In Transit

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Acknowledgements

*To gain an integrated individuality, each of us needs
to cultivate his own garden. But there is no fence about this garden:
it is no sharply marked-off enclosure. Our garden is the world,
in the angle at which it touches our own manner of being.*

John Dewey

CONTENTS

Introduction

Bret Eynon, *LaGuardia Center for Teaching and Learning*

> *Learning is both an active and reflective process. Though we learn by doing, constructing, building, talking, and writing, we also learn by thinking about events, activities and experiences. This confluence of experiences (action) and thought (reflection) combines to create new knowledge.… Reflection then is the vehicle for critical analysis, problem-solving, synthesis of opposing ideas, evaluation, identifying patterns and creating meaning – in short, many of the higher order thinking skills we strive to foster in our students.*
>
> <div align="right">"Action + Reflection = Learning"</div>

> *What we really need for citizens and workers of the twenty-first century is people who can conduct a lifelong conversation between their own experience and learning – who can use their experience to enhance learning and their learning to enrich application.*
>
> <div align="right">K. Patricia Cross</div>

What does it mean to reflect? How is reflection important to learning? What classroom strategies help students develop the habits of reflection? How could we use reflection to deepen intellectual development inside the classroom and beyond? What makes reflection rigorous, demanding, and effective? How could reflection be central, not marginal, to student work? How could reflection be tailored so that students can make connections between their lived experiences and disciplinary ways of thinking?

These are some of the questions pursued by LaGuardia faculty in this volume of *In Transit: The LaGuardia Journal on Teaching and Learning*. And these questions have been taken up by educators worldwide. The faculty of LaGuardia Community College, including those represented here, are part of a broad global conversation about ways to best utilize reflection in teaching and learning.[1]

Before we can examine the questions pursued by our faculty scholars, however, there is a prior question to consider: Why reflection? Why are so many teachers and researchers focused on reflection? Reflection doesn't fit neatly into any discipline – it isn't mathematics or biology or accounting or sociology. Few of us studied reflection in graduate school. It is not commonly required to enter college or to graduate. Why, then, is it important?

Reflection's refusal to fit neatly into a disciplinary or sequential slot is, in fact, part of the answer. As a wave of researchers have shown, reflection is important because it fits *between*, connecting one topic and discipline to another, helping students order, make sense of, and ultimately use what all too often appears to them to be a jumble of disconnected facts and assignments. Used well, reflection can help to address questions that haunt many educators: What are students getting out of this? What does it all add up to? How do I help my students understand the deeper meaning of what we're studying? What can I do to help my students really understand, really care, really grow as self-guided, self-motivated learners?

"The function of reflection," one recent scholar noted, "is to make meaning: to formulate the 'relationships and continuities' among the elements of an experience, between that experience and other experiences, between that experience and the knowledge that one carries, and between that knowledge and the knowledge produced by thinkers other than oneself…. The creation of meaning out of experience is at the very heart of what it means to be human. It is what enables us to make sense of and attribute value to the events of our lives" (Rodgers, "Defining" 848).

The idea of reflection has intrigued thinkers for centuries, of course, going back at least to ancient Greece – where the phrase "Know Thyself" was inscribed on the forecourt of the temple of the oracle of Delphi – and ranging forward through Socrates, Dostoevsky, Thoreau, and Nelson Mandela, all of whom identified the value of the examined life. The discourse around reflection has recently taken a new turn, however. New research on cognition focuses significant attention on reflection and its role in learning. Far from being a fluffy sideshow, reflection is demonstrably central to the most meaningful forms of learning and cognitive growth. Reviving interest in the theories of John Dewey, this research has prompted educators to focus attention on ways to more intentionally and effectively structure the reflective process. At the same time, new digital technologies have begun to offer tools that can be used to facilitate reflection in a range of forms and media, and to make it more visible for teachers and for learners themselves. The articles in this volume suggest ways that LaGuardia faculty have been influenced by all of these developments.

Why Reflection? New Research on Learning

The Oxford English Dictionary defines reflection, in physics and medicine, as the process of "bending, turning, or folding back; recurvation" of waves of energy that rebound from a surface ("Reflection" def. 4a). In cognition, the *OED* defines reflection as "the action of turning (back) or fixing the thoughts on some subject; meditation, deep or serious consideration" ("Reflection" def. 8a). A recent study, in a collection entitled *Reflection: Turning Experience into Learning*, builds on this definition to identify three key phases of reflection: 1) returning to experience – recalling or detailing salient events; 2) attending to or connecting with feelings; and 3) evaluating experience – re-examining experience in the light of one's intent and existing knowledge, integrating new knowledge into one's conceptual framework (Boud, Keogh, and Walker 26–31).

In recent decades, a growing number of cognitive researchers and educational theorists have studied the reflective process and concluded that it is a key to enriched student learning. In their widely acclaimed synthesis of new research on cognition and learning, *How People Learn: Brain, Mind, Experience, and School*, John Bransford and his colleagues identified and examined respected research that demonstrated the benefits of reflection for student learning in topics as diverse as physics, writing, and mathematics, as well as for increasing the degree to which students transfer their learning across disciplines and semesters. Based on these findings, Bransford and the National Research Council concluded, in summary, that: "[i]ntegration of metacognitive instruction with discipline-based learning can enhance student achievement and develop in students the ability to learn independently. It should be consciously incorporated into curricula across disciplines and age levels" (National 21).

In her review of the research, in *Reflection in Higher Education Learning*, Jennifer Moon further specifies the ways in which reflection benefits the learner:

- Reflection slows down activity: the learner has time to process the material, linking it to previous ideas;
- Reflection gives learners a sense of ownership of taught material, making it more personally meaningful;
- Reflection encourages metacognition, the awareness of one's own cognitive processes; and
- Reflection encourages students to challenge their learning, resulting in a greater commitment. (7)

Renewed interest in reflection has led many current researchers back to the seminal work of John Dewey. Active from the 1880s through the 1950s, Dewey is widely recognized as one of the towering giants in American intellectual history. Having shaped the pragmatic school of philosophy and modern democratic theory, Dewey also stands as one of our most sophisticated thinkers about learning and its role in individual and social development. Dewey argued that the dynamic of experience and reflection lay at the heart of learning. In *Democracy and Education*, he defined education as "that reconstruction or reorganization of experience which adds to the meaning of experience and which increases [one's] ability to direct the course of subsequent experience" (76). Experience, for Dewey, includes not only hands-on learning, but also reading, writing, listening, watching, talking, and creating. The task of educators, for Dewey, is to design powerful experiences that connect to each other, helping students build thinking skills and deepen their understanding of key concepts (*Experience* 14–17).

Reflection is key to making this process meaningful. For Dewey, reflection is the necessary counterpart of experience, "the bridge of meaning that connects one experience to the next, that gives direction and meaning to growth" (Rodgers, "Defining" 850). In *Experience and Education*, Dewey posited reflection as the pivotal component to the growth of intelligence. "To reflect," he wrote, "is to look back over what has been done so as to extract the net meanings which are the capital stock for intelligent dealing with further experiences. It is the heart of intellectual organization and of the disciplined mind" (87).

Contemporary scholars examining Dewey have clarified the qualities of reflection that can make it most meaningful. One of the most perceptive of recent Dewey scholars, Carol Rodgers, has summarized Dewey's four criteria for effective reflection:

1. Reflection is a meaning-making process that moves a learner from one experience into the next with deeper understanding of its relationship with and connections to other experiences and ideas. It is the thread that makes continuity of learning possible, and ensures the progress of the individual and, ultimately, society. It is a means to essentially moral ends.
2. Reflection is a systematic, rigorous, disciplined way of thinking, with its roots in scientific inquiry.
3. Reflection needs to happen in community, in interaction with others.

4. Reflection requires attitudes that value the personal and intellectual growth of oneself and others. ("Defining" 845)

"Reflection is not an end in itself," writes Rodgers, "but a tool or vehicle used in the transformation of raw experience into meaning-filled theory that is grounded in experience, informed by existing theory, and serves the larger purpose of the moral growth of the individual and society. It is an iterative, forward-moving spiral that moves from practice to theory and theory to practice" ("Defining" 863).

Rodgers has defined four stages in what she calls the "reflective cycle" (see Figure 1 below). Writing in the *Harvard Educational Review*, she expands on these stages: 1) "Presence in Experience: Learning to see"; 2) "Description of Experience: Learning to describe and differentiate"; 3) "Analysis of Experience: Learning to think from multiple perspectives and form multiple explanations"; and 4) "Experimentation: Learning to take intelligent action" ("Seeing" 235).[2] Rodgers is particularly focused on the second and third stages, where reflection drives an iterative learning process. Like Dewey, Rodgers connects reflection to further action. New knowledge and deepened understanding lead to new steps forward, re-engaging with experience. Thus, the process is cyclical, a recursive framework for life-long learning ("Seeing").

Figure 1: The Reflective Cycle

Presence in Experience
Learning to see

Description of Experience
Learning to describe and differentiate

Experimentation
Learning to take intelligent action

Analysis of Experience
Learning to think from multiple perspectives and form multiple explanations
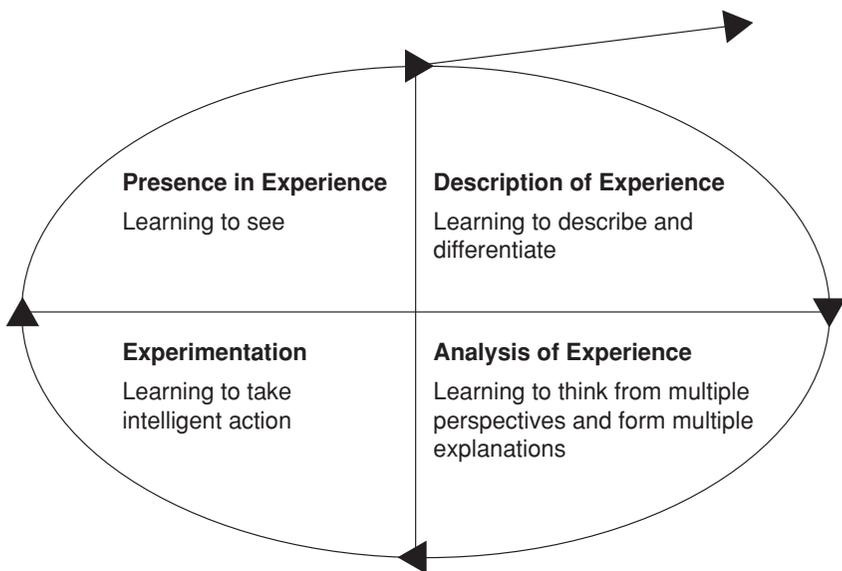
Source: Rodgers, "Seeing" 235

Many education researchers have concluded that the reflective cycle is crucial to deep or integrative learning. Surveying the research on cognition and learning, the eminent K. Patricia Cross – mathematician and psychologist, and former dean of Cornell University – notes that "[i]n the United Kingdom, researchers are likely to refer to 'deep' and 'surface' learning to distinguish between learning that makes the connections that lead to deeper understanding versus information which rests on the surface, inert and unassimilated" (Ramsden, qtd. in Cross 10). Cross suggests that reflection is often the defining step that moves students from surface learning to deeper understanding (Cross 10).

Reviewing the evolving scholarship on cognition, Cross finds that many cognitive researchers highlight the importance of the prior knowledge and the framework of assumptions and understandings, or "schema," that students bring with them into the classroom (8). This framework shapes what students take away from any classroom lesson. Understanding and connecting with this framework of prior knowledge is a key task for educators – a task that reflection helps to accomplish. "While there are surely facts that must be learned in any field of study," Cross writes, "the problem with surface learning is that when the facts fail to become rooted in the [student's] schema, they cannot be used to build knowledge, and the isolated bits of information are quickly forgotten" (10).

"What these findings seem to boil down to," Cross concludes, "is that deeper learning needs time to work its way into one's schemata. Students need time to talk, write, reflect, and otherwise engage in activities that help them make the material their own" (11). Cross highlights the particularly crucial role of reflection in this process: "Perhaps the most significant message – or at least the one that relates most closely to current research and scholarship on learning – is the role of reflection in learning. Learning occurs, not necessarily as a result of the experience itself, but as a result of reflecting on the experience and testing it against further experience and the experience of others" (22).

Making Reflection Work: From Research to Practice
Recognizing the powerful potential of reflection, many faculty want to use it in their classrooms. Implementation can seem like an intimidating challenge. But new scholarship dispels some of the mystique surrounding reflection. "Reflection does not mean that we sit in the lotus position, hypnotically humming meditative chants," explains one practical

guide. "Reflection should be active and multi-modal. Opportunities for reflection should occur before, during and after activities. That way, students can take note of their own learning starting point, assess their progress in the midst of a unit and critically evaluate their own learning at the end of the activity" ("Combining" 3).

Strategies for incorporating reflection tend to fall into three categories, focusing on writing, technology, and/or group conversation. Writing may be the most common tool for encouraging student reflection. Faculty can use different forms of writing to prompt reflection, including essays, freewriting, learning journals, and letters. In this volume of *In Transit*, several faculty studied the use of writing to support reflection; interestingly, most of them come from outside English and other traditional writing disciplines. For example, Valerie Taylor-Haslip uses guided reflective journals to help nursing students examine and make meaning of their clinical experiences. Drawing on the work of John Bean, she lays out four levels of reflective writing and finds a correlation between student progress to deeper levels of reflection and their improvement on other assessment criteria. Louise Fluk considers ways that reflective research narratives can be used to both deepen and assess students' information literacy skills. Mathematician Prabha Betne studies the use of reflection in courses shaped by LaGuardia's Project Quantum Leap, where mathematical concepts are connected to compelling scientific issues such as global warming. For Betne, like Bransford and his colleagues at the National Research Council, reflection plays a metacognitive role that supports the retention and transfer of knowledge and skill. "[I]n a mathematics context," Betne writes, "reflection involves examining the procedural knowledge used in everyday practice in such a way that its application can be broadened beyond immediate circumstances."

New technologies offer additional routes for reflection. Discussion boards and blogs can invite student writing. Knowledge mapping software allows students to create visual depictions of their learning processes. ePortfolios offer students opportunities to collect artifacts from their classrooms and attach reflections that are both specific and broadly integrative. Digital storytelling can utilize music, voice, and imagery to encourage student thinking about key moments in their life narratives. All these tools can facilitate the sharing of reflection, the creation of audience and reflective exchange. Studying this phenomenon in a national research project, Randy Bass and I found that "new media technologies promoted the expansion of what we have come to

call *embodied pedagogies*, inducing learning that engages affective as well as cognitive dimensions, not merely through the role of emotion, but through creativity and intuition, through expressions of self-identity and subjectivity as the foundation of intellectual engagement" (Bass and Eynon, "Capturing" 17). Far from simplifying the learning process, or reducing it to "feel good" moments, we concluded, sophisticated reflective uses of new media can reveal "the intricate relationship between emotional and epistemological understanding" (Bass and Eynon, "Capturing" 17).

Several articles in this volume consider the use of different technologies to support and reveal the reflective processes of LaGuardia students, notably wikis and ePortfolios. Jennifer Benichou and Kathleen Huggard used wikis to support reflection by ESL students. While the technology was simple, students found reflection challenging. Refining their approaches, Benichou and Huggard demonstrate that careful scaffolding by faculty deepens students' reflective process. Other faculty used a technology explicitly designed to support reflection – the electronic student portfolio, or ePortfolio. Gary Richmond and John Silva report on their use of ePortfolio in an English and Humanities learning community, tracing the ways that reflection reveals students' growing sophistication with language and complex thinking. Deborah Robinson also used ePortfolio, describing the ways students reflect on career goals and experiences in a Co-operative Education course. Deborah McMillan-Coddington used ePortfolio to encourage and document student reflection in her nursing courses, introductory to capstone. In all three articles, student ePortfolios serve not only as a tool for supporting reflection, but also as a way for these faculty to conduct a fine-grained examination of the step-by-step evolution of students' thinking processes.

