

Assessing Learning in Service-Learning Courses Through Critical Reflection

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The purpose of this study was to describe and examine a model for assessing student learning through reflection in service-learning courses. This model utilized a course-embedded process to frame, facilitate, support, and assess students' depth of learning and critical thinking. Student reflection products in two service-learning courses (a freshman course and an upper-level course) at a public university were examined at two times for depth of academic, personal, and civic learning and for level of critical thinking. Depth of learning and levels of critical thinking between freshmen and upperclassmen were compared. Results suggest that the model and associated rubrics were useful in documenting student learning. Students could identify, describe, and apply their learning. They had difficulty, however, evaluating their learning and thinking critically. There was some enhancement in depth of learning and critical thinking over time with upperclassmen achieving greater depth of learning and higher levels of critical thinking in some areas. Findings indicate that the model is a rigorous tool that can be used to document and assess student learning in service-learning courses.

Keywords: Service-Learning, Assessment, Critical Reflection

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For three decades, colleges and universities throughout the United States have been using service-learning pedagogy and practices to connect discipline-specific theory in academic courses to intentional community service efforts that address important social issues of local, state, and national concern (Blouin & Perry, 2009; Boyer, 1994, 1996; Eyler & Giles, 1999; Zlotkowski, 1999). One of the challenges encountered in this endeavor has been the mixed results and inconsistent findings derived from research studies of student outcomes that sought to determine what service-learning students learned (Simmons & Cleary, 2005), how they learned it, and how their learning compared to learning within other pedagogical contexts. Early assessments depended heavily on self-report measures of outcomes that did not directly assess student learning (Steinke & Buresh, 2002). For example, Eyler (2000) suggested that student satisfaction and student learning are often confused when self-reports are used as an assessment strategy in service-learning courses. Relatively few studies utilized raters' independent evaluations of student products (e.g., Kendrick, 1996; Markus, Howard, & King, 1993; Osborne, Hammerich, & Hensley, 1998; Sessa, Matos, & Hopkins, 2009).

What the field may lack are systematic and rigorous tools for evaluating student learning that can be used in a variety of courses, disciplines, levels, and settings. Instructional models that use intentional methods to measure and document incremental improvements in students' higher-order thinking skills over multiple semesters are in the early stages of development (Jameson, Clayton, & Bringle, 2008; McGuire, et al., in press).

Because the service-learning community widely accepts reflection as an integral part of the learning process, available attempts to measure the quality of learning in service-learning courses suggest that both the quantity and the type of reflection that students engage in may be crucial factors in learning (Eyler & Giles, 1999; Hatcher & Bringle, 1997; Kolb, 1984).

Using Reflection in Service-Learning Courses

Despite its centrality, reflection is perhaps the most challenging aspect of service-learning to assess, stemming from difficulties in developing and implementing effective measures (Simmons & Cleary, 2005) and tools to evaluate and deepen learning outcomes (Ash & Clayton, 2004; Ash, Clayton, & Atkinson, 2005). The inadequate assessment of reflection in service-learning courses is noteworthy given that reflection possesses certain benefits, including opportunities to infuse students' subjective

experiences, thoughts, and feelings into the content-oriented coursework. Although there exists a rich body of literature on the use and forms of reflective practices in higher education (Epp, 2008; Grossman, 2009; O'Connell & Dymont, 2006), few studies examine reflection as a tool for assessing depth of student learning (Richardson & Maltby, 1995; Wessel & Larin, 2006; Williams, Wessel, Gemus, & Foster-Seargeant, 2002). There is some evidence to suggest that the key to strengthening the power of service-learning is to engage in effective and rigorous reflection (Eyler, 2002; Eyler & Giles, 1999). Reflections are rich sources for documenting students' descriptions about what they are learning in a course (McClam, Diambra, Burton, Fuss, & Fudge, 2008; Sessa et al., 2009), the depth of their learning, and how critically they are thinking about it.

