knowledge of the content of the textbook. Presumably, students' acquisition of this content was independent of the service-learning experience—indeed, results from the end-of-course survey suggested that service-learning had no effect on

the importance students attached to the assigned reading from the text. Another explanation is that the exam was not sufficiently representative of students' depth of understanding of course content. As noted by Ball (2003) and Eyler (2000), the learning that college students undergo in the context of service-learning is complex and nuanced, and it is by no means clear what sort of assessments are most appropriate for capturing the intellectual outcomes.

Taken together, results from the within- and between-instructor comparisons suggest that service-learning had the greatest positive impact on students' ability to make connections between theory and practice and on their overall experience of the course. In this respect, our results are consistent with those of Wasserman (2009). Anecdotal comments selected from various students' reflective journal entries from Spring 2002, Autumn 2002, and Spring 2005 illustrate how their classroom experiences helped them to make connections between theory and practice (see Table 6). Students reported that they found their service-learning experiences extremely valuable in helping them make sense of the concepts covered in the course.

Limitations

It is, of course, possible that the favorable results in support of the service-learning version of the course were due to differences between the cohorts of students involved in service-learning and those not involved. This argument becomes less tenable, however, when one considers that the effects were documented across multiple cohorts. It is also possible that the effects were due to the novelty of the service-learning. Again, this explanation seems unlikely given that the benefits were sustained even when service-learning had become institutionalized as a regular component of the course.

Several other limitations of the study need to be mentioned. One is the lack of direct measurement of the prospective teacher education students' interactions with the children or of the children's progress in reading. As we pointed out earlier, the primary goal of incorporating service-learning into *Reading Foundations* was to enhance the learning experience of the prospective teacher education students. The service provided to the schools and children was a secondary goal. Another limitation is the lack of observational data on the extent to which the prospective teacher education students subsequently implemented program-relevant pedagogical practices as teacher education students in their field placements (in contrast to Wasserman, 2009, who collected

Table 6
Anecdotal Comments From Students' Reflective Journals

"I am incredibly grateful that I got to experience children's literacy in a classroom. I have learned so much about the process of reading as well as how to assess reading. Without my field placement, I do not think I would have made connections between the classes and the schools. Thank you for giving me the opportunity of being in a classroom to learn—I had a wonderful time." (Spring, 2002)

"This has been such an incredible experience seeing the improvement in the boy's reading and behavior since I began incorporating strategies learned in class. … I am now so much more observant having learned about reading in the text and in class. I have been trying to apply what we learned the first couple of weeks of class to what I observe even at the end of the quarter. I have also been able to see many things that we have spoken about recently. All of the material we have learned has stuck with me and helped me be a key part in improving the boys' success." (Autumn, 2002)

"I am really glad that I got to have this field experience, it helped me to better understand concepts discussed in class as well as finally work with the school aged children. (Spring, 2002)

"Overall, the classroom at [school name] engages in many of the same things and they really seemed to relate to our class. It was amazing to me how similar things were and how much easier it was for me to understand what things meant once I actually saw it in the classroom." (Spring, 2002)

"I think that the experience has been enjoyable and a great way to allow us to actively learn the materials presented in class." (Spring, 2005)

"Being able to see methodology and concepts applied to the classroom really helped me." (Spring, 2005)

"My experiences this quarter were invaluable. I am so glad we were able to do service hours along with the class. It helps to bring a deeper meaning to what we learned in class to help us better instruct our future students." (Spring, 2005)

such data). Yet another limitation is that the between-instructor comparisons relied on a comparison group comprised of versions of the course taught in summer quarters (because service-learning was incorporated in the course at all other times). It is possible that seasonal factors (for instance, missed vacation time) were responsible for the poor ratings of the course when taught without service-learning. A counterargument, of

course, is that the pattern of responses we obtained on the end-of-course survey in the between-instructor comparisons is consistent with the responses we obtained from the focus groups in the within-instructor comparisons, as well as with the anecdotal comments from students.

Conclusions

This study represents a substantial advancement over previous studies of service-learning in preservice teacher education in reading because it involved comparison groups of students who did not experience service-learning, direct assessment of students' content knowledge, and multiple instantiations of a quarter-length course over five years. The results provide converging evidence from multiple data sources that the service-learning experiences in the undergraduate course in reading had beneficial effects on prospective teacher education students' ability to make connections between theory and practice and on their overall experience of the course. Before the introduction of service-learning, students appeared to have difficulty making connections between theory and practice. The positive outcomes were observed in the initial pilot of service-learning and when service-learning was brought to scale in subsequent quarters. Nevertheless, results showed that the service-learning had no effect on students' content knowledge related to reading processes and pedagogy.

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Acknowledgments

Adaptation of the *Reading Foundations* course to incorporate service-learning was supported by grants to the first author from the University Center for the Advancement of Teaching, under the Ohio State Teacher Enhancement Program, and from the Service-Learning Initiative of The Ohio State University. We would like to thank the faculty of the University Center for the Advancement of Teaching, The Ohio State University, for their advice in adapting the course. We thank, in particular, Dr. Kathryn Plank for conducting the in-class focus groups. We would also like to thank Dr. Golden Jackson of the Service-Learning Initiative, The Ohio State University, for her encouragement, and Drs. Evelyn Freeman, Patricia Scharer, and Jerry Zutell of the School of Teaching and Learning, The Ohio State University, for their support of service-learning in the School of Teaching and Learning.

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Appendix A
Likert-Scale Items on End-of-Course Questionnaire
(SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree)

1.	Learning activities were relevant to course goals.	*SD*	*D*	*N*	*A*	*SA*
2.	Course helped open new areas of knowledge to me.	*SD*	*D*	*N*	*A*	*SA*
3.	Course developed my understanding of concepts and principles.	*SD*	*D*	*N*	*A*	*SA*
4.	Course provided me with useful factual knowledge.	*SD*	*D*	*N*	*A*	*SA*
5.	Course helped develop skills, techniques, or view I need in this field.	*SD*	*D*	*N*	*A*	*SA*
6.	Course contributed significantly to my professional growth.	*SD*	*D*	*N*	*A*	*SA*
7.	Assigned reading was important for understanding course material.	*SD*	*D*	*N*	*A*	*SA*
8.	I had the necessary background knowledge I needed to succeed in this course.	*SD*	*D*	*N*	*A*	*SA*
9.	Course assignments contributed to my learning.	*SD*	*D*	*N*	*A*	*SA*
10	Course assignments stimulated my interest in the course.	*SD*	*D*	*N*	*A*	*SA*
11.	Films or videos used in course aided learning.	*SD*	*D*	*N*	*A*	*SA*
12.	Appropriate assessment methods were used in this course.	*SD*	*D*	*N*	*A*	*SA*
13.	Assessment methods were consistent with course goals.	*SD*	*D*	*N*	*A*	*SA*
14.	Activities were well chosen and well organized.	*SD*	*D*	*N*	*A*	*SA*
15.	I gave class activities my full attention.	*SD*	*D*	*N*	*A*	*SA*
16.	Compared to other courses, I devoted a great deal of effort to this course.	*SD*	*D*	*N*	*A*	*SA*
17.	I was receptive to the learning possibilities offered by this course.	*SD*	*D*	*N*	*A*	*SA*