Since LaGuardia's nursing programs have decided to implement ePortfolio across their curricula, McMillan-Coddington and her nursing colleagues have the opportunity to extend their investigation of reflection across courses and semsesters. McMillan-Coddington reviewed reflections generated by nursing students during two years of intensive study and clinical experience and discovered that this longitudinal approach allowed her to more effectively evaluate progress in "student knowledge, confidence, and self-regulation in the clinical area." Of equal or greater importance, she reports, students themselves look back over this extended record and see tangible and vivid evidence of "their own personal and professional growth in identifying and providing ethical, effective, and empathic care."

Of course, technology is by no means a classroom necessity. Discussion, particularly small group collaborative learning, can be structured to focus students on what they have learned, and to compare their experiences and insights to those of others. As noted earlier, Dewey highlighted the value of reflection in community: The process of formulating one's experience in order to communicate can have a powerful impact in helping to clarify its meaning. "Speech – our ability to communicate concepts – can shift us from a state of unawareness to deliberate, self-conscious action," agrees one contemporary article. "This helps us internalize and link thought to action, allowing us to problem-solve, create coherence, and form patterns of understanding" ("Action" 2).

Reflection through carefully scaffolded discussion is examined in several articles in this volume. Sreedevi Ande considers the use of reflective class discussions in her engineering courses, helping students extract broader meaning from specific case study problems. Kyoko Toyama reports on her experience using reflective discussion to deepen the work of a peer mentor in her New Student Seminar, an experiment that started with a single student and has evolved into a broader counseling program, the Peer Partners-in-Learning. Similarly, using Rodgers' reflective criteria as a guide, Marina Dedlovskaya and Patricia Sokolski integrated reflective group discussion as a learning process in their Project Quantum Leap learning community that linked basic skills mathematics and critical thinking.

Aiming to help students generalize their abilities to use data to develop analyses and support arguments, Dedlovskaya and Sokolski trace their use of reflection as it evolved over two semesters. The process not only enabled this faculty pair to gradually and thoughtfully improve their skill at guiding reflective discussion; it also permitted a comparative study of the two semesters. Dedlovskaya and Sokolski compared student scores on the required COMPASS exam and, significantly, they found a correlation between increased student sophistication in reflection and improved outcomes on the standardized COMPASS examination. "Scores in our pre- and post-tests," they write, "suggest that learners benefit from deliberate thinking aloud, as well as from a more considered 'stepping back' to regard complicated actions."

Whatever tools are used, faculty play a critical role in structuring the reflective process and linking it to the key concepts and issues of their courses and disciplines. This point emerges again and again from the articles in this volume. Happily, the literature provides a range of

approaches to developing reflective questions and writing prompts. One of the most common is the simple, three-part framework: What?, So What?, and Now What?:

- *What have you learned?* Descriptive review, highlighting key points.
- *So What?* Why is this important? What does it mean? How does it change your thinking about a topic or issue?
- *Now What?* What are the implications of this new insight into particular knowledge or a broader learning process? How can you use this new knowledge or insight? How might it change your approach as you go forward? ("Combining" 3)

Carol Rodgers offers a variation on this framework, one that focuses particular attention on the descriptive phase of the reflective cycle. Her attention to this phase is consistent with her caution about the need to slow down the learning, as well as to create a feedback loop between students and faculty. Her questions can be used to prompt private, individualized reflection, or what she calls "descriptive feedback," that informs the teacher as well as the students:

- What did you learn?
- How do you know you learned it?
- What got in the way of your learning?
- What helped your learning?
- How did you feel? (Rodgers, "Attending" 219)

Reflective prompts are, of course, most powerful when they are rooted in activities and assignments that are designed to promote critical thinking and active learning. Jennifer Moon lists some of the qualities of assignments that can work best to encourage and support reflection: problem-solving with messy, real-life data; asking questions where there are no clear cut answers; tasks that prompt learners to integrate new learning into previous learning; tasks that demand the ordering of thoughts; and tasks that require evaluation ("Reflection in Learning" 175–76).

The articles in this collection provide interesting examples of prompts grounded in specific disciplinary and course contexts. Benichou and Huggard examine student reactions to their initial reflective assignments, and the steps they took to make reflection effective. Dedlovskaya and Sokolski provide rich examples of their reflective discussion prompts, documenting the evolution of their own pedagogical skill in making reflection effective for students. McMillan-Coddington

highlights the importance of her carefully prepared prompts and, at the same time, her need to deal with the unexpected, the "teachable moment" when students encounter the messy, unpredictable realities of clinical practice. While being a student nurse presents particular challenges, this tension is, in fact, revealed in other articles as well. Faculty find they must carefully scaffold the reflective process and yet retain the flexibility to respond to specific experiences and perspectives of the individual learner.

Double Loop Learning: Becoming Reflective Practitioners
One last point drawn from the literature about reflection is highly relevant to this collection and, more broadly, to the work of educators at LaGuardia and elsewhere. While most researchers focus on student reflection, a small but significant group focuses on the role of reflection for professionals, including faculty. One of the best known studies of reflection is *The Reflective Practitioner: How Professionals Think in Action*, by Donald Schön. A philosopher, director of the Institute for Applied Technology in the Kennedy administration, and, from 1972, Ford Professor of Urban Studies and Education at MIT, Schön's work focused on the ways that reflective professionals learn from their practice:

> The [reflective] practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique. He reflects on the phenomenon before him, and on the prior understandings which have been implicit in his behaviour. He carries out an experiment which serves to generate both a new understanding of the phenomenon and a change in the situation. (68)

The work of Schön, Rodgers, Moon, and others have highlighted the particular value of reflective practice for faculty. Observing and reflecting on what actually happens in the classroom – not only what the faculty member does, but also what the students do, say, write, and create – is crucial to the growth of our pedagogical skill and effectiveness. "The power of the reflective cycle," writes Rodgers, "seems to rest in its ability first to slow down teachers' thinking so that they can attend to what is, rather than to what they wish were so, and then shift the weight of that thinking from their own teaching to their students' learning" ("Seeing" 231).

Across the board, the faculty seminars of the LaGuardia Center for Teaching and Learning (CTL) focus on the cultivation of reflective practice. Whether the subject is experimenting with new technologies, improving math education, exploring diversity, or redesigning capstone courses, CTL seminars ask faculty to pause and examine their practice, to be more intentional, and to consider carefully the evidence that indicates the effectiveness of their pedagogical experiments. In recent years, the emergence of the Center's Carnegie Seminar on the Scholarship of Teaching and Learning and this journal, *In Transit*, have extended this process, helping scores of LaGuardia faculty move from reflective practice to reflective scholarship. This development is still in its early phase at LaGuardia and elsewhere, and key academic structures have yet to fully adjust to it. The articles in this issue provide a window into an emerging community of discourse, in which reflective inquiry is increasingly meaningful. The extent to which LaGuardia and other higher education institutions find ways to officially recognize and validate this effort will play a vital role in shaping our long-term success as colleges that learn.

Notes

1. This essay has benefited from dialogue with countless colleagues at LaGuardia and nationwide, including members of the Integrative Learning Project, the Connected Learning seminar, the Visible Knowledge Project, the Making Connections project, the Carnegie Foundation for the Advancement of Teaching, and the national faculty of the Association of American Colleges and Universities. Special thanks to those who read and commented on early drafts, including Max Rodriguez, Carolyn Henner Stanchina, Gail Green-Anderson, Rachel Theilheimer, and Randy Bass.

2. This cycle is similar in many ways to the Experiential Learning Model defined by David Kolb, which also has four steps: Concrete Experience, Reflective Observation, Abstract Conceptualization, and Active Experimentation.

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Learning to Reflect *In* and *On* Action

Marina Dedlovskaya, *Mathematics, Engineering, and Computer Science*
Patricia Sokolski, *Humanities*

> *The purpose of education [is] the intellectual, moral, and emotional growth of the individual and, consequently, the evolution of a democratic society.*
>
> Carol Rodgers

Essential to effective learning, the complex cognitive act of reflection can assume different forms. On one hand, reflection may occur in the moment, as it might for a nurse or mathematician intent on resolving an immediate situation or problem. In this case, he or she engages in a simultaneous process of selecting among alternative approaches, connecting to prior experiences, and imagining future applications. Or reflection can be less immediate, a kind of stepping away to look at our experience from a distance. In both cases, writes John Chaffee, we "figure out the way our thinking operates and thus learn to do it more effectively" (2). In Chaffee's view, reflective thinking *is* critical thinking, an intrinsic part of our "natural human ability" (2).

Donald Schön, influential theorist of reflection in practice, distinguishes between these two forms as "reflection-*in*-action" and "reflection-*on*-action." In the former, we are "thinking what we're doing as we do it," as suggested by the nursing and math examples above (Schön, "Donald" 5). In the latter, we think about an action after it has been completed, "thinking back on what we have done in order to discover how our … action may have contributed to an unexpected outcome" (Schön, *Educating* 26). But whether *in*-action or *on*-action, reflection is "a meaning-making process that moves a learner from one experience to the next with a deeper understanding of its relationships with and connections to other experiences and ideas" (Rodgers 845).

As teachers of Introduction to Algebra (MAT095) and Critical Thinking (HUP102) at LaGuardia Community College, we are well aware of our students' need to improve critical thinking and quantitative reasoning skills. With the goal of improving these skills, in Fall 2007, we integrated our courses into a single learning community. Two projects on environmentalism structured the community's disciplinary content, and reflective practices shaped classroom activities. Our objec-

tive was to intensify the learning experience of our students in math and critical thinking, to shake open, in the words of Jeremy Kilpatrick and his colleagues, their "capacity to think logically about the relationships among concepts and situations" (National 129). The semester ended, but questions about achievement remained, the result of unsatisfying evaluations of student work. How could we have better developed "number sense" in students who have had, for the most part, irregular exposure to fundamental math principles? What could we have done better to improve student abilities to integrate logical and quantitative reasoning, to recognize inaccurate calculations when they see them, and to understand the need to justify belief with evidence?

Resolved to find answers to some of our questions, we approached the following Spring 2008 semester with several modifications. This paper presents a study of that semester's endeavors, describes and compares the codesigned first and second class projects which framed our math and critical thinking community, and offers a brief evaluation of several examples of student work from the first project. Our evaluations of the first project yielded insights that led to modifications in the second, midsemester, project. The discussion that follows is presented within the context of those modifications, and traces an evolving practice of student reflection.

Assigned to our community of twenty math and critical thinking students, both projects offer insights into our understanding of the ways reflection can support classroom teaching and learning. Indeed, the implicit question threading its way through our discussion of our classroom practice is the degree to which reflection in combination with compelling contexts, can intensify, deepen, and excite learning in both teacher and student. In our conclusion, we offer a comparison of Project One and Project Two in Spring 2008, and suggest plans for future inquiry.

Compelling Contexts and Learning Communities
It is an American commonplace that many arrive in the nation's math classes with low interest and little confidence in "doing math." Students often declare that they "hate" math (see the online I Hate Math Club, I Hate Math T-Shirts, etc.). Their antipathy is partially explained, perhaps, by the tendency, in a traditionally taught basic math class, to require rote learning of skills that may appear socially and culturally irrelevant to today's learner (Fuson, Kalchman, and Bransford 29). Educators agree that this perceived disconnect between mathematics and

everyday life adversely affects student motivation (Grubb and Cox 93, 95–97) and disrupts achievement and retention (CUNY 4–5). Committed to confronting students' negative perceptions of math, LaGuardia's Division of Academic Affairs and the LaGuardia Center for Teaching and Learning launched, in January 2007, Project Quantum Leap (PQL), a faculty development seminar for the study of ways to improve math achievement. To narrow the "relevance" gap, PQL adopted two teaching and learning strategies: The first was the engagement of students in the exploration of "unresolved public issues," or compelling contexts, a pedagogy inspired by the Science Education for New Civic Engagement and Responsibilities (SENCER) initiative. Among the public problems identified as having immediate social relevance for LaGuardia students were the environment (in Introduction to Algebra, MAT095), public health (in Elementary Algebra, MAT096), and economics and finance (in College Algebra and Trigonometry, MAT115). The second PQL educational strategy was the creation of learning communities, paired courses linked by themes and projects that generate connections within and across disciplines. In Spring 2007, along with eleven math and four nonmath colleagues, we participated in PQL's first phase, the exploration of specific conditions believed to enhance math learning.

Drawn together by PQL, the transformative pedagogies of SENCER and learning communities are meant to improve student performance in each of the paired courses and deepen social awareness. In addition to the concepts of context and community, we view the practice of reflection as equally vital to effective learning. As understood by Carol Rodgers, reflection is "the thread that makes continuity of learning possible, and ensures the progress of the individual and, ultimately, society. It is a means to essentially moral ends" (845). At the heart of our Fall 2007 and Spring 2008 environmental projects, the practice of reflection in community furthered both of our educational goals: advancing math and critical thinking skills and clarifying connections between individual choice and the fate of the planet.

Fall 2007 Background and Analysis
Introduction to Algebra and Critical Thinking Learning Community
Our initial experience with contexts, communities, and reflection unfolded in Fall 2007. Forming our first learning community, we began to integrate compelling contexts and civic engagement into our disciplinary content. As an initial step, we designed our classroom projects with four goals in mind. First, and most broad, the projects

had to address themes of energy consumption on both the individual and global levels. Second, the projects had to involve students in regular practice of skills common to both math and critical thinking, such as problem-solving logic, decision making, and argument building. Third, we placed content distinct to each discipline front and center; for example, in math class, students worked at developing "number sense," and in critical thinking class, they read and analyzed texts, wrote essays, and discussed controversies to develop decision-making and problem-solving skills. Finally, students would apply these skills to personal issues related to energy consumption in their everyday lives.

We assigned the first project on electricity consumption at the beginning of the semester, conceiving it as an individual effort that required no research. The students were their own source of information. The second, midsemester, project, designed as a group activity and focused on consumption of resources at LaGuardia, required some research and an oral presentation. Depending on the topic they chose, students interviewed LaGuardia staff and gathered information from online sources. Each three-week project incorporated two loosely structured aspects of the reflection process: informal class progress "check-ins," or feedback, and a final reflection on the overall project.

Throughout the semester, observations of Introduction to Algebra students revealed that they most often fixed on finding the "right" answer rather than on understanding how they arrived at it. In other words, our students simply relied on the instructor, the Internet, or their peers to confirm conclusions. While checking with sources and recalculating the problem is arguably a form of Schön's reflection-*in*-action, in fact, this kind of "thinking while doing" suggests a rather weak form of thinking, especially as this back-and-forth process between student and resources usually stopped once the correct answer was found. Without pausing to "step back" to reflect on the ways he or she had arrived at the correct answer, the student then moved on to the next problem. Similarly, in the critical thinking class, beginning students often expressed strong opinions about the environment and many other issues. But, again, their claims were frequently unsupported by credible evidence. Instead, in discussion and in writing, students often replaced justification with generalization.

In both classes, the lapse in second-order thinking, or careful thinking about the ways we think, was demonstrated by math and critical thinking students' difficulty in justifying the accuracy of their conclusions. Our evaluations of their projects on energy consumption led us

to conclude that our goals of improving student reasoning called for a more intentional and deliberate approach to the practice of reflection. That is, informed by Schön's distinction between reflecting *in* and reflecting *on* action, we believed that motivating our students to reflect on numeric operations while in the process of performing the operations could result in improved ability to determine accuracy of their calculations. In turn, accurate calculations could be transformed, after reflection, into data used to support reasoned positions on the environment. At the end of our first learning community in Fall 2007, we resolved to confront these lapses in reasoning head on, and made modifications to classroom practice for Spring 2008.