The purpose of this article is to describe and evaluate the DEAL Model for assessing student learning. This model, grounded in the theoretical work provided in Bloom's *Taxonomy of Educational Objectives* (1956) and Paul and Elder's *Critical Thinking: Tools for Taking Charge of Your Professional and Personal Life* (2002), was developed as a mechanism to guide and quantitatively evaluate student critical reflections in service-learning courses by using outside ratings for depth of learning and critical thinking (Ash & Clayton, 2004; Ash, Clayton, & Atkinson, 2005; Ash, Clayton, & Day, 2005). The DEAL Model is a three-step process that moves students from (a) Describing their service-learning experience, to (b) Examining this experience in light of specified learning objectives for *academic enhancement*, *personal growth*, and *civic engagement*, to (c) Articulating their Learning in their reflections (Ash & Clayton, 2004; Ash, Clayton, & Moses, 2007; Jameson et al., 2008). The model addresses changes to the teaching and learning process and the shifts in perspective that occur when students are engaged in the *counter-normative* process of learning by connecting academic learning and community service through reflection (Clayton & Ash, 2004).

Describing the DEAL Model of Critical Reflection

In the DEAL Model, academic enhancement represents an understanding of concepts and ideas presented in a particular class on a particular topic. Personal growth is described as the development of individual potential. Civic engagement pertains to the development of knowledge, skills, abilities, values, and interest in making a difference in one's community. The model attempts to help students "build their capacity to examine and enhance the quality of their own learning" (Jameson et al., 2008, p. 7).

Students create reflective writings, called *articulated learnings*, to express and explore their individual learning in the contexts of academic enhancement, personal development, and civic engagement (Ash,

Clayton, & Atkinson, 2005). These written products may be evaluated by raters to determine a student's depth of learning and level of critical thinking.

Depth of Learning

Depth of learning is based on Bloom's *Taxonomy of Educational Objectives* (1956), which explains learning as a hierarchical sequence moving from the lower-order thinking skills (identify, describe, apply) to the higher-order thinking skills (analyze, synthesize, evaluate). An important premise of Bloom's work is that each level must be mastered before progressing to the next as these levels increase in difficulty. His work enabled Ash and colleagues (Ash & Clayton, 2004; Ash, Clayton, & Atkinson, 2005) to construct a framework for guiding students in identifying their learning objectives, encouraging students' critical evaluation through prompting questions, and allowing empirical assessment of students' reflections by providing a coding mechanism. The DEAL Model requires students to utilize and respond to specific objectives designed to challenge them to identify, define, and comprehend a course concept; analyze the concept as they have experienced it in practice; and evaluate the adequacy of the concept in the context of their service (Ash & Clayton, 2004).

In the DEAL Model, prompting questions are used to help students address the objectives in each rubric. These prompting questions differ according to whether students are addressing academic enhancement, personal growth, or civic engagement as they examine (i.e., identify, define, evaluate) each specific learning objective in their reflection process. For examples of prompting questions, see Appendix A.

Academic enhancement. Academic enhancement prompts guide students toward examining course material through their service experience in the community. Students explain and analyze an academic concept learned through course readings and class discussion. They analyze similarities and differences between theory and practice to generate new, more nuanced, understandings of these academic concepts and to evaluate their understanding of the concept as it relates to their service-learning experience. Students are also asked to consider whether their understanding of the academic concept has changed over the semester and what, if any, additional questions need to be asked and answered to obtain a deeper understanding of this concept (Ash & Clayton, 2004; Ash, Clayton, & Atkinson, 2005).

Personal growth. The personal growth prompts require students to explore what the service experience revealed about their personal characteristics: strengths and weaknesses, sense of identity, assumptions, beliefs, and convictions as well as other traits. Students consider how they learned to be the way they are. They also indicate changes they would

like to make in themselves as revealed through their service experience. The DEAL Model facilitates student learning by examining personal characteristics through the lens of their service experience rather than by “venting” subjective feelings often found in unstructured personal journals or reflections (Ash & Clayton, 2004; Ash, Clayton, & Atkinson, 2005).

Civic engagement. In civic engagement, students consider actual and potential approaches for enacting long-term, sustainable, and systemic change in the various communities for which they provided service. Students describe and identify the mutual objective they are working toward (as part of a group project or on behalf of the organization) as well as consider the approach taken by the community to achieve this objective. Students also examine the positive and negative effects that taking this approach has had on achieving this objective and proffer alternative approaches. They then offer possible improvements to facilitate short-term as well as long-term change (Ash & Clayton, 2004; Ash, Clayton, & Moses, 2007).

Critical Thinking

In addition to enabling the identification and articulation of learning objectives, the DEAL Model refines the critical reflection process by adapting theories from Paul and Elder's (2002) *Critical Thinking* to the context of service-learning (Ash, Clayton, & Atkinson, 2005). To demonstrate students' abilities to think critically, their reflections are assessed for the inclusion of the following principles: integration, relevance, accuracy, clarity, depth, breadth, logic, and significance (see Ash, Clayton, & Atkinson, 2005, Appendix B, p. 60).

Structuring Reflection Using the DEAL Model

When using the DEAL Model, students follow specific prompts to guide their reflections. First, students are asked to provide detailed and fact-based descriptions of their experiences through answers to the questions, Who? What? Where? When? Second, they transition from objective descriptions to analytic evaluations, in which they are prompted to make “a reasoned judgment using sound arguments” (Ash, Clayton, & Moses, 2007, Chapter 4, p. 8). Third, by utilizing a formalized structure for writing and revising their reflections, students respond to the questions posed by Ash, Clayton, and Atkinson (2005, p. 51): “What did I learn?” (examine learning); “How, specifically, did I learn it?” (provide specific evidence to support learning); “Why does this learning matter, or why is it significant?” (find importance in the learning); and “In what ways will I use this learning, or what goals shall I set in accordance with what I have learned, to improve myself, the quality of my learning, or the quality of my future experiences or service?” (assess learning and decide whether it has met, or will meet, short-term and long-term goals).

In addition, utilizing the DEAL Model Depth of Learning and Critical Thinking rubrics and prompting questions, students revise and strengthen their writing and thinking as they prepare first, second, and, in some cases, third drafts of their reflections. After each draft is submitted, students receive extensive written instructor feedback that is based on the two rubrics (Ash, Clayton, & Atkinson, 2005). Because the DEAL Model requires students to address explicit learning objectives of increasing complexity and to consider specific critical thinking concepts in their reflections, changes in student learning over the course of the semester can be quantitatively assessed by external raters.

Evaluating the DEAL Model

This evaluative study of the DEAL Model was guided by the following questions:

1. On average, what was the depth of learning and the level of critical thinking students achieved as measured by the DEAL Model?
2. Does utilization of the DEAL Model enhance students' depth of learning and level of critical thinking over time within a semester?
3. Does class level influence the depth of learning and the level of critical thinking as measured by the DEAL Model?

Method

Participants

Samples were taken from two undergraduate service-learning courses at a large teaching university in the northeast United States. The classes were taught by faculty familiar with service-learning pedagogy and practices and trained in the use of the DEAL Model by its developers. In both courses, students participated in two hours of weekly service for 10 weeks at a variety of local, community-based nonprofit organizations. The first course, *Psychology of Leadership: Theory and Application*, had four class sections that included 95 first semester freshmen enrolled in the university's Emerging Leaders Learning Community. Of the 95 students enrolled in the course, 63 consented to participate with 25 completing enough reflections to be included in this study.

The second course, an upper-level seminar entitled *Challenges, Potentials, and Practices of Community Organizing*, had 17 students (11 seniors, 5 juniors, 1 sophomore) with an undergraduate major or minor in Communication Studies. Three prerequisite courses were required to register for this class. Sixteen students consented to participate with all completing and submitting the documentation necessary for inclusion in the study.

Design and Procedure

During the 10-week period in which the students in the four freshmen classes participated in their service-learning experiences, they wrote weekly reflections following structured prompts based on concepts embedded in the DEAL Model. Although the course was offered in four sections, each professor essentially followed the same format with regard to the reflection assignments. Near the end of the semester, students submitted their first drafts (T1) of academic enhancement reflection papers that addressed a specific academic concept related to the course content and their service. Utilizing the DEAL coding rubric, their professors provided feedback that challenged the students to think more deeply and broadly about their learning in the reflection statements. Students were also given the Depth of Learning and Critical Thinking rubrics for their own use. This same process was repeated for personal growth and civic engagement. At the end of the semester (T2), the students—guided by the rubrics and in response to prompts to address academic enhancement, personal growth, and civic engagement—submitted a final reflection paper.