Spring 2008, Project One
Household Electricity Consumption
Once again, we framed the semester with two projects. More personal, the first project focused on household electricity consumption; the broader second topic was recycling at LaGuardia. Our teaching challenge was to provide our classes with opportunities to construct a clear understanding of environmentalism and of the differing perspectives surrounding it, and to develop a way to make meaning of their own experience of it. Among the learning goals, three were essential: Common to both projects was the primary requirement to justify the validity of conclusions. Second, a successful project depended upon the thoughtful collection, selection, analysis, and application of valid data. Last, the expectation, *sine qua non*, was that students could perform numeric operations in the service of a reasoned argument about the environment.

We structured both projects around three activities. In the first week of Project One, our math and critical thinking learning community students gathered one week of data on the electricity consumption of three home appliances. In the second week, they reduced their individual usage by approximately half, calculated their personal savings of money and consumption, and projected the global impact of their actions on the reduction of carbon dioxide emissions. At the end of the third week, students wrote an essay that described their collection of data, analyzed the consequences of reducing their energy consumption, and reflected on the changes, if any, in their personal behaviors as consumers and the possible effects of their behaviors upon the environment.

To help students produce more informed and analytic arguments, we assigned activities to increase skill sets and knowledge. In math class, students reviewed decimals, simple averages, and unit rates within

the context of activities about energy consumption. In the critical thinking sessions, students read excerpts from Al Gore's *An Inconvenient Truth,* summarized its positions, and evaluated its presentation of numerical data. Later, students were to use this information to build their own arguments about the consumption of energy.

As students worked on their projects, we introduced practices of reflection *in* and *on* action. In math class, for example, students reviewed their homework calculations; while reviewing the operations, they also identified computation steps and justified the results. Pairs of students discussed their calculations of electricity use and checked them for accuracy. If the validity of the answer was questioned, we put the calculations on the board for the whole class to examine. To help make sense of the numbers under discussion, we provided concrete contextual situations, calculating, for example, the total electricity consumption of a whole household. Recognizing the impossibility of a single home computer consuming in a week an amount of energy equal to the total amount of electricity consumed by a household in three months, beginning students could then identify and correct the mistaken calculation. Thus, after stepping back to look at homework calculations (*reflection-on-action*), students began to *reflect as they calculated*. In other words, by "thinking on their feet" out loud, mindfully, and in the moment, students were r*eflecting-in-action*, a process of evaluating and modifying that is essential to the practice of quantitative reasoning (Smith).

The commitment in Spring 2008 to a more intentional pedagogy had implications in critical thinking class, too. In Fall 2007, like many teachers who wish for student feedback, we had always devoted a few minutes at the beginning or the end of class to ask a general "How's it going?" question regarding progress of large projects. In those exchanges, students who felt comfortable volunteering their ideas reported out to the instructor; after they had spoken, we would move on to the "central" topic of the day.

Modified in Spring 2008, the practice of "checking in" became a guided and more deliberate exercise. Its aim was the creation of focused conversations held by a community of thinkers engaged in discussing an issue in ways that led to insights and new ways of understanding their approach to the project. For example, we turned our informal Fall 2007 "How's it going?" feedback sessions into "good conversations." Once a week, in small groups, students discussed the information they had gathered for their projects for fifteen minutes, and then each group reported out to the full class. This process ensured that students would

carefully and thoughtfully talk with one another about their data collection progress. Identifying impasses and possible solutions, they created "good conversations," guided, but not controlled, by the instructors. In Schön's words, these more directed exchanges were "neither wholly predictable nor wholly unpredictable" ("Donald"). For example, a student once hit a snag in his research of household energy consumption in that his father wanted around-the-clock TV, and did not like the suggestion to turn it off in order to consume less energy. Rallying around, students urged the student to convey to his father the importance of the learning project, suggested that he take his father out to dinner, and asked if the instructor could write a letter to the father! Another time, when a few students reported falling behind on collecting data, their peers worked out an adjustment to the deadline.

A clear difference between the Fall 2007 and Spring 2008 projects was the completion of data collection by everyone in the Spring class, a result, we think, of the community of encouragement provided by our "good conversations." A combination of both reflection *in* and *on* action, these deliberate and thoughtful investments in each other's progress helped students to find solutions to difficulties. Without data, they would have given up; without "good conversations," they may not have shared their frustrations and suggestions. From teachers-giving-solutions in Fall 2007, we became coaches (Schön, "Donald"), encouraging our students to be active learners who rely on their knowledge and past experiences to analyze situations, make connections, and provide workable solutions not only for themselves, but also for others. These kinds of collective, reflective discussions created community, and also provided a stronger foundation for students as they wrote the final assignment for the first project. As presented below, this concluding segment required the application of concepts learned in math and critical thinking classes and asked students to evaluate their findings as well as their experiences of the project and the ways the project might have motivated changed behaviors.

Analysis of Student Work, Project One
Of the twenty students in our learning community, fourteen were also enrolled in Basic English (ENG099); the others were either in Composition I (ENG101) or not enrolled in English courses. At the end of the first three-week project, students were required to submit a formal paper in which they were to answer the following set of questions and include a separate worksheet that demonstrated their calculations:

Reflect on your experience in using both critical thinking and math concepts. How much energy and money have you saved by using your appliances differently? How did Math help you to understand and complete this project? What were your ideas about each individual's impact on the environment before and after this experiment?

The paper did not require a specific number of pages; however, most were between one and two pages long. As math and critical thinking instructors, we looked forward to essays that would reveal the degree to which our students managed to integrate their critical thinking skills with numerical data in support of their arguments about energy consumption. As well, we wanted student demonstrations of the ways math applications helped in understanding and completing the energy project, and the ways the experiment changed their understanding of an individual's impact on the environment.

Although eighteen of twenty essays submitted at the conclusion of Spring 2008 Project One demonstrated students' ability to present an argument and discuss what they had learned about energy consumption, their skills in using data in support of their arguments varied significantly. For our evaluations, we devised a rudimentary rubric to categorize student responses to the assignment:

Indicator	Level 1	Level 2	Level 3	Level 4	Level 5
Presentation of argument	Presents no argument	Presents an argument	Presents an argument	Presents a detailed argument	Presents a fully developed and detailed argument
Use of numerical data in support of argument	Does not include numerical data	Does not include numerical data	Includes numerical data, but data does not support the argument	Supports the argument with numerical data, but the data is miscalculated	Supports the argument with numerical data that is appropriate and accurate
Description of impact of experiment on student's life	Does not describe impact of experiment	Does not describe impact of experiment	Describes impact of experiment	Describes impact of experiment	Describes impact of experiment in detail

Below are excerpts of student work, each categorized by level of competency. Our evaluations of the integration of math and critical thinking skills accompany the student excerpts:

Level One (2 papers): There is no developed argument, no conclusion describing the impact of the experiment on the student's life, and no reference to data:

> I learned how to reduce on our daily consumption, it open my eyes on how often I leave my computer on and leave my cell phone charge plug[ged]… in the littlest things count.

Level Two (9 papers): The three students quoted below present an argument, but do not provide numerical data or indicate the impact of the experiment on their lives (emphasis added):

> Energy consumption is very important to people like me because now I know how much energy I use in my house…. After this experiment I saved *lots* of energy in my house…. I stopped watching television and started spending *more* time at school [rather than] coming home and spend[ing] *lots* of electricity.

> Most families like me waste *a lot* of energy causing us to have *high* energy bills…. I no longer use lights during the day unless absolutely necessary…. *[M]ore* reading replaces the use of television.

> What I have learned about energy consumption is that we consume a lot of it at *an alarming rate*…. Math has helped me understand the theme of energy consumption by enabling me to see the numbers in the CO_2 levels that the earth emits…. Critical Thinking has enabled me to think of new ways to conserve energy.

Here students provide information about their patterns of energy consumption and prove insightful about the necessity to think about these issues. But as shown in the examples above, they use quantifiers (*a lot, at high level, more*) without giving the numerical results of the calculations performed. Some submissions include generalizations based on personal experience. For example, one student wrote:

> I am concerned of what is going on in my building, because if I had a lot of usage that isn't needed, I'm sure that in many other apartments it is worse than inside my apartment. I am concerned with what's going on in the world. I found interestingly enough that I was able to conserve energy and at the same time exercise more.

The latter response shows the student's interest in and concern about the issue; the comments are personal, but they are too general. While the student included data with her project, the work reflects an inability to use the data as evidence in support of her argument.

Level Three (4 papers): This work includes an argument and data, but again the data used does not support the argument:

> I did my experience with all three appliances which I used the most, like the TV, the computer, and the living room light bulb. Altogether per day that became in current electricity consumption of 2.145 and reduced rang up to 0.99 which made a difference of 1.155. After getting to this point of my experiment, I calculated how much electricity I could be able to save in 1 year, which gave me a total of 421.575. Having known that the average retail cost of electricity per kilowatt-hour in New York State is $0.1619, I calculated how many dollars I was able to save, which gave me $0.202.

It is difficult to interpret the data provided in the above example because we do not know what the numbers refer to. In addition, there is no analysis of the impact on the student's life. Instead, the essay jumps to a general conclusion:

> I find that if people were to reduce their energy consumption not only [would] that benefit our environment but also can benefit them as well. As it turns out, the more time we get away from our computers and TVs the more time we can spend on self improvements. Our environment is suffering due to our laziness.

This final excerpt does develop an argument, but the argument is not based on the data provided by the student. The paper shows an attempt to use data to support an argument, but the data is not appropriate to the argument.

Level Four (2 papers): Students include interesting conclusions, but these are based on miscalculated numerical data:

> I think that money and energy are crucial points. In my data collection I realized that I reduced my time in half on each appliance. This also reduced the money in half…. To many people this may be beneficial because they are reducing your

costs and helping the environment. To others however they may relay on the use of things such as a computer so much that the price will not encourage them to use it less.

On her worksheet, not included here, the student calculated a saving of *$0.6811 for a year*. The student makes a good argument: If we reduce usage by half, we save half the money paid for electricity. However, the student's calculations suggested that her annual electricity costs totaled only $1.36 ($0.6811 × 2). Clearly, there is an error in her calculations.

Level Five (3 papers): These papers include an argument and support it with appropriate and accurate numerical data. The following excerpt is a student's concluding paragraph, which follows presentation of appropriate data, accurately calculated:

> I realize that, after all the electronic devices/appliances were stripped away from me, [t]hey were in a sense, not only polluting the earth, but also my mind. That's something I wasn't expecting to discover! On the money standpoint, Math held more weight, on displaying how much money was saved. I'm always back and forth with Math and how it relates to me. It's kind of like a love/hate relationship and I'm sure my reflection on Math is coming across like that. Nevertheless, I was able to save money by reducing my usages. After I reduced everything, I was able to save $56.84! That's a lot of money, maybe math does hold significance! Although I know everything we do in our lives has an impact on our environment, I didn't know what appliances/electronics did more or less damage!

This student makes a good argument supported by correct data. In his conclusion, he reflects on the impact that his work on the project has had on his life. He discusses both his increased understanding of energy consumption and his developing appreciation for studying math.

Conclusions, Project One
Overall, our evaluations of Project One revealed two significant patterns. In general, as evidenced in student responses to the final segment of the project, students were able to use personal experience to draw conclusions about the consumption of energy at the individual and global level, illustrating improved ability to reflect *on* their actions. Their responses provided insight into our students' ways of thinking

about the effects of the project on their lives. However, a pervasive absence of data or the inclusion of inaccurate data demonstrated that students remained uncertain about how to use numerical evidence to support an argument despite our incorporation of deepened reflective practices, i.e., reflection-*in*-action (while they were doing calculations), and reflection-*on*-action ("good conversations").

Again and again, our evaluations of the first project of the semester pointed to a gap between students' demonstrated ability to reflect out loud while calculating, and their inability to use those calculations to support a reasoned written argument. Simply put, our first project did not successfully guide students to integrate numerical data as evidence for their views.

Based on these realizations, we resolved to reorient the second project in three ways. First, in addition to increasing our practice of reflection in both classes, we decided to model and stage additional activities more concretely, thus giving students more focused practice with the effective use of data. Second, we agreed that math learning should be more frequently reinforced in the critical thinking assignments. Third, our prompt for the reflection paper would more explicitly guide students to make connections between the class project and its impact on their personal, everyday lives.

Spring 2008, Project Two
Institutional Consumption of Resources at LaGuardia
With these discoveries about our learning community in mind, we targeted the improvement of student skill in using data to support logically reasoned critical analyses. We scheduled the modified second project to begin around midterm of the Spring semester. Once again designed as a three-week project, the focus shifted from personal, domestic use of energy to institutional consumption of resources at LaGuardia. Another difference was an emphasis on student collaboration to gather information from college personnel as well as to conduct research using online sources. Finally, each of the five groups was required to present their arguments to their peers in an oral presentation that included data-driven proposals for sustainable solutions for reducing LaGuardia's consumption of resources. Included in the requirements for these presentations were individual reflections on the changes in their views and their lives as a consequence of the project.

As presented in critical thinking class, the application of problem-solving methods provided a research framework. Among the research

topics were the use of paper towels in the bathrooms, the recycling of water bottles and aluminum cans from campus vendors, and the disposal of a variety of paper products and cafeteria garbage. Guided by clearly delineated and systematic problem-solving steps, students brainstormed specific questions about these issues, offered and evaluated reasonable solutions, and recommended future actions to reduce consumption. Throughout the project, students collected information from online sources and/or interviews with Building Operations personnel, cafeteria staff, and librarians. Outside of class, groups met separately with the math instructor to present and evaluate the data; in critical thinking class, students discussed its relevance. If the data collection appeared incomplete, students scheduled follow-up interviews and looked for additional information online. This additional time for reflective thinking about their research provided the students with more feedback and ensured steady project progress.

One skill isolated for improvement was the use of data to support arguments. To encourage students to see the relation between institutional consumption and their individual responsibility, we incorporated two separate activities in math and critical thinking in the early stage of the project. In math, with data provided by the instructor, students evaluated the reduction in air pollution and use of natural resources such as oil, water, and trees if an imaginary computer lab were to recycle paper. This activity showed students how to use data to make useful comparisons, and helped students to make similar comparisons in their own projects. The potential effectiveness of this additional activity was demonstrated by one group's conclusion that if four departments around the college did not use paper at all for five years, the savings would pay one semester of tuition for almost 300 students. Another group found that the amount of paper consumed as paper towels in the E Building in one year requires the destruction of approximately 1,800 trees.

A critical thinking assignment required students to tally their personal use of the same resource for one week. For example, students calculated the amount of garbage they produced or the amount of paper they had used. This data gave students a more personal frame of reference for examining and measuring the consumption of resources. As indicated below, when compared to the papers they had submitted in Project One, the Project Two presentations revealed an increase in student ability to use data to support an argument.

Evaluation, Project Two

We used the rubric developed for the Project One papers (see page 8 above) to evaluate student ability to integrate appropriate and accurate data into their research. In comparison with the first project, the presentations of the second project demonstrated an increased ability to use quantitative data in support of an argument:

Levels One and Two: No work fell in these categories since all five groups built an argument and included some data.

Level Three: One group supported their argument with data on the national consumption of aluminum cans, but did not calculate the consumption for LaGuardia and therefore could not support their conclusion with the appropriate data; that is, the data was calculated correctly, but it was inappropriate to the argument the group made.

Level Four: No work fell into this category since the remaining four groups provided arguments, used appropriate and accurately calculated data in support of their argument, and described the impact of the experiment on their lives.

Level Five: Four groups supported their arguments with appropriate and accurate data and showed the impact of the project on their attitudes and behavior.