In the upper-level seminar, students prepared a first draft of their personal growth reflection (T1) and received feedback from their instructor that was based upon the DEAL coding rubrics. They repeated this procedure for the first draft of their academic enhancement reflection (T1) and the first draft of their civic engagement reflection (T1) and again received written feedback. Toward the end of the semester (T2), students prepared and submitted a final paper that integrated their rewritten reflections for personal growth, academic enhancement, and civic engagement. These students were also provided with the Depth of Learning and Critical Thinking rubrics for their own use. To determine whether students could deepen their depth of learning and increase their critical thinking over time, *t*-tests were utilized to compare first draft scores (T1) and final product scores (T2) of student reflections. The *t*-tests were also used to determine if there were differences between students of different levels (e.g., freshmen versus upper-year students).

Coding

The authors of this study were trained to be subject matter experts (SMEs) by Patti Clayton of North Carolina State University. The SMEs, utilizing the DEAL rubrics to measure depth of learning and critical thinking, learned to evaluate the quality of thinking demonstrated in written reflections. Using the rubric and a consensus coding approach, two SMEs independently evaluated students' depth of learning while two others independently measured participants' levels of critical thinking. When the SMEs were coding the reflections they did not know whether a given paper was a draft (T1) or final (T2) version because papers were mixed evenly throughout the data set.

Coding for depth of learning. To determine academic learning, two SMEs read and independently coded each reflection following the Depth of Learning rubric. If the student could not identify and describe a concept, the reflection received a score of 0. If the student clearly identified and described a concept, the reflection paper received a score of 1. If the student was also able to clearly apply the concept in consideration of the service-learning context, the reflection received a score of 2. If the student was able to clearly identify, describe, apply, analyze, and synthesize the concept, the reflection received a score of 3. If the student identified, described, applied, analyzed, synthesized, and evaluated the concept, the reflection received a score of 4.

Once each SME finished scoring 10–15 reflections, the SMEs met to consensus code the reflections. They repeated this process until all the academic reflections were read, scored, and consensus coded. The same procedures were then followed to measure depth of learning for personal growth and civic engagement.

Coding for critical thinking. To evaluate for levels of critical thinking, two SME coders independently read and coded each reflection to determine if it contained the elements of critical thinking identified by Ash, Clayton, and Atkinson (2005) and based on their analysis of the work of Paul and Elder (2002). The elements identified were relevance, accuracy, clarity, grammar and spelling, depth, breadth, logic, and significance. Based on students' inclusion of the critical thinking elements in their reflection, scores ranged from a low of 1 to a high of 4. The SMEs followed the same consensus coding process that was used for depth of learning.

Results

Overall Depth of Learning and Critical Thinking Levels Achieved

Means, standard deviations, and percentages were calculated to determine overall depth of learning and critical thinking levels achieved by students in their final products. Table 1 shows the depth of learning levels achieved. Table 2 shows the critical thinking levels achieved.

In terms of depth of learning, results suggest that students were, in general, able to identify and describe concepts in the academic enhancement and personal growth areas, and to some extent, they were able to apply those concepts using the rubrics. Few could analyze and synthesize, and even fewer were able to evaluate these concepts. Results suggest that more than one-third of the students were unable to identify and describe a civic engagement concept. None could fully evaluate the civic engagement concept. In terms of critical thinking, using the rubrics, SMEs found that students' levels were poor to fair. Few were adequate and almost none achieved the level of "good."

Table 1
Overall Depth of Learning Scores on Final Reflections for Academic Enhancement, Civic Engagement, and Personal Growth

	Academic enhancement (n = 36)	Civic engagement (n = 38)	Personal growth (n = 39)
Mean (SD)	1.64 (1.05)	1.45 (1.22)	2.10 (.88)
Depth of learning level achieved:			
None	19.4%	36.8%	7.7%
Level 1: Identify and describe	13.8%	5.3%	7.7%
Level 2: Apply	55.6%	34.2%	53.8%
Level 3: Analyze and synthesize	5.6%	23.7%	28.2%
Level 4: Evaluate	5.6%	0%	2.6%

Table 2
Overall Critical Thinking Scores on Final Reflections for Academic Enhancement, Civic Engagement, and Personal Growth

	Academic enhancement (n = 39)	Civic engagement (n = 37)	Personal growth (n = 38)
Mean (SD)	1.94 (.83)	1.46 (.69)	1.45 (.69)
Critical thinking level achieved:			
Level 1: Poor	35.9%	64.9%	65.8%
Level 2: Fair	35.9%	24.3%	23.7%
Level 3: Adequate	25.6%	10.8%	10.5%
Level 4: Good	2.6%	0%	0%

Enhancement of Depth of Learning and Critical Thinking Over Time

In terms of depth of learning, students were able to improve their personal growth scores between their first drafts and final products. There was no improvement on academic enhancement and civic engagement scores. In terms of critical thinking, students were able to improve both their civic engagement and their personal growth scores between their

first drafts and final products, but were not able to improve their academic enhancement scores (although these score differences approached significance). See Table 3 for depth of learning results and Table 4 for critical thinking results.

Table 3
Differences in Depth of Learning Levels Between Scores on First Draft and Final Products for Academic Enhancement, Civic Engagement, and Personal Growth

	First draft	Final product	t-score (df)
Academic enhancement	1.28	1.64	1.27 (24)
Civic engagement	1.53	1.50	.25 (29)
Personal growth	1.52	2.23	2.88* (30)

* $p < .005$.

Table 4
Differences in Critical Thinking Levels Between Scores on First Draft and Final Products for Academic Enhancement, Civic Engagement, and Personal Growth

	First draft	Final product	t-score (df)
Academic enhancement	1.78	1.98	1.28* (24)
Civic engagement	1.34	1.50	2.40** (31)
Personal growth	1.27	1.57	3.07*** (29)

* $p < .10$. ** $p < .05$. *** $p < .005$.

Comparison of Depth of Learning and Critical Thinking Between Freshmen and Upperclassmen

In terms of depth of learning, upperclassmen received higher scores on their final (T2) civic engagement reflections than freshmen. There were no differences in scores on academic enhancement or personal growth. In terms of critical thinking, upperclassmen received higher scores on civic engagement than freshmen. Mean differences in the expected direction approached significance for academic enhancement. There were no differences in critical thinking scores between upperclassmen and freshmen on personal growth scores. See Table 5 for depth of learning results and Table 6 for critical thinking results.

Table 5
Differences in Depth of Learning Levels Between Freshmen and Upperclassmen Final Product Scores for Academic Enhancement, Civic Engagement, and Personal Growth

	Freshmen	Upperclassmen	t-score (df)
Academic enhancement	1.59	1.71	.34 (34)
Civic engagement	.96	2.20	3.50* (36)
Personal growth	2.13	2.06	.23 (37)

* $p < .001$.

Table 6
Differences in Critical Thinking Levels Between Freshman and Upperclassmen Final Product Scores for Academic Enhancement, Civic Engagement, and Personal Growth

	Freshman	Upperclassmen	t-score (df)
Academic enhancement	1.74	2.22	1.83* (37)
Civic engagement	1.09	2.00	5.13** (35)
Personal growth	1.36	1.56	.88 (36)

* $p < .10$. ** $p < .000$.

Discussion

The purpose of this study was to describe and examine a model that uses independent ratings for assessing student learning through reflection in service-learning courses. To accomplish our evaluation, we asked three research questions:

1. What depth of learning and level of critical thinking do students achieve as measured by the DEAL Model?
2. Did utilization of the DEAL Model enhance students' depth of learning and level of critical thinking over time?
3. Did class level influence depth of learning and level of critical thinking as measured by the DEAL Model?

Using the DEAL Model, we found that, similar to other research on reflection (Richardson & Maltby, 1995), the depth of learning scores for the majority of students fell into the categories of lower-order thinking skills (identify, describe, and apply) and their critical thinking ranged from

poor to fair. Although students were able to slightly improve their critical thinking skills over the course of the semester, they were less able to improve their depth of learning. Finally, the sole indicator of difference between freshmen and upperclassmen in depth of learning and critical thinking was in civic engagement.