We attribute improved integration of quantitative data in support of beliefs about the environment to the modifications we made to Project Two. These modifications included a more systematic and intentional approach to reflection throughout the project. Second, we modeled ways to use data in support of an argument. In addition, during the research, data collection, and analysis phases, we scheduled more time for students to meet with the math instructor and devoted more critical thinking class time to discussion, thereby increasing opportunities in both cases for students to "think aloud" about their data collection and its relevance to their argument.

However, we realize that the additional assignment of an individual essay that would require reflection on the project as a whole would have allowed students to deepen the meaning of what they had learned, draw individual conclusions about the issues they had

investigated, and discuss how their own behavior would change as a result.

Project Two did not include the higher level of reflection upon personal responsibility and behavior promoted, perhaps, by the cognitive demands of individual reflections. We can nevertheless point to an increase in critical thinking and math skills attributable to increased intentionality in thinking made possible by the practice of reflection in our classes. The average score for the COMPASS exam (the test used to determine student placement into and exit from the developmental math course sequence) in this class was 56.8, which is significantly higher than the required passing score of 30, and slightly higher than the 53.5 average score for Fall 2007. In order to assess student learning gains distinct from the COMPASS, we conducted pre- and post-tests in the math class. In Fall I 2007, the average for the pre-test was 25, for the post-test, 44. In Spring I 2008, the average pre-test score was 32, the post-test, 61. The bigger difference indicates a significant increase in student knowledge. In critical thinking class, 24 out of 28 students completed the course in Fall 2007; in Spring 2008, 22 out of 25 students completed the course, a 2.3% increase. Although the pass rate did not improve, Spring results showed a slight increase in class completion.

Final Thoughts on Fall 2007 and Spring 2008

As we explore ways to improve our students' critical thinking and quantitative reasoning skills, we recognize that systematic inclusion of two types of reflection – *in-* and *on*-action – in addition to careful staging and modeling of activities, and more classroom time for projects are all essential to achievement. Scores in our pre- and post-tests suggest that learners benefit from deliberate thinking aloud as well as from a more considered "stepping back" to regard completed actions. We also believe that math teaching benefits students when made more explicit and visible, challenging them to reflect on the ways they arrive at the identification of algorithms needed for data analysis. As indicated by their final projects, reflecting on the connection of numbers to their everyday experience enhanced skills required for the completion of their projects on energy consumption. Similarly, careful staging of activities and scaffolded projects can help students to see the relations among parts of assigned projects, resulting in improved critical thinking skills. Increased attention to modeling how to incorporate data in arguments offers students greater insight and examples that they can include in their everyday lives. Finally, devoting more class time to the practice of

reflection on a common project within a compelling context encourages students to be more active and collaborative in their learning, and more visible and accountable to each other.

The process of reflection has also led us to improve our teaching practice. Although this article has focused on our work in Fall 2007 and Spring 2008, we have continued to refine our projects, incorporating topics such as cell phone recycling and clothing consumption to increase our students' awareness of their responsibilities as consumers and inhabitants of our planet. In Fall 2009, we added a reflective writing assignment, "This Week in Math," to the critical thinking syllabus. In the first week of the semester, students create a list of the learning goals and strategies needed to pass MAT095. Each week, they evaluate their graded assignments and reflect on their progress, devising new strategies to improve success. These activities reinforce our exploration of issues related to the environmental theme of our learning community and the concept of compelling contexts stressed by Project Quantum Leap.

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The Rhetoric of Teaching and Learning Rhetoric

Gary Richmond, *Humanities* and John Silva, *English*

The Persuasive Note

During the past several years, the authors, in collaboration with Professor Gustavo Moretto, have been experimenting with various combinations of music, English, philosophy, and speech communication courses. Within a Liberal Arts cluster of courses, we have used a variety of themes to connect our fields in increasingly cross-disciplinary and integrative ways. The fruits of our collaboration culminated in 2008, when we opted for a shared rhetorical approach. Having previously determined that a rhetorical approach had potential pedagogical value in each of our disciplines, we asked ourselves the question: "Can we broaden and deepen students' understanding of the formal power of rhetoric by making it the theme of our cluster?" Thus was launched *The Persuasive Note* Liberal Arts cluster – comprising Introduction to Music (HUM101), Public Speaking (HUC106), Composition I (ENG101), The Research Paper (ENG103), and an Integrating Hour (LIB110).

We were acutely aware that rhetoric was not an easy sell: After all, there are many prevalent misconceptions about it, some of them pejorative, such as the notion that it refers to language that is stylistically over-elaborated, over-elevated, bombastic, or pompous.[1] By contrast, our students, the majority of whom are freshmen, arrived on the first day of classes with almost no idea or, at best, a very vague notion of rhetoric. Here are three representative responses as to what it meant to them before participating in the cluster:

> Before taking the cluster of courses rhetoric to me generally meant nothing. I had no clue as to what it meant. Every time it was mentioned in class I would get all fuzzy as to the meaning of it.

> In all honesty and humility, before college, I never heard the word 'rhetoric'. For the first week of class I heard the same common word, but I was afraid to ask for a definition. [This student would later remark that he one day "realized why a simple definition cannot explain what rhetoric means."]

Rhetoric is a boring method used only in oratory. Unbelievably, this was my conception of rhetoric before studying it in the persuasive note cluster.

In developing *The Persuasive Note* cluster, we agreed to emphasize those aspects of rhetoric (defined by one student as "a powerful notion of how we get our thoughts and feelings across to others") that would best help our students in our respective disciplines. Our success was such that, by semester's end, after the idea of rhetoric was well established for each of our individual disciplines, we began to transcend the applications in our respective courses and to examine interesting inter- and trans-disciplinary connections, borrowings, and cross-fertilizations. Students themselves began to extrapolate rhetorical ideas beyond the disciplines represented in the cluster, an unexpected creative surge facilitated, undoubtedly, by their writing of reflections on rhetoric in general, then in a discipline-specific sense, and, ultimately, in inter- and trans-disciplinary senses extending beyond even our own.

While we used several approaches to elicit critical and creative student reflections, including specific homework assignments and classroom discussions, the primary instrument was a "Reflections" page on all student ePortfolios. The page was meant to provide an opportunity for students to reflect more fully and deeply on our cluster theme in relation to their coursework, education, and lives generally (the many student reflections scattered throughout this article were extracted from these ePortfolio pages). We were, naturally, interested in discovering the depth of their understanding of rhetoric in principle and in practice for each of our disciplines, but even more so in seeing the extent to which we had succeeded in inculcating rhetoric into our cluster in ways which furthered the aims of interdisciplinary teaching and learning.

Conceiving Rhetoric

Rhetoric has been a pedagogical tool since antiquity, first in public speaking and soon after in written expression. The relatively modern extrapolation of rhetoric even further into the consideration of such arts as music and painting would itself seem to be a sort of evolutionary "rhetorical device," a kind of trope in the evolution of the various art forms.[2]

Why has rhetoric historically found a place in the classroom? First, a fuller understanding of its principles, devices, and strategies has long

been known to help students in any discipline to conceive, plan, and execute their work effectively. In addition, knowing rhetorical devices and structures improves their ability to read, grasp, and critique the discourses of others.

Still, perhaps the greatest value of rhetoric for our students is to clarify what they come to see as the essentials of researching, critically analyzing, and finally creatively using information in their papers, speeches, and other work.[3] By the end of the term, many students recognized the value of this aspect of rhetoric:

> Through my participation in the cluster I have learned that rhetoric is a useful tool in order to enhance my communication skills. Its figures, appeals, canons, and elements have helped me understand how to structure and deliver a clear and persuasive message. What we write, say, or express has more power if we use rhetorical methods and means in the communication process.

Clear and significant consequences, both creative and receptive, appear to follow upon the acquisition of rhetorical skills. For example, these skills provide audience members in, say, a speech or music class and readers of literary and other discourses with a framework and a lexicon that result in active, confident, and critical participation in interpreting the text at hand. Further, studying rhetoric helps students better "read" their audiences and, thereby, better tailor their discourses to their purposes. Conversely, it can also help them accurately and critically "read" the intended (and, sometimes, unintended) meanings in the discourses of others.

In order to achieve these ends, we were careful about our choice of texts. We decided to begin with an ancient work widely admired for rhetorical features that are both eminently teachable and accessible to our students. As a common reader, we chose Homer's *Iliad,* a work that helped our students improve as readers, listeners, and writers. As a result of texts such as this, our students came to understand that rhetoric has an active as well as a receptive role to play in the expressive life. As one student commented:

> Whether it is through writing, through music, or through speeches, the art of rhetoric is a rather important factor. It not only helps the "speaker" to communicate their thoughts and ideas, but it also helps the listening audience.

The Rhetorical Perspective

Significantly, Cicero's fivefold division of rhetoric as invention, disposition, style, memory, and delivery has proved particularly useful as a shared strategy in all of our classes.[4] This generalization may at first seem surprising: Since each of Cicero's categories has traditionally been associated with speaking and only the first three of them with writing, they have rarely been linked to music-making. However, we have discovered an analogous application with musical composition and performance.

It would appear that the very act of reflecting on forms, for example, the canons of rhetoric operating in musical composition, helped some students rather convincingly to find them there. According to one of our students:

> While analyzing the musical compositions of Bach, Mozart, and Haydn, I noticed that Cicero's five canons of rhetoric are present in the process of creating a pleasant and logical musical piece. To illustrate invention, the first canon of rhetoric, [we see it] is present when the composer is looking for an original motive that will be repeated through the whole composition. After this disposition makes an appearance, the composer structures the [elements] to make the piece coherent. Then the composer uses style to ornament the composition while choosing instruments and notes. After this [he] uses memory in order to recall the motives, themes, and notes that will be repeated throughout the composition. Finally, the composer or [some other performer] engages in the delivery, the last canon of rhetoric, where non-verbal and verbal messages in the composition maximize the effectiveness of the message.

We have discovered a similar usefulness in the time-honored stylistic registers of high, middle, and low as well as in Aristotle's influential modes of discourse development: definition, division/classification, cause/effect, process, and comparison/contrast. These categories provide representative structural (and other) patterns particularly for speech/essay development. Structures such as fugue and symphony provide analogous, although diverse, patterns in music.

Early on, we also introduced our students to Aristotle's three rhetorical *appeals,* namely, *ethos,* dramatization of the speaker through his/her voice; *logos,* knowledge, information, structure, and purpose of the

discourse; and *pathos,* dramatization of and appeal to the audience as a member of a community of shared feelings, interests, and/or values.[5] Thus, we demonstrated that rhetoric provides all the techniques of *suasion,* first taken up in consideration of compositional structure, but then developed in myriad ways, as each discipline has its own arsenal of rhetorical devices, offering expressive and effective tropes, figures, analogues, and so forth.

But one might ask: Do students really grasp these complex, interpenetrating notions and begin to apply them? In attempting a necessarily tentative answer to this question, we should look at excerpts from student reflections late in the term on each of the three disciplines in the cluster:

> **Music:** Music composers and [performers] intend to create powerful music to persuade the audience to listen and like their compositions . . . This process makes of music an artistic form of communication. Since the purpose is to create unique, logical, powerful, and beautiful music . . . to captivate and influence an audience, rhetoric, the art of persuasion and its elements, plays an important role in this process.

> **English:** The rhetoric in English literature, composition and research . . . exemplifies the concept of rhetoric. I believe that without rhetoric teaching and learning about works in English would not make as much sense as it does today. The great works of literature, such as the plays written by Shakespeare and the Greek mythical stories Homer told in the Iliad, are perfect examples of written compositions that people may find best suited to understand the rhetorical modes of English.

> **Speech:** [While] rhetoric is used every time we try to express our ideas . . . its use particularly in public speaking is very clear because it shows how Cicero's five canons of rhetoric – invention, disposition, style, memory and delivery, and Aristotle's rhetorical appeals – ethos, pathos, and logos, help in structuring and delivering a message . . . The canons and appeals are helping me in the building of a strong case where I can be more persuasive by having valid arguments, an understandable arrangement, an ornamental style, an effective use of memory, and an eloquent delivery.

In addition, students began to make subtle comparisons and contrasts among the various disciplines. For example, in the following brief analysis, the student saw a fundamental difference between English and the other two cluster disciplines:

> Rhetoric in English . . . is different from that of music and speech because it is not a presentation. It is not heard by the ear. It is seen by the eye. The structure and style is different. The way that it is received by the person is more personal [in the sense that] you can always go back and look at it again.

The Creative Interplay of Rhetorical Elements
Throughout the semester, we treated rhetoric as a complex, rich, and evolving concept vital for the development of "orators" skilled in diverse arts and sciences, and audiences who are both appreciative and critical of the work produced in various disciplines. Along the way, students deepened their understanding of the multiple ways in which rhetoric informs these disciplines and, indeed, many aspects of their lives through its uses in, for example, journalism, advertising, politics, law, etc. Rhetoric can also be related to ethical considerations such as those involved in developing an informed citizenry.

Eventually, students discovered that producers, consumers, and critics of work may also share methods and "devices," sometimes borrowing analogous tropes, structures, ways of arguing, etc. The philosopher of aesthetics, Susanne K. Langer, has written that while each art possesses its own dominant "semblance," what she terms a *primary illusion,*[6] there are also *secondary illusions* taken from other arts (for example, "space" or "texture" in music) which function as a kind of "echo," becoming vital and effective within that borrowing art. She writes, "The primary illusion always determines the 'substance,' the real character of an art work, but the possibility of secondary illusions endows it with [a] richness, elasticity, and wide freedom" (118).

A number of students who had become intrigued by these notions managed ultimately to grasp them with considerable subtlety:

> Susanne Langer . . . spoke of there being two different types of illusions in art, primary illusions [such as] the colors in painting; and secondary illusions, [such as] 'color' in music. The idea of a secondary illusion of art in music goes further than just color. These illusions are what give a piece of music its own musical identity.

Lessons Learned

So, what have we learned, after running the cluster for the first time, about what our students learned? While using various tools to assess the course, our primary assessment instrument, as previously noted, was the ePortfolio "Reflections" page. Student reflections offer informal evidence that our students came to comprehend the meaning, purpose, and value of rhetoric not only in our three disciplines but also across disciplines and, beyond our cluster courses, in other arts, sciences,[7] popular culture, hobbies, the work place, etc.:

> One of the things I learned about rhetoric was that it can be applied to almost anything. It turns out that some of my favorite hobbies draw from a rhetorical rule book.

> Rhetoric . . . helps [in organizing] a project by steps to construct an essay, paint a painting, write a piece of music, [or develop] a science experiment.

> It is interesting to see how rhetoric is not only present in music, composition, and oratory, but also in an exact science like mathematics. Learning about rhetoric in this cluster has made me realize that the formulation and testing of a hypothesis . . . is like the use of a theme, instances, and conclusions in a musical composition; or a thesis statement and supporting details in an essay or speech.

There is still, of course, much work to be done. First of all, we need to inquire into the specific ways that studying rhetoric impacts the quality of student work and the extent to which it does so. For now, we have little doubt that a rhetorical foundation has helped our students design speeches, essays, and formal research papers with greater skill and confidence. In the future, some further assessment can be achieved, in English for example, by evaluating student achievement on the final exam in the light of the initial diagnostic essay. Comparable assessment models can also be applied in speech and music courses.

But that is work for another day. Meanwhile, what could be sweeter music to our ears (or is it to our minds' eyes?) than to read this student remark: *"I love rhetoric and learning about it"*? And we love teaching it, too.

Notes

1. Rhetoric has also been thought to be made up of any discourse that chooses persuasion over truth, glibness over integrity, etc. Such an attitude goes back at least as far as Plato, who, saddened over Socrates's fate, concluded that "legal rhetoric is mostly employed to pervert truth and justice by seeking either to help wrongdoers escape punishment... or to impose legal penalties on the innocent" (Poulakos and Poulakos 14).