These findings are important. Research identifies the benefits of participating in service-learning. However, research has produced mixed results and inconsistent findings in regard to the effectiveness of this pedagogy (Simmons & Cleary, 2005). Eyler (2000) suggests that these results are due to the fact that research conducted to date is fairly rudimentary. What has been lacking in the field are systematic and rigorous tools for evaluating student learning that can be used across a broad array of service-learning settings. This study shows that it is possible and useful to assess student learning through reflection by using independent ratings. Although this study included only two service-learning courses, each course included different content in different disciplines at different levels. We found that the assessment rubrics of the DEAL Model enable reflection to be used to determine what students are learning, how well they are learning it, and even how their learning compares to learning in other pedagogies.

Limitations

There were three limitations to this research. The first limitation was the small sample size. Larger samples could begin to better account for such things as student demographics, the impact of different instructors, and so forth. For example, this study did not consider the gender or race of the students, the difficulty of the course material, or the various teaching styles used to present the DEAL Model.

The second limitation of this study was the lack of a comparison group in which a different pedagogical approach was utilized. Additional remaining questions pertain to whether students learned more deeply or thought more critically about their academic enhancement, personal growth, and/or civic engagement as a result of their service-learning experiences *and* reflection as compared to students who were in the same course taught from a different pedagogical approach.

Finally, variations in the instructional support faculty received on their use of the DEAL Model as well as the quality and quantity of written feedback faculty provided on student reflections may have affected the results of this study. Although all faculty provided some form of written feedback that incorporated the DEAL Model rubrics and the prompting questions, inconsistencies in the amount of time and support provided were not accounted for and could have influenced the effectiveness of the feedback.

Recommendations

Future research. To further test the applicability of the DEAL Model in a variety of situations, the following are recommended:

1. Collect and analyze data in a single course over multiple semesters to determine if individual faculty improve their use of the DEAL Model in the same class over time and the effect of that learning on student outcomes.
2. Include additional courses in other disciplines, and courses at the same and different levels, over the course of a semester to determine if major, course content, and/or grade level yield a better understanding of how deeply students are learning and how critically they are thinking as they prepare reflections.
3. Institute longitudinal designs to determine whether and how students improve their capability to reflect, deepen their learning, and think more critically throughout their tenure within the university. The DEAL Model can be used to track a student's learning not only within a course, but also across linked courses that use the same framework (see Jameson, Clayton, & Bringle, 2008).
4. Experiment with different types of instructional support, resources, and guidance to faculty who are using the DEAL Model and assess change in the students' depth of learning and critical thinking from Time 1 to Time 2.
5. Experiment with alternative structures for measuring depth of learning and critical thinking to determine which are best for meeting the learning needs of students. The following are resources for other available possibilities: Anderson and Krathwohl's (2001) revision of Bloom's work; Biggs and Collins's *Evaluating the Quality of Learning: The SOLO Taxonomy* (1982), which provides structures describing observed learning outcomes; Biggs's (1987) *Learning Process Questionnaire Manual*, which addresses personal and situational factors/contexts, motives, approaches to and strategies for learning as well as surface, deep, and achieving learning; or Fink's (2003) *Creating Significant Learning Experiences*, which discusses the interactive nature of learning, learning how to learn, foundational knowledge, application of learning, caring, the human dimensions of learning, and integration.

Practice. If reflection is to be utilized as an assessment tool, several issues need to be addressed. Our research supports findings from similar studies (Landeon, Byrne, & Brown, 1994; Richardson & Maltby, 1995; Wessel & Larin, 2006) in which students new to the reflection process did not

demonstrate deep learning or critical thinking in their writing. We recommend the use of multiple rewrites with instructor feedback, peer-led reflection sessions, and online tutorials to help students document and deepen their learning. We also agree with the conclusion of others (Landein et al., 1994; Smith, 1998) who have found one semester too short a period for students to develop critical reflection skills. The capability to reflect at deep levels requires students to refine these skills over a period of years (Grossman, 2009).