2. Even in its earliest stages, rhetoric was not a unitary discipline. George A. Kennedy identifies at least three strands, loosely describable as "technical," "sophistic," and "philosophical," that soon emerged (16–17). According to this prominent expert on rhetorical history, "a secondary rhetoric in arts other than literature" also exists:

   > In antiquity the analogy between rhetoric and painting or sculpture was repeatedly noticed, by Aristotle, Cicero, and Quintilian among others, and the analogy to architecture is occasionally mentioned as well. Writers on the arts sometimes borrow terminology from rhetoric. *In the Renaissance and later, treatises on music, painting, and other arts were often based on the structure and categories of classical rhetoric.* (5–6, emphasis added)

   It should also be recalled that Aristotle considered music and "visible performance" to be two of the six parts of tragic form – together with plot, characters, speech, and ideas (Lausberg 518).

3. This benefit of rhetorical education is closely related to important elements of information literacy, defined in 1989 by the American Library Association as the ability "to recognize when information is needed and . . . to locate, evaluate, and use [it] effectively." This definition forms the basis of the *Information Literacy Competency Standards for Higher Education* developed in 2000 by the Association of College and Research Libraries. Of course, much more than "information" is implied when speaking of rhetoric. On the pedagogical pertinence and usefulness of rhetoric for today's students, see Knoblauch and Brannon's second and fifth chapters, "Ancient Rhetoric in Modern Classrooms" and "Modern Rhetoric in the Classroom," respectively.

4. Kennedy offers a helpful introduction to Cicero's understanding and use of these terms (90–96).

5. For an exhaustive discussion of these three terms and of their practical applicability in modern settings, see Hauser, 90–119.

6. Langer holds that music, for example, expresses a kind of "virtual time" as its primary illusion, the plastic arts express various forms of "virtual space," and so forth. However, such expressions are mere pointers to extended analyses, sometimes occurring over several chapters.

7. The American philosopher and scientist, Charles S. Peirce, argued that the very methodology of scientific inquiry represented a kind of theoretical rhetoric (Richmond).

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The Use of Guided Reflective Journals in Clinical Nursing Courses

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> *Research has shown that the regular habit of journal writing can deepen students' thinking about their course subjects by helping them see that an academic field is an arena for wonder, inquiry, and controversy rather than simply a new body of information.*
>
> John C. Bean

Introduction

In nursing courses, lecture and discussion have been the primary methodologies for teaching theoretical principles, and the standard measurement tool for evaluating academic success in the classroom has been pen-and-paper testing. As a result, nursing students have tended to memorize factual material in order to pass their exams, but then found it difficult to apply their newly acquired theoretical knowledge to the clinical area. With a more complete understanding of the relationship between theory and practice, nursing students could not only improve their performance in both classroom and clinical settings but also become more competent nurses upon graduating.

For learners who must demonstrate the practical application of didactic knowledge, it is important that they become "aware of their attitudes toward learning" (Rosenbaum, Lobas, and Ferguson 1187). With nursing students, this task appears to be most effectively accomplished by encouraging them to reflect on the larger context, meaning, and implications of their actions and experiences in the clinical area. Through this process, which fosters the internalization of concepts that have been encountered in the classroom, nursing students can gain better insight into the areas in which they need additional theoretical grounding, thereby improving both their academic and clinical success.

Guided reflective journals are a form of exploratory writing whose purpose is to stimulate student thinking about both theoretical and clinical concepts (Bean 102). They provide the opportunity for a student-centered written conversation between learner and instructor regarding significant experiences that have occurred in the clinical area. In the journal, students can pose questions, seek clarification of specific

items, find meaning, and discuss matters of concern and interest with the instructor (Paterson 211).

Dye states that journaling with "a structured journal format with clear instructions and ongoing feedback has been found to be most successful in maintaining student engagement" (1). Increased student engagement leads to a better understanding of course content, and this improved understanding strengthens student ability to apply theoretical concepts to the performance-based skills required of competent practitioners. For students entering the nursing profession, the ability to link theory with practice through ongoing reflection is of vital importance. As Dye points out, "An essential component of expert professional practice is the practitioner's ability to critically reflect on his or her performance" (1).

As a strategy to encourage nursing students to reflect upon their performance, guided reflective journals were introduced into the Parent-Child Nursing course (SCR270) in LaGuardia Community College's PN-RN Advanced Pathway program. The students who enter the PN-RN Advanced Pathway are Licensed Practical Nurses already in possession of technical skills that can be applied under the proper supervision. Their goal, however, is to assume the role of a Registered Nurse, which carries with it a much greater level of responsibility and requires practitioners to think critically rather than rely on the guidance of others. This study explores the use of guided reflective journals in helping nursing students achieve this goal.

Sample Population

The students involved in this study were Licensed Practical Nurses studying in the PN-RN Advanced Pathway program for the purpose of becoming Registered Nurses. There was a total of thirty students, twenty-eight of whom were female. Ranging in age from their mid-20s to their mid-50s, most of the students were returning to school while continuing to work full time.

All of the students were enrolled in the evening section of the course, Parent-Child Nursing, which requires both classroom and clinical work. For their clinical work, the thirty students were divided into three groups of ten students each. Their maternity and pediatric clinical rotations were carried out at three locations: Bellevue Hospital Center, Jamaica Hospital Center, and Flushing Hospital Center, all in New York City.

Methodology

The thirty students were each given a journal and a weekly writing assignment that would compel them to reflect on their practice in the clinical setting and encourage them to be better prepared for their next clinical experience. As explained to the students, the overall purpose of keeping a journal was to record their experiences, reflect on what they had learned, and document the sources that they had used as scientific rationales for the decisions they had made and the actions they had carried out during the clinical rotation day.

Written instructions for completing the assignment were distributed to the students on the first day of class and reinforced by an oral summary of the guided journal process. The students were asked to determine a personal clinical objective each week and then to reflect on their experience of attempting to achieve that goal. They were instructed to research areas where they felt they had a knowledge deficit and to reflect on what they might do differently as a result of their experience. To help start the process, a list of suggested personal objectives was distributed, although the students were also encouraged to create their own personal objectives. (For the full text of the assignment and list of suggested personal objectives, see Appendix.)

Each week, the instructor collected the journals and read the most recent entries. Using criteria developed by Hatton and Smith (described in detail below), the instructor evaluated the level of reflection to be found in each student's writing and provided feedback on how the level of reflection might be improved the next week. The contents of the journals were kept confidential, and the instructor met with students personally as needed. Students who required remediation were referred to the nursing skills laboratory for additional practice, and the class instructor monitored their journals on a more frequent basis. The students also signed permission slips allowing the instructor to analyze their journal writing for research purposes.

Data Analysis

In a study conducted at the University of Sydney, Hatton and Smith identified four levels of reflective writing: (1) descriptive, (2) descriptive reflective, (3) dialogic reflective, and (4) critical reflective. These levels are hierarchical in nature, with "descriptive" representing the lowest level of reflective writing and "critical reflective" the highest.

Descriptive writing, according to Hatton and Smith, is "not reflective at all, but merely reports events" (14). In this form of writing,

students do not provide reasons or justifications for their actions. Instead, their journal entries are limited to task-oriented descriptions of the duties they have carried out. Although such descriptions might be quite detailed, they do not explain why the student writers did what they did, nor indicate whether, in their estimation, the task was successfully accomplished.

Descriptive reflective writing is defined by Hatton and Smith as reflection that attempts to provide reasons, often based on the students' personal judgment or on what they have read in the literature (14). These journal entries may provide a measure of student self-assessment or clarification of intentions, but they are generally restricted to just one perspective or present only a single factor as the rationale for what occurred (24).

Dialogic reflective writing is a form of conversation that writers have with themselves (14). In this type of reflection, students spend less time reporting events and more time discussing experiences. They explore possible rationales for their actions and reveal a deeper understanding of concepts. There is evidence in this type of reflective writing that students are drawing on their powers of judgment, explaining their actions in specific situations, seeking possible alternatives, and beginning to hypothesize about future actions (24).

Critical reflective writing, at the top of Hatton and Smith's hierarchy, includes clear rationales for actions and decisions, and takes into account the broader theoretical, historical, social, and political contexts of the writer's experience. Students writing at this level of reflection go beyond a single personal perspective. They are able to demonstrate an awareness of what has influenced their actions and to discuss the effects their actions might have in multiple contexts (14, 24).

Examples of student journal entries of each type, with the exception of critical reflective writing, can be found in Table 1. Examples of critical reflection are not provided as none of the nursing students was able to demonstrate this level of reflection.

Table 1: Sample Student Journal Entries Categorized According to the Hatton and Smith Criteria

Student journal entry	Descriptive	Descriptive reflective	Dialogic reflective	Critical reflective
Student 1	Today I was assigned to 34 year old patient who had a C-Section done. She also had Sickle Cell Disease and was concerned about her newborn baby getting the disease. My goal was to teach her about the disease and also how to care for her wound to prevent infection. I was able to inform her that for her daughter to get the disease the father would have to have the disease and the newborn chances would be 25%. I also taught her about hand washing technique to prevent infection and also to walk as much as she can to prevent constipation.		Today I was assigned to the newborn nursery. Since I am repeating this course, I decided to explore all of the areas of newborn assessment so that I can get a better understanding. I was more comfortable in doing a thorough assessment along with my professor and I am sure this will help me in my exam.	
Student 2		Today I was assigned to my first clinical task and duties [and] I was a little nervous when professor gave me the assignment. Although I am a nurse for 5 years I never worked on a maternity unit. I was glad to get this experience so in the future I can think of working the maternity unit at times.	My patient today was a 7 year old boy diagnosed with Status Asthmaticus. I have learned that Status Asthmaticus can cause severe respiratory distress and without immediate care the child may progress to respiratory failure and die. After receiving treatment [with] solumedrol, which I administered with my professor, my patient was able to walk around without any respiratory distress. I wrote a note, gave report to the nurse and I was very happy I got the opportunity to help.	

In addition to evaluating the students' weekly entries in their guided reflective journals, the instructor also examined two other measures of student performance. One measure was the unit exams based on material covered in class and graded with a percentage score. Evaluations of the

students' clinical performance constituted the second measure. For the formal clinical evaluations, the students received one of three grades: "satisfactory," "needs improvement," or "unsatisfactory."

At the end of the semester, data from Weeks One, Four, Eight, and Twelve was compiled and plotted on a graph so that trends could be examined. These data included (1) the percentage of students writing at a descriptive reflective level or higher, (2) the average exam score, and (3) the percentage of students receiving a clinical performance assessment of "satisfactory." The question being posed was whether any correlation might be observed between the students' ability to reflect and their academic performance in class and in the clinical area.

Results

The most significant result of the study was that most students showed clear evidence of being able to use their instructor's feedback to increase the level of reflection found in their journal writing over the course of the semester. During the first week, as shown in Graph 1, only 27% of the students were writing at even the descriptive reflective level (the second lowest level in Hatton and Smith's hierarchy) in their journal entries. The large majority wrote only descriptive passages, with little or no evidence of reflective thought.

By the fourth week, the number of students writing at the descriptive reflective level had more than doubled, reaching 57%. By the eighth week, 90% of the students were using their journals for reflective purposes, and of these, nearly half had reached the level of dialogic reflection.

Graph 1: Comparison of Students' Level of Reflection, Exam Grades, and Clinical Performance
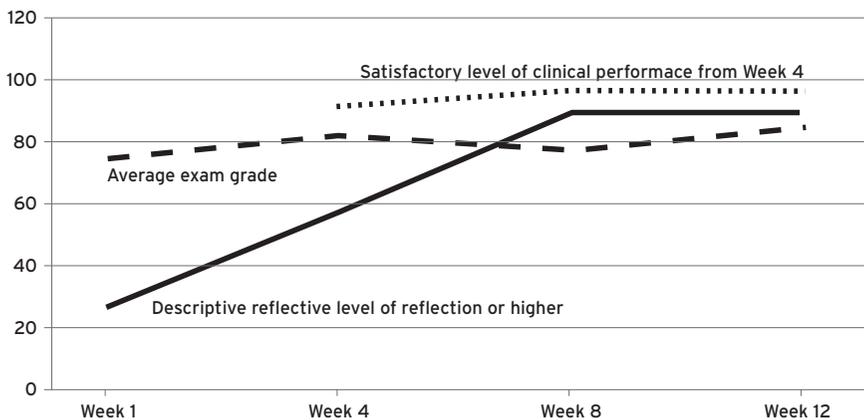
Although no students were able to attain the highest of Hatton and Smith's levels, that of critical reflection, the number writing at the descriptive reflective and dialogic reflective levels held steady until the end of the semester. In Week Twelve, only three of the thirty students (10%) continued to limit themselves to simple descriptions. Fourteen students (47%) were demonstrating an ability to engage in descriptive reflection, while another thirteen students (43%) had reached the level of dialogic reflection.

There was also some indication that the students' increasing ability to use their journals for reflection might be related to improved results on both their written exams and their clinical performance. As a group, the students had their lowest average exam grade, 75%, during the first week, when their journal writing was almost entirely limited to simple description. By the fourth week, when a majority (57%) of the students had begun to write reflectively in their journals, the average exam grade had increased to 82%.

In the eighth week, the average student exam grade slipped to 77%, even though 90% of the students had reached at least the descriptive reflective level of journal writing. This apparent contradiction can be explained, however, by the fact that the class had just concluded the part of the course dealing with maternity and was taking the first exam devoted to pediatrics; the change in subject matter could easily account for the lower exam scores. By the twelfth week, the average exam grade had risen to 85%, the highest average during the entire semester. At this point, not only were 90% of the students continuing to write reflectively in their journals, but nearly half of these had reached the level of dialogic reflection.

In the area of clinical performance, where the effects of reflective writing might be expected to be most observable, the results were even more consistent. In the first week, the students' clinical performance had been only at the beginning stages and was not formally assessed. In the fourth week, however, 90% of the students received an evaluation of "satisfactory," while 10% got a grade of "needs improvement" or "unsatisfactory." As the percentage of students writing reflectively in their journals increased from 57% in the fourth week to 90% in the eighth week, the percentage receiving a grade of "satisfactory" on their clinical performance also increased, from 90% to 96%. As noted, the level of reflection in the student journals remained high in the twelfth week, as did the students' clinical performance, with 96% once again receiving a grade of "satisfactory" during that week.

In addition to exam scores and evaluations of clinical performance, there were other indications of the positive effect of reflective writing on the students' work and on their attitudes toward that work. In their journals, the students gradually became more focused on the results of their actions, and on the effect of those actions on their patients, as opposed to just reporting the tasks they had accomplished. They also made increasing reference to how much they were learning by keeping reflective journals and how the experience was affecting their academic and clinical success.