In most service-learning courses, however, improving reflection skills is only part of what students are expected to accomplish. Students are required to work in community organizations in conjunction with exploring academic concepts. If instructors are to train students in the use of rubrics to deepen learning and hone critical thinking skills, they may need to reexamine course goals, to select and rank course content, and to identify how learning will be evaluated.

Second, the assessment of student learning through reflection is contingent on faculty interest, knowledge, skills, and abilities. In order to improve student learning, faculty learning must be addressed. As faculty refine their teaching methods in congruence with the DEAL Model, students should improve both depth of learning and critical thinking in their written reflections.

Third, institutional commitment and support are needed to encourage faculty to explore new ways of deepening learning and improving critical thinking. Incorporating mechanisms for teaching students to use the reflection process and teaching faculty to assess student learning through reflection require the allocation of resources. Although limited resources are a reality for many universities, if the university is committed to the principles of deep learning and critical thinking, then institutional support must be provided.

Conclusion

Having grown in popularity over the past 30 years, service-learning has developed into an effective pedagogy linking academic learning with efforts to address issues of societal concern. But one of the challenges faced by faculty who use service-learning—a challenge that consistently emerges in the research—is the assessment of student learning outcomes. In this study, we have described the DEAL Model and demonstrated that it is a rigorous tool that can document and assess students' reflective learning in service-learning courses. The rubrics of the DEAL Model serve as independent ratings that appear to accurately measure how deeply students are learning course material and how critically they are thinking about their learning. We and others have concluded that documenting this

learning requires that students develop the skills necessary for writing critical reflections. At the same time, faculty need the training and resources to enhance their ability to guide and assess student reflection. For this to happen, institutional support and commitment are needed. Although our study indicated that student learning can be assessed and documented by using the DEAL Model, there were sufficient limitations to our work, compelling us and others to replicate this study and conduct additional research that tests the DEAL Model.

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Appendix A

Academic Learning Objective Rubric

Learning objective (LO) level	Academic enhancement learning objectives	Associated guiding questions
<p>LO 1: Identify and describe</p>	<p>Identify and describe a specific academic concept that you now understand better as a result of reflection on your service-learning experience.</p>	<p>1.1 Identify an academic concept that relates to your service-learning experience. —AND— 1.2 Describe the academic concept that relates to your service-learning experience.</p>
<p>LO 2: Apply</p>	<p>Apply the academic concept in the context of the experience.</p>	<p>2.1 How does the academic concept apply to/emerge in your service-learning experience? For example, how did you or someone else use the material? When did you see it?</p>
<p>LO 3: Analyze and synthesize</p>	<p>Analyze the academic material (and/or your prior understanding of it) in light of the experience and develop an enhanced understanding of it.</p>	<p>3.1 Compare and contrast the academic material and your experience. In what specific ways are the academic material (and/or your prior understanding of it) and your experience the same and in what specific ways are they different? —AND— 3.2 What are the possible reasons for the difference(s) between the material (and/or your prior understanding of it) and your experience? (For example, look at bias/assumptions/agendas/lack of information on the part of the author/scientist or on your part.) —AND— 3.3 In light of this analysis, what complexities (subtleties, nuances, new dimensions) do you now see in the material that were not addressed or that you had not been aware of before?</p>

LO 4: Evaluate

Evaluate the adequacy of the material (and/or your prior understanding of it) and develop a strategy for improved action.

Based on the previous analysis:

4.1 How specifically might the material (and/or your prior understanding of it) need to be revised?

—AND—

4.2 If applicable, what additional questions need to be answered and/or evidence gathered in order for you to make a more informed judgment regarding the adequacy/accuracy/appropriateness of the material (and/or your prior understanding of it)?

—AND—

4.3 What should you and/or your service organization do differently in the future (or have done differently in the past) AND what are the associated benefits and risks/challenges?

Note. From "Integrating Reflection and Assessment to Capture and Improve Student Learning," by S. L. Ash, P. H. Clayton, and M. P. Atkinson, 2005, *Michigan Journal of Community Service-Learning*, 11(2), Appendix A, p. 60. Copyright 2005 by the *Michigan Journal of Community Service-Learning*. Reprinted with permission.

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