It was also noted that students who reflected more often in their journals tended to seek more frequent clarification from the instructor in both classroom and clinical settings, and these conversations in turn helped the instructor understand what the students were experiencing. For example, Ming, with grades of B and B+ on her exams, was having difficulty applying principles learned in class to the clinical area. In one instance, under Ming's care was a 17-month-old infant who cried vigorously whenever Ming approached with a stethoscope. Unable to soothe the child, Ming asked the instructor for help in obtaining the vital signs of the crying infant, and this task was successfully accomplished. It was not until the instructor read Ming's journal, however, that she discovered Ming's awareness that the infant was in pain or associated the stethoscope with pain:

> Today, I was assigned to a patient who was admitted due to a right hip dislocation. She is a 17 month old Asian. When I walked in, the mother was playing with her, and she seemed to be having fun. I introduced myself and asked the mother if I could take the baby's vital sign. She allowed me to do so. Upon starting to take her apical pulse, the baby started crying and pushing the stethoscope I was holding away from her. I realized that she associated the stethoscope with pain or an unpleasant experience. The mother seemed to be upset about the baby's crying. I did not know what to do, so I decided to come back later. About 15 minutes had passed, and I walked in and smiled cheerfully. At first I allowed the baby to become familiar with the stethoscope, and surprisingly she began to play with it for a while. I thought to myself, "I got you." Nonetheless, when I tried to put it on her heart, she went ballistic again. She cried and fidgeted more than before. The mother was apologetic to me. I felt bad for her. I told her not to feel that way because

it was natural that her baby was not cooperative due to the pain associated with the stethoscope. Finally, I asked Professor Haslip to save me from the situation. While the professor distracted the baby with toys, I was able to get an apical pulse and respiration. Even though she gave me a hard time, I felt bad for her. It must be very frustrating since she is not able to express herself. The only expression she could express was to cry.

After reading this journal entry and discussing the situation with Ming, the instructor realized that Ming had not thought to apply the principles of infant growth and development covered in class to her clinical experience. Although Ming had studied Erikson's theory of growth and development, she had not recognized that the infant was in the "Trust versus Mistrust" stage of development (London et al. 892). When asked what she would do differently in the future, Ming replied, "Have the Mom hold the baby." Reflecting upon her encounter with the mom and the baby, Ming offered, "I must think about what is said in class and what I have read." Thus, as a result of journal writing and the discussion with the instructor that it prompted, Ming was able to make a connection between classroom learning and direct experience in the clinical setting.

Conclusions
The use of guided reflective journals points to a positive influence on overall student progress, at least as observed in a clinical nursing course. Evidence suggests that as students improve their level of reflective writing, exam grades and clinical performance improve as well.

In sum, student reflection appears to foster growth in both academic and clinical settings. Through reflection, students become more attuned to themselves and begin to develop an awareness of the temporary limitations and potential applications of their knowledge base. When new to the idea of keeping a journal of their experiences, students tend to reflect at a lower level and to limit themselves to the relating of specific events. They do not know what it is they have not learned until they attempt to make decisions or explain their actions. It is not until students recognize the limitations of their own practice that they begin to make connections with what they have learned in the classroom. In asking students what prevented them from achieving their goal or what they could have done better, the instructor is really asking whether the students have begun to reflect. Reflection leads to

a search for answers, which in turn leads to a greater appreciation for what has been covered in class.

The process of keeping a guided reflective journal moves the student through this process to higher levels of reflection. Reflection in the clinical setting forces nursing students to acknowledge their own strengths and limitations as they attempt to make decisions concerning patient care. When students receive instructor feedback in the form of increasingly demanding reflective questions, they begin to utilize more complex processes that result in higher levels of critical thinking and more effective decision-making.

Appendix: The Guided Journal Assignment

SCR 270 Parent-Child Nursing Clinical Rotation Guided Journal
The clinical rotation for maternity nursing will take place the first six weeks of the course and each week you will rotate to a different area of maternity. The pediatric nursing clinical rotation will take place the last six weeks of the course. To optimize your personal clinical experiences, you will keep a journal to record your learning objectives and learning experiences throughout the semester.

Purpose: To provide you with an opportunity to focus on a personal learning objective apart from the assigned clinical learning objective.

Description: Your journal should be kept in a small notepad and carried to the clinical area each week. Write your personal objective and the date as the title of your entry. Use the informal narrative style of writing for all entries and proceed in the following manner:
1. Prior to reporting to the clinical area, write down your own personal learning objective for the day.
2. At the end of the clinical day, record your experiences in your journal.
3. Explain if you were or were not able to meet your personal learning objective.
4. Describe what you would do the same or differently to ensure you met your objective during the next clinical experience.
5. Write a reflection of the entire clinical rotation experience as your final entry in your journal at the end of the semester.

Below are suggestions you may use as learning objectives; however, you are encouraged to develop your own personal goals.

Week 1   Personal expectations for orientation to the maternity units

Week 2   Personal organization of your clinical tasks and duties

Week 3   Prioritization of your work day

Week 4   Communication and interaction with a maternity client

Week 5   Communication with another healthcare professional (MD, Pharmacist, etc.) regarding your client

Week 6   Formal report to the nurse responsible for your client

Week 7   Personal expectations for orientation to the pediatric units

Week 8   Understanding the drug interactions of medications you will be administering to the pediatric clients

Week 9   Patient education for the parents of an infant

Week 10   Patient education for the parents of a toddler or pre-schooler

Week 11   Patient education for the parents of a school-age child or adolescent

Week 12   Reflections on the entire clinical experience

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The Narrative of Research as a Tool of Pedagogy and Assessment: A Literature Review

Louise Fluk, *Library*

The LaGuardia Library has offered its three-credit course, Information Strategies (LRC102), as a Liberal Arts elective for over twenty years. The term project for the course is an annotated bibliography of materials that would serve to answer a selected research question in a ten-page research paper. Writing the research paper itself is not a requirement of LRC102 but the annotated bibliography must be accompanied by a "narrative of research" in which the student describes the process used to find each item in the bibliography and explains its inclusion.

The informal rationale for assigning the narrative of research is twofold: pedagogy and evaluation. As a pedagogical tool, the narrative serves as a reflective exercise in which students recount in detail the process of conducting a substantial research project (the bibliography). The reflective essay makes students conscious of the process of research; it

> helps to focus students' attention on what they are actually doing when they develop a research question, choose a database or search engine, select keywords, revise searches, evaluate materials, and so on. As a kind of 'capstone' assignment, a narrative of research touches on all of the IL [information literacy] competencies.[1] (Fluk, Egger-Sider, and Rojas 183)

In addition, the narrative of research provides students with much-needed reinforcement of writing skills.

As an evaluation tool, the narrative of research provides the instructor with insight into student thinking about research and student practice of research skills. The narrative helps to evaluate what the student has learned. Often, it provides more information than a research paper or annotated bibliography about the level of a student's information literacy. In addition to summative evaluation of student accomplishment, the narrative of research also provides instructors with important course evaluation data.

However, these reasons for assigning the narrative of research in LRC102 have indeed been "informal," based on a largely unexamined set of assumptions that seem logical and have often been confirmed anecdotally, but were not grounded in any qualitative or quantitative research. With the advent of institutional outcomes assessment at LaGuardia in the last decade, the Library has felt the need to revisit the issue of the pedagogical value of the narrative of research.

LaGuardia's outcomes assessment plan mandates rubric assessment of seven core competencies, among them "research and information literacy" (LaGuardia 121). The target of the assessment is student work of various kinds and from various disciplines, deposited electronically in an ePortfolio "assessment area" and made available anonymously to faculty raters. Between 2004 and 2006, a committee of LaGuardia faculty developed an "Information Literacy (IL) Rubric" to test three learning outcomes distilled from the ACRL *Standards* (Fluk, Egger-Sider, and Rojas 197–200). These three learning outcomes are:

1. determining information needs and searching effectively,
2. evaluating sources effectively, and
3. using information ethically.

Outcomes 2 and 3 can, uncontroversially, be tested using traditional research papers and citations/bibliographies from any field of study. But the rubric specifies that learning outcome 1 should be tested using student narratives of research and, while few dispute the value of narratives of research as an assessment tool, most faculty in other disciplines remain unconvinced of their contribution to student learning, as distinct from the *assessment* of student learning (Fluk, Egger-Sider, and Rojas 183). Therefore, narratives of research are assigned by only a few faculty members outside the Library. Since LaGuardia's outcomes assessment plan requires evaluation of core competencies across the disciplines, the lack of examples of such student work from a variety of courses constitutes a severe limitation of the IL rubric.

Rather than going back to the drawing board and revising the IL rubric, it seemed worthwhile first to conduct a literature review looking for recent studies[2] of the validity of the narrative of research as a pedagogical and evaluative tool and for examples of its practical application in institutions of higher education. Do narratives of research have sufficient pedagogical value to warrant their use in courses across the college? The hypothesis of this paper is that such a literature review will strengthen the "informal rationale" upon which the Library faculty has

long based its use of narratives of research in LRC102 and may convince other faculty to add such narratives to their arsenal of techniques for promoting student learning.

The Scope of "The Literature"

The notion of conducting a literature review about the pedagogical and assessment value of narratives of research and their use in higher education is fraught with unexpected complications. To begin with, what is the scope of "the literature"? Traditional literature reviews range over published research materials – books and journal articles in print and online – on a given topic. However, on the topic at hand, there is, in addition to academic books and articles, an enormous "literature" that is relevant but hard to survey. Websites abound on information literacy instruction, on pedagogy in various other fields, and on assessment in higher education, but none is devoted to narratives of research in instruction in any field. In addition, while course syllabi in any number of disciplines also abound on the Web and could be good sources of data about use of research narratives in instruction, the syllabi vary wildly in the information they provide. Few provide more than limited details about their assignments and fewer still provide any explanatory rationales. And what of "unpublished" syllabi – those buried in password-protected course management systems and those still distributed on paper only? These syllabi are completely beyond the scope of a literature review, but a survey questionnaire addressed to teaching faculty might yield interesting data on the actual use of narratives of research. This paper will focus on the published literature but will also attempt to take into account important Web documents and syllabi.

Defining Terms

The second complication of conducting a literature review about "narratives of research" is that very few use that terminology. Indeed, a Google search[3] for the two keyword phrases, "narratives of research" and "information literacy" yielded all of five documents, three of which were generated by or descriptive of activities at LaGuardia and one an extract from a guidelines document about the ACRL *Standards*.[4] Even the *Standards* do not include the phrase "narratives of research," although Standard Four, Outcomes 2a and 2b provide a clue to alternate terminology:

The information literate student . . .
- Maintains a *journal* or *log* of activities related to the information seeking, evaluating, and communicating process
- *Reflects* on past successes, failures, and alternative strategies (Association 13, emphasis added).

A wide variety of terms is used to describe what LaGuardia has called narratives of research. Among the "Informal, Exploratory Writing Activities" Bean discusses are journals, notebooks (including double-entry notebooks), reading logs, diaries, daybooks, learning logs, semistructured journals, and guided journals (chap. 6). Other permutations include: reflective research journals, reflective journaling, research journals, learning journals (Woodward; Wagner; Boud, "Avoiding" 125; Smith; Hutchins 175; Walker; McGuiness and Brien; Brown, et al. 285), personal journals (Woodward 416; Edwards and Bruce, "Panning" 366; Brown, et al. 285), search reports (Edwards and Bruce, "Assignment"), "personal notebooks . . . thinkbooks" (Fulwiler 2), research process journals (Gratch Lindauer 125), research essays (Beck 18), research notebooks (Donnelly 30), process writing, process logs, research logs (Quantic; Woodward 416; Macaluso; Sharma), process analysis (Angelo and Cross 307–10), learning diaries (Jarvis 79), logbooks (Rutherford, Hayden, and Pival 436; Shapiro and McAdams), and search diaries (Smith). Some instructors enliven the assignment with less generic names: "I-Search Paper" (Donnelly 33; Jent), "Paper Trail" (Burkhardt, MacDonald, and Rathemacher, chap. 9; Nutefall), "List of Information Tools Used" (Cooney and Hiris), research portfolio (Minneapolis), and pathfinders (Morgan and Peoples).

The variety of nomenclature is not simply a testimony to the riches of English synonymy. Different terminology may imply different instructional purposes and even different pedagogical philosophies. For purposes of this review, the following definitions, of *research logs, journals,* and *portfolios,* will help to sort out the issues:

Research Logs: Logs are, according to Wagner, the least "reflective" form of journaling, largely, though not exclusively, descriptive (263). They constitute a record of questions asked, information resources consulted, twists and turns of search strategy, and answers found – or not (Joyce and Tallman, qtd. in Jent, 34; Gilinsky and Robison 408); a "written account of the progress of the research process" (Rockman 57); a record analogous to a reporter's notebook (Lampert 352); the story of a research journey, with the logbook as the "suitcase" (Shapiro

and McAdams 129–30). LaGuardia's version of the assignment has been a narrative but the research log can be an outline (Angelo and Cross 310), short answers to guide questions (Choinski, Mark, and Murphey 573–74; Cooney and Hiris 230–31), or even an oral presentation about the topic researched and problems encountered in finding information (Jacobson and Xu 33–34). At least one source advises against the narrative form, lest the project overwhelm the assignment it is meant to support (Angelo and Cross 310). And, in the I-Search paper, the research paper itself tells the story; it is scaffolded by a log/journal of search strategies and reflection (Jent).

Journals: Journal writing resists precise definition, especially since it has been adopted in many different fields of study for a variety of purposes (Walker 216–17). It derives its essential nature from the French word for "day" (*jour*), a root it shares with the word "journey" (English and Gillen 87). Journaling is writing about quotidian experience, but not only in the descriptive sense of an events log. The "journey" – in our case, the research journey – has a goal, and writing thoughtfully, i.e. reflectively, about the messy process of reaching that goal is a way of "turning experience into learning" (Boud, "Using" 10).

However, reflection is also a notion that resists precise definition because it has a variety of purposes. Derived from the Latin *reflectere,* "to bend or turn backward," reflection connects experiences and existing knowledge to create new knowledge (Gillis 50–51). In fields such as athletic training (Walker), librarianship (Farmer), nursing (Gillis; Brown, et al.), social work (Boud, "Avoiding"), and teacher education (Wagner; Woodward), the aim of reflective journaling is professional growth. In secondary and college classrooms, reflective journaling is assigned to improve learning of material, understanding of ideas, and student writing (Fulwiler) and as a metacognitive tool, requiring students to think about their thinking (Jent). Reflective journaling is both "writing to grow" (Holly, cited in Wagner 263), and "writing to learn" (Jacobson and Xu 72–75; Smith 26). In information literacy education, reflective journaling is less about personal growth than about foregrounding the research process, making students aware of that process and, thereby, improving it (Beck 18; Sharma 132).

Portfolios: The definition of portfolios developed by Paulson, Paulson, and Meyer is widely quoted in the literature of information literacy education (Fourie and van Niekerk, "Using" 335; Snavely and Wright 300; Jacobson and Xu 122; Fourie and van Niekerk, "Follow-up" 110):

> A portfolio is a purposeful collection of student work that exhibits the student's efforts, progress, and achievements. The collection must include student participation in selecting contents, the criteria for selection, the criteria for judging merit, and evidence of student self-reflection. (60)

At the risk of oversimplifying, this paper views journals as research logs *cum* reflection and portfolios as journals supplemented by additional documentation of student "efforts, progress, and achievements." The "narrative of research" in the original research question for this review becomes the research log and/or research journal, the latter incorporating a limited form of metacognitive reflection, namely the practical reconstruction of the student's research process.

Extent of Research Log Use in Information Literacy Education
Research logs and journals seem to be an underutilized tool of either pedagogy or assessment in IL education. Holliday and Martin reviewed 192 syllabi for general education courses to identify where students at Utah State University were being exposed to IL instruction. Fewer than half of the syllabi showed any IL assignments; most of those were research papers, none research logs. O'Hanlon got similar results in a study of syllabi at Ohio State University. Hrycaj analyzed 100 online syllabi for credit courses offered by academic libraries, counting the "assessment techniques and teaching methods" used; research logs are not among them although they may be subsumed in the category of "final projects" or "in-class projects" (529). Catts elaborates on a list of "methods of assessment" of IL (274–78) and Meulemans reviews the literature of IL "learning assessment methodologies" (68–70) but neither includes research logs. Kapoun surveyed 320 libraries in four-year colleges regarding their assessment procedures, receiving responses from 57 libraries (19%); none mentioned research logs. In an important ACRL survey of *Assessment in College Library Instruction Programs,* conducted in 2001 (Merz and Mark 29), 94 of 158 responding libraries (59%) reported that they assess instruction. Of those 94 libraries, only 27 (28.6%) did assessment using research logs or reflective writing about process. Finally, a recent review by this author of 341 assessment-related pages from the websites of higher education institutions listed in the meta-site *Internet Resources for Higher Education Outcomes Assessment* (Schechter) found that only 29 (8.5%) refer to research logs.

Nevertheless, important examples of research log assignments exist and enthusiastic support for such assignments can be found in the literature. One of the best-known exponents of IL education, Tom Eland of the Minneapolis Community & Technical College (MCTC), has developed a "Research Portfolio" assignment that faculty in any field can use to teach and assess student research. Note that, although Eland calls the assignment a "portfolio," it actually meets the definition of a research log/reflective journal adopted above. Guidelines, a completed sample, and an assessment rubric appear on the MCTC Library website (Minneapolis). MIT's Materials Science and Engineering Program offers a freshman course in "Information Exploration," in which each of six assignments includes a research log. The logs account for 30% of the course grade (MIT). Several college libraries recommend research logs to faculty as alternatives to term paper assignments, among them the College of Staten Island, San Jose State University (SJLibrary.org), and Touro College. Without a serious survey of the field, however, it is impossible to gauge how representative these examples of the use of research logs and journals are in higher education practice.

Rationale for Using Research Logs: Pedagogy and/or Assessment?
The apparent paucity of research log and reflective journaling assignments in information literacy education is surprising considering the enthusiasm for them exhibited in the literature. Much of this literature treats research logs and journals as pedagogical tools to improve student skills rather than as tools of assessment. Thus, the *Guidelines for Using Journals,* adopted by the National Council of Teachers of English in 1986, were created "for strong pedagogical reasons, based generally on . . . assumptions about the connections between thought and language" (Fulwiler). Beck describes a research essay as a "meta-learning" activity (17). Edwards and Bruce found that assigning a reflective journal and a search process report helped students progress through stages of information-seeking that they identified as "looking for a needle in a haystack," "finding a way through the maze," and "using the tools as filter," on their way to the highest level, "panning for gold" (*Assignment*; "Panning"). Jacobson and Xu identify logs and journals as examples of "writing to learn formats" (74). For Jent, the I-Search journal became a "vehicle for understanding my complicated topic. . . . I became a better thinker, a more impartial evaluator of my own work, and a better writer" (74). Rutherford, Hayden, and Pival describe WISPR (Workshop on the Information Search Process for

Research), a tutorial developed at the University of Calgary based on Carol Kuhlthau's research into the Information Search Process (ISP). Each phase of WISPR includes a "logbook" in which students record and reflect on their ISP, leading "to a better understanding of searching and a more critical evaluation of tools, techniques, and sources used in the process" (436). Finally, Jackson, mapping the ACRL IL competency *Standards* to Perry's stages of cognitive development, sees research journals as helpful to students in the dualist and multiplist stages (55, 57).

Several more sources view research logs and/or journals as tools of *both* pedagogy and assessment. In a paper that predates the Internet and hence sounds rather quaint on the subject of research, Diana Quantic finds that research logs serve both student and professor. Students are "forced to think about how they [do] their research," discovering their own strengths and weaknesses (223), and instructors can analyze the problems students are having and respond to them. Two papers analyze collaboration of librarians and English faculty to integrate student research and writing: Smith quotes both Fulwiler on journal writing as a way of thinking (22) and Caposella on journal writing as a way to promote "cognitive maturity" (23, cf. Jackson). At the same time, she acknowledges an assessment component: journals provide instructors with information which can be used to improve future assignments and service (25). Likewise, McMillen and Hill encourage the use of "research journalizing" in composition classes both to make students aware of the recursive nature of research (16) and to provide a "diagnostic for the research process" (19). According to Rockman, keeping a log or journal

> support[s] information literacy skills by developing the complementary skills of reflective thinking, analysis, decision making, problem solving, and writing [and] becomes a tool for evaluating the information, the search process, and the learning that took place. (57)

Shapiro and McAdams found that "[s]tudents who spend time each week reflecting upon the progress of their research, next steps, and what they are personally learning about the process, in a journal or logbook, have better projects and take away more value from the experience" (139). In addition, "the logbooks . . . were of research interest in and of themselves and could be used as an evaluation tool" (130). In a recent study of a business capstone course, Gilinsky and Robison argued both

that "[r]esearch logs facilitate student learning" (412) and that the "reflection paper – essentially a self-assessment of what an individual student learned about IC [information competency] – can also be said to be a narrative evaluation of the efficacy of the IC component in the course" (410).

A few sources treat research logs and journals as tools of assessment only: Macaluso considers journaling and process writing as ways of authentic assessment of IL competencies. In a graduate business course, Cooney and Hiris assigned an annotated "List of Information Tools Used" which they consider indispensable for assessment of information competency (222). In a political science course, Hutchins notes that "[r]equiring students to identify how they found and obtained their resources was extremely useful in informing future library instruction and affirming its value" (177). The strongest argument for reflective journals as an assessment tool is made by McGuiness and Brien who studied research journals created by 109 freshman students at University College Dublin, concluding that they "provided wonderful insight into how students cope with researching and writing academic essays" (37).

By contrast, the literature of IL education views portfolios chiefly as assessment tools, not only of student work but also of the design of assignments, delivery of instruction, and course syllabi. The pedagogical purpose and value of the portfolio lie in the products within it – including research logs, journals, and draft and completed assignments in any format – as well as the "purposeful" act of selecting those contents (Paulson, Paulson, and Meyer). This distinction explains why, in the literature of information literacy education here surveyed, the great majority of sources discuss use of portfolios for assessment (Fourie and van Niekerk, "Using"; Middle States 48; Snavely and Wright; Gratch Lindauer 125; Nutefall; Fourie and van Niekerk, "Follow-up,"; O'Hanlon 176; Radcliff et al. 131–42; Scharf et al.; Sonley et al.). Just three sources discuss the research portfolio as a learning tool but, with regard to two of them, the assessment theme persists. Donnelly describes "research notebooks" – essentially portfolios – as learning tools. In *Teaching Information Literacy* (86–96), Burckhardt, MacDonald, and Rathemacher describe the "Paper Trail Project" developed at the University of Rhode Island ("The Paper Trail"). A year later, Nutefall published an article about an adaptation of the Paper Trail assignment as a method of information literacy assessment. In the same vein, Sharma's article discusses the use of portfolios *both* to teach and to assess IL skills.

Disadvantages of Research Logs and Research Journals

As noted above, most of the literature views logs and journals in a positive light. A few authors also note the disadvantages of these assignments, chief among them the time required of both students and instructors (Wagner 270; Macaluso 48; Bruce, Edwards, and Lupton 12; Contreras-McGavin and Kezar 73; McGuiness and Brien 37; Radcliff et al. 129; Sonley et al. 48). The need for clear articulation of tasks and grading is noted by Macaluso (48) and McGuiness and Brien (37). Students need to be convinced that the exercise is not just "busy work" (Radcliff et al. 133; Sharma 133; Gilinsky and Robison 412; Mills). It is possible that the apparent underutilization of research logs and journals discussed above is due to additional drawbacks not articulated in the published literature. Certainly, however, the pedagogical value of research logs and journals asserted in the literature seems to outweigh the drawbacks and to warrant instructor efforts at mitigating those drawbacks.

Conclusion and a Caveat

The preponderance of articles here reviewed tend to support the "informal rationale" of LaGuardia Library faculty for using "narratives of research" (read: research logs and journals) as a pedagogical tool. However, it must be noted that few of the articles are based on broad and rigorous empirical research: They provide valuable literature reviews, experiential or anecdotal evidence, case studies, and analysis of pedagogical theory, but few present the results of research studies. Writing in 2001, the editors of *Promoting Journal Writing in Adult Education,* a collection of articles entirely devoted to the topic, asked:

> [W]hy is so little empirical research available on journal writing? . . . all those who contributed to this volume have used journal writing in their classes, yet none of them offers data, beyond those collected anecdotally, to support the use of journal writing. (English and Millen 89)

Since 2001, some empirical research relevant to the use of research logs and journal writing has been published in the literature of information literacy education: Case studies of single courses predominate, with student performance and student satisfaction as the main objects of study (Cooney and Hiris; Nutefall; Sharma; Sonley et al.; Gilinsky and Robison). Edwards and Bruce have used phenomenographical tools to

study how students experience and understand the research process and the implications of the results for IL education. They concluded that logs and journals constituted "the assignment that triggered change" in student search processes (*Assignment*; "Panning"). Scharf and her colleagues developed a performance-based assessment instrument to test the IL skills of a sample of students close to graduation at New Jersey Institute of Technology. One of the outcomes was insight into changes needed in IL instruction: "We learned that class assignments must make the research process explicit, so we will experiment with research journals and annotated bibliographies . . ." (471).

There is no doubt that further research should be done into how research logs and journal writing affect student learning and how best to assign it. But there is also no doubt that research logs and journals can and should play an important role in information literacy education and assessment.

Notes

1. Refers to the IL competencies delineated by the Association of College and Research Libraries in its *Information Literacy Competency Standards for Higher Education* (aka ACRL *Standards*).

2. With the exception of a few articles cited in later works, the materials in this review were issued in or after the year 2000.

3. Conducted 23 Mar. 2009.

4. The fifth result of the Google search was unrelated.

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The Peer Partner-in-Learning: Integrating the Practice of Reflection into the New Student Seminar

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Introduction

In recent years, student involvement in cocurricular activities is often cited as contributing to the sense of belonging that, for many undergraduates, is transformational (Camp 272; Tan and Pope 2). However, in my own classes at LaGuardia Community College, students who face the demands of work and family report having little time for the college clubs, workshops, and cultural events that often make up a central part of traditional college life. In addition, those with uneven or marginal high school experiences are perhaps less inclined to participate in campus offerings. Yet research demonstrates that the leadership skills usually nurtured by cocurricular experiences are particularly essential for students unfamiliar with the pathways to academic and vocational growth (Elliott 84).

Like many faculty interested in the full dimension of student development, I have always looked to the classroom itself to complement the broad range of activities offered by Student Life and other campus organizations. However, in my dual capacity as counselor in LaGuardia's College Discovery (CD) program[1] and professor of the New Student Seminar (NSS), I decided to take a more deliberate pedagogical approach to the question of student leadership. Aware that strong student-faculty interactions have positive effects on student success (Hazeur 1), I invited Julio, one of my second-year College Discovery students, to assist me in the Fall 2008 seminar. From our relationship evolved a pilot project of "peer partners-in-learning," a term designating the combined roles of mentee, teaching assistant, and peer mentor. While the mentoring of students as teaching assistants is rare at community colleges, I hoped that such practice might intensify and accelerate the development of leadership skills in both teaching assistant and students enrolled in our seminar.

To mentor Julio in his new role, and to prepare myself for the responsibility, I drew upon the practice of reflective inquiry that structured my participation in LaGuardia's 2006–07 Difficult Dialogues Study Circles. Guiding my inquiry into the effects of peer partnering was a single question: Could student cofacilitation of the New Student Seminar, supported

by the practice of reflection, increase a sense of undergraduate belonging, autonomy, and independence in the student assistant? This paper views that question from the perspectives of both faculty and teaching assistant (hereafter referred to as "peer partner") and emphasizes the potential of peer partnering to cultivate the independence of thought, attentive communication, and self-correction that characterize strong leadership. For the purposes of my exploration of the effects of peer partnering and reflective inquiry upon leadership development, I looked most closely at the peer partner's classroom performance and cocurricular engagement. In Fall 2008, the use of reflective practice in the peer-partner experience as a method to increase academic, social, and personal confidence was evaluated by College Discovery counselor observations, peer-partner reflections, and qualitative surveys, integrated and presented here as a case study.

The Study Circle Model
Unlike many cocurricular activities, a typical study circle is set up less as a social event than a focused exploration of an idea or issue. Very often, as in LaGuardia's Difficult Dialogues Study Circles, discussion is facilitated by reflective inquiry, also called process-orientation, which refers to activities by which a facilitator guides a group or individuals to awareness and insight by posing reflective questions ("Study Circles"). In the language of the psychologist, processing refers to the discussion of emotional reactions to an event or experience (Hill and O'Brien 121). As a participant in Study Circles, I have observed that facilitators generally respond to divergent viewpoints and feelings about a profound social issue in ways that keep the conversation flowing and move the group from dialogue to civic action. Attentive listening, mirroring, synthesizing, and balancing group dynamics all contribute to open, candid, and respectful exchange.

Equally important to the facilitation of the expression of feelings and opinions by participants is the reflective conversation shared between facilitators before and after the study circles. For example, during LaGuardia's Difficult Dialogues, my cofacilitator and I met to discuss the effectiveness of our roles after each of the five weekly sessions. These regular exchanges of perceptions and impressions of the circles provided an opportunity to examine and improve our actions as facilitators. Inspired by the potential of reflective facilitation to transform my teaching practice and, most important, strengthen student leadership skills, I determined to incorporate its method into my

New Student Seminar. As in dialogue circles, the teaching challenge of the New Student Seminar is to balance practical and process-oriented objectives in ways that allow students to express not only academic concerns but also emotional needs.

The Use of Reflection in Professional Practice
Since Dewey, the term "reflection" has become central to the professional vocabulary of teachers and to pedagogical practices across the disciplines. Tom Strong discusses reflection in counseling as a dialogic practice through which clients make connections that are evident to the counselor but not yet evident to the client ("Reflections" 1001). In the field of psychology, reflection facilitates intentional self-inquiry into the ways one behaves, experiences, and forms perspectives about oneself and one's life. It is a collaborative process in which the "reflective" counselor helps the client to identify, express, and clarify feelings in the hope that the client becomes immersed in his or her inner experiences (Hill and O'Brien 121). Primarily listeners, counselors probe or reflect upon what is said by the client; as a result, the client also begins to listen deeply to his or her own words.

The dialogic nature of reflection, particularly in counseling and in the classroom, implies that counselors and educators – and not only clients and students – develop the capacity for self-reflection as ongoing practice (Larrivee 987). "Reflection-for-practice is in essence proactive in nature" (22), write Reagan, Case, and Brubacher; that is, reflective practitioners examine their methods, seek new information, "challenge their own practices and assumptions" (Ross, Bondy, and Kyle 337), and modify their practice. In other words, reflective pedagogy can benefit the desire of both teacher and student to clarify self-knowledge.

In a counseling or classroom environment, awareness of self emerges as a result of sustained "inquiry into one's experience [and] active participation in the events of our lives" (Fiddler and Marienau 76). Dewey's belief that learning improves with the degree of reflective effort assumes a deliberate practice of "thinking for an extended period by linking recent experiences to earlier ones in order to promote a more complex and interrelated mental schema" (Clark). In *Educating the Reflective Practitioner*, Schön elaborates upon Dewey by including the collaborative aspect of reflection as a continuous process which, in the words of Joan Ferraro, involves "thoughtfully considering one's own experiences in applying knowledge to practice while being coached by professionals in the disciplines" (2). Dewey's and Schön's concepts of

reflection are mirrored in the Japanese notion of *kaizen*, or the effort of "continuous improvement" in which "reflection becomes part of daily work and conversations" (Maiers). Collaborative, reflective, continuous: *kaizen*, or the practice of looking at one's behavior and making changes in light of new discoveries, may well be applied in our classrooms. Continuous improvement, then, is achieved with continuous reflection. Through this process, "students will become more and more engaged in their growth and learning" (Maiers). It must be noted, however, that the traditional practice of *kaizen* cannot be fulfilled without the support of teachers and parents and, sometimes, an entire society. In the absence of a total environment of *kaizen*, my goal in the design of the classroom triad (teacher/peer partner/enrolled students) was to create a reciprocal flow of reflection in which all members offer views of past and present behaviors and beliefs, and project future plans.

The Case for Peer Partnering
Academic mentoring can take many forms, from tutoring and peer-based relationships among students within their disciplines, to preprofessional practicums and upper-division teaching assistantships under faculty who serve as mentors to doctoral students. The literature on peer-based undergraduate intervention, or peer mentoring, supports the increasing importance of mentoring in the first year of college as a means "to reduce first year attrition by aiding transition to university" (Hill and Reddy 98). In their study of the impact of mentoring on Latino undergraduate students, Hill and Reddy found that mentoring played a positive role in preparing new students for college life, academic success, and life after graduation. Identifying an important distinction in mentoring interventions, Hill and Reddy write: "Mentors' advice reflected implicit academic values rather than strategic short cuts, and mentoring cued reflection on their own development" (98).

The term "peer partner," as opposed to the term "peer mentor," suggests a nonhierarchical relationship within the triad of teacher, peer partner, and students, one that places value on reciprocal relations. The advantages of the presence of a peer partner in a New Student Seminar are many. As role models, peer partners can lead first-year students in making the adjustment to college and to the new demands of college-level study. They can actively engage their fellow students' attitudes about a variety of topics essential to academic success: for example, effective study and test-taking skills. Peer partners can also share first-hand experience of campus resources from transfer, tutorial, and finan-

cial aid services to the library and recreational facilities. But the deepest contribution of the peer partner to the seminar is shared self-exploration, a process traditionally facilitated by the counselor/instructor.

In addition to generating a new dynamic among my New Student Seminar students, the presence of a peer partner on a continuous basis required changes to my teaching methods. First, I redesigned activities to emphasize the roles of the peer partner and the processes of intentional reflective inquiry. Second, my peer partner and I agreed to schedule regular times to discuss classroom dynamics and student concerns, issues that I had formerly reserved for my colleagues. Finally, as a result of the increased sense of professionalism demonstrated by my peer partner, I began to rethink the roles and relationships of teacher and learner.

At first, I reacted with anxiety and uncertainty to having a student cofacilitate the seminar. However, this new arrangement provided both of us with several advantages. As the weeks of our New Student Seminar passed, Julio gradually assumed more leadership and modeled positive student behaviors. In each of the weekly one-hour classes, he actively engaged in class activities and shared his experiences from his first year as a student. Finally, in Julio's character and actions, students could glimpse future possibilities for their own potential, and in the behaviors and views of the students, Julio recognized a younger, less experienced version of himself. Over time, I, too, adapted to the presence of Julio as a peer partner and to the changes in my classroom role. My comfort level increased and the traditional hierarchical barriers between my students and me eased. Gaining confidence, Julio interacted more fully in class and in our meetings together, contributing to a practice of reflection that provided more opportunity for classroom modification than the standard once-a-semester faculty observation.

A Case History as an Evaluation of Peer Partnering

Julio was quiet and reserved when we first met during the 2007 summer program for College Discovery students. Later, as a student in my Fall 2007 New Student Seminar for science majors, Julio presented himself as responsible and attentive, but, again, not as particularly active. Yet, throughout the year, Julio visited me regularly during office hours to inquire about his major and to discuss future career goals, and in Spring 2008, as a second-semester student, he registered for my section of the Counseling Seminar for CD students. Noticing changes in Julio as he grew more comfortable speaking in class, I invited him to help register first-year students. During registration, Julio's liveliness as he talked

with students was even more apparent and pointed to a sharp contrast between peer dynamics and the typical interactions between students and faculty. Struck by these differences and imagining the effects of bringing second-year students into the classroom as peer partners-in-learning, I began to conceive a project that would cultivate the potential of students who, like Julio, did not demonstrate traditional leadership charisma, but did exhibit qualities of curiosity and inquiry essential to the practice of reflection.

The structure and process for "peer partners-in-learning" drew upon the Difficult Dialogues Study Circles model. In particular, my earlier experience as a study circle cofacilitator influenced the roles and responsibilities that Julio and I shared. For example, before and after each weekly class, we met for thirty minutes, intentionally setting our meetings for the same time as a sign of our commitment and investment in each other's growth. As the weeks passed, during class and in our meetings afterwards, we grew increasingly aware of listening to each other and reflecting on the content and style of our interactions.

However, our initial relationship was not without frustration. Our double roles as teacher-student and cofacilitators tested Julio's ability to offer opposing views or constructive criticism. Instead of leading discussions, he often sat in class as if he were one of the students. In response to open-ended reflective inquiry questions (e.g., "How do you think class went today?" "What was it like to share your personal experiences with fellow students?" "How did you perceive your role while working with me?"), Julio's observations were unfailingly positive and overly general. "The class went well," he would respond. "The students were attentive." In sum, Julio was passive, taking less initiative than I had expected.

Sensing that Julio continued to see himself as a student subordinate to his instructor, I explored his feelings about assuming a stronger presence in leading class discussions. After he expressed uncertainty about how much he should talk in class, I developed several "reflection facilitation" techniques. To help him feel more prepared to facilitate the next class, Julio and I used our preparation sessions to review questions that we would later raise with the students. In addition, we discussed the dynamics between the students and ourselves and reflected upon our own participation. Prompted to share insights and observations, and given ample time to express himself, Julio grew less reticent and developed clearer forms of communication. In turn, I asked more demanding questions about how we conducted the class and related as partners.

"What should I have done differently?" I asked. "What did you notice about your presentation in class?" As our work progressed, Julio was able to respond to my deliberate questions with concrete suggestions for improvement.

Being in class together with a peer partner was a profound experience for me as well. Was the cause of my earlier perception of Julio as passive the result of an unfair expectation that he be more like me and other teachers who tend toward "dynamic" classrooms? I recognized that some students related more easily to Julio's manner as similar to their own, and I understood their appreciation for an alternative leadership style. Reflecting on my own experience, I discovered that Julio's reserve actually complemented my presentation. In this regard, Schön's concept of reflection as "thoughtfully considering one's own experiences in applying knowledge to practice" (Ferraro 2) took on new meaning for me. Awareness of my own evolving ideas and feelings about teaching, and of my behaviors in the classroom, opened me to insights that I would not have gained without Julio's presence.

In sum, my intention to nurture student leadership development through the practice of reflection benefited both Julio and me. Toward the end of the semester, Julio wrote a reflective assessment in which he described himself as more open to sharing his shortcomings and vulnerabilities in order to reach new students who harbored anxiety and fear of the unknown. No longer just a student, he forced himself to "break the ice" when the seminar was silent and unresponsive. Finally, Julio expressed a deeper knowledge of the position of the teacher, a role he had previously taken for granted.

Conclusion

Arun Jacob suggests that community colleges can serve as a "democratizing force in post-secondary education" if faculty implement comprehensive, integrated, complementary, and innovative approaches that promote increased student engagement ([ii]). Starting as an experiment in a single classroom, peer partnering with Julio has evolved into Peer Partners-in-Learning, a vital component of the College Discovery program that stresses engagement as a path to achievement. After conducting numerous studies, including one at LaGuardia, Tinto and Goodsell-Love concluded that students who establish a sense of belonging are more likely to succeed in college (20). A review of Julio's educational journey reveals many accomplishments and multiple honors for academic excellence. Inducted into both the Chi Alpha Epsilon and the

Phi Theta Kappa National Honor Societies, Julio is also an officer of the College Discovery [Student] Club. Julio was accepted to the 2009 Intercollegiate Summer Program at Barnard College where he took two science courses. In addition, Julio won LaGuardia's Alan Berman Scholarship and was recognized on Honors Night for outstanding service to the college. In the spring of 2009, I invited Julio to present about the Peer-Partner Program at the 10th Biennial Conference of the Tri-State Consortium of Opportunity Programs in Higher Education. After our workshop, many of the one hundred in attendance expressed the wish to replicate our program and commended Julio on his work and accomplishments as a peer partner.

Julio's range of achievements demonstrated a capacity that he himself may not have foreseen. Certainly, his continuous effort as a peer partner, prompted by the practice of reflection, contributed to his academic achievements and emotional growth. But in the lives of many students, especially at LaGuardia and for a variety of reasons, the opportunity for a transformational experience may go unperceived, easily missed. To encourage students like Julio, we teachers must intentionally present them with opportunities, tapping their shoulders many times.

Angela Maiers observes that what many students really want is a relationship with their teachers. "When students feel valued, honored, and respected," she writes, "there is an interest and energy in the process of learning that reaches far beyond the content we teach." Maiers suggests that teachers "should stand before [students] as learners." It is in this sense that the experience Julio and I shared brought home to both of us the value of the reflective practitioner's unending commitment to growth, change, development, and improvement, in a word, *kaizen*.

NOTES

1. The College Discovery program assists "students who have the potential to succeed in college but lack the educational foundations and economic resources necessary" ("About Us").

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Co-op, Reflection, and Professional Identity: An Experiential Education Approach

Deborah Robinson, *Cooperative Education*

> *We do not learn from experience. We learn from reflecting on experience.*
>
> John Dewey

A theme common to the lives of most students is the need for in-class professional preparation and cultural knowledge that support a transition from campus to workplace. At LaGuardia Community College, the mission of familiarizing students with professional life and its language and expectations is undertaken primarily by the department of Cooperative Education (Co-op). Since the 1970s, Co-op has guided students in experiential learning, or the process of learning by doing. But, as Dewey warned, learning from action may have negative or "miseducative" effects that are often the result of unexamined experiences (*Experience* 25). Over the last forty years, Co-op courses have met this challenge by combining internship opportunities with critical reflection in the classroom. More recently, these opportunities have been revitalized by the use of ePortfolios – with their inherent capacity to guide the practice of reflection – and by the construction of career identity in a new sequence of courses: the first-year Fundamentals of Professional Advancement course (CEP121) and the second-year full-time internship experience (CEP201), and accompanying discipline-specific Internship Seminars (CPA041, CPB041, CPC041).

Overview: Connecting Students, Connecting Classrooms
In 2008–09, twenty LaGuardia faculty participated in the Center for Teaching and Learning's interdisciplinary professional development seminar, "Connecting Students, Connecting Classrooms: ePortfolio and the Power of Engagement" (CSCC). The goal of the seminar was to clarify the meanings and uses of reflection within the context of ePortfolio. The nucleus of an integrative learning dynamic, ePortfolio fuses technology, disciplinary learning, reflective practice, and assessment (*ePortfolio*). The interdisciplinary advantages of ePortfolio are multiple, and it encourages cohesiveness of learning by bringing

together evolving and visible expressions of student work from across disciplines and semesters into a single website. Most important to the focus of this paper is ePortfolio's "Collect, Select, Connect, and Reflect" pedagogy, which encourages intentional teaching and learning in faculty and students alike (*ePortfolio*).

Theories of Reflective Practice
In the literature on reflection and ePortfolio, Jennifer Moon's study of Dewey, Kolb, and Schön is essential to mapping the ways that ePortfolio pedagogy can incorporate reflective practice and thus expand student self-awareness and professional knowledge. In *A Handbook of Reflective and Experiential Learning: Theory and Practice*, Moon proposes an academic view of reflection as:

> likely to involve a conscious and stated purpose … with an outcome specified in terms of learning, action or clarification.... The process and outcome of reflective work are most likely to be in a represented (e.g., written) form, *to be seen by others and to be assessed.* (83, emphasis added)

Identifying conscious intention, outcomes, and visibility as essential properties of reflection, Moon refers to Dewey's stress on the significance of reflection and experiential knowledge throughout the formal educational process (Moon, *Reflection* 12). Summarizing Kolb, she suggests that his experiential four-sector learning cycle – concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing) – has implications for college-wide general education learning initiatives (Moon, *Reflection* 24–26). Through the experiential learning cycle, the student learns to connect classroom knowledge and life experience, reflect upon that connection, and establish educational and professional goals to keep pace with an evolving identity. Moon concludes her synthesis with an exploration of Donald A. Schön's "theories in use" and his ideas of reflection which, firmly grounded in professional workplace practice, elaborate on four critical elements: self-knowledge, organizational dynamics, professional development, and workplace culture (Moon, *Reflection* 40).

Classroom Applications of Reflective Practice
The value of ePortfolio as a support for the practice of reflection presents itself to Co-op faculty most clearly in the artifacts of learning

(essays, images, multimedia presentations, etc.) that students select and post, thereby providing an evolving electronic record of their academic, professional, and social acculturation. Prompts, scaffolding, and activities that mine students' life experiences are of particular importance in reinforcing the connection between career exploration, workplace experience, and reflection. Throughout Co-op curricula, students are guided to evaluate acts of learning, describe the conditions under which these occurred, and compare and document stages of conceptual development.

Along the way, supported by the interactive design of ePortfolio, students engage in a variety of forms of self-reflection that can free learners from the unidirectional limits of the traditional classroom. The template design of ePortfolio consists of a set of five interrelated modifiable sections ("Welcome," "About Me," "Educational Goals," "Classes and Projects," and "Links"). This design reinforces recursive narration about life experiences and classroom learning by encouraging students to revisit significant learning experiences and their impact upon present decision-making processes. ePortfolio also offers a flexible alternative to more static written formats in its capacity to display visual and audio files – for example, digital stories and oral presentations. Anticipating the workplace, the ePortfolio template and pedagogy draw upon and develop skills in independent documentation, organization, interactivity, and self-evaluation, all especially meaningful to "the highly motivated, self-directed learner," who wishes to "approach the workplace as a continual classroom from which to learn" (McNamara).

My Fundamentals of Professional Advancement (FPA) course stimulates professional knowledge and familiarity with workplace discourse and culture by tasks that require students to research employment trends and opportunities, identify realistic educational options, and design resumes. To expand their knowledge and to increase their motivation to create comprehensive and reflective ePortfolios, students write a series of narratives that describe their skills, abilities, interests, and personalities; assess motivations, competencies, and relevant experience; and clarify future goals. Such assignments prepare students for internship interviews in the short term and, at the same time, they help to develop a long-term professional identity. Clearly articulated reflective questions provide a fresh approach for students who struggle to reflect upon classroom learning and experience: "What did I learn from this project and why is it important?" "How will this product of learn-

ing prepare me for my next steps?" "What are my accomplishments?" "In what areas do I need assistance?" Responding to questions such as these helps generate the clarity of self-knowledge, beliefs, and perceptions that contributes to professional readiness and the realization of one's goals.

For example, in response to the FPA career exploration assignment, Paul, who arrived in the United States with limited English proficiency, selected political science as the topic of his research paper and learned that interning for a political campaign could lead to a job. As demonstrated in two posts excerpted below, Paul's reflective exploration both clarifies his goals and captures his evolution. The first excerpt is from his ePortfolio "Educational Goals" page created in FPA during Spring I 2008:

> When I first came to New York the only idea that I had in mind was to learn English. However as I started at LaGuardia new ideas came to my mind. I decided to continue my education at a senior college and if everything goes as I hope I will go to a Law school, since I'm volunteering in a school in Manhattan and I'm working with lawyers and legal assistants. Law school has become the biggest goal.

In Fall II 2008, Paul interned in the Office of New York State Assembly Member Jose Peralta in Corona, Queens. His Internship Seminar essay acknowledges the effect of his experience on his view of the workplace, his evolving educational and career goals, and his future plans:

> In my case the internship was a helpful key to clarify my career goals. Although I still have some doubts about my final career goals, what I know so far is that this internship helped me to accomplish some of my goals. Now I have a sense of how a political office works.

But Paul's final reflection goes beyond a statement of goals to express a deeper awareness of how to create meaning in his life:

> Any politician has the responsibility to look after their community. For me it is not only a responsibility but an obligation to make sure that people are getting what they deserve. During my internship I saw many constituents walking into the office

or calling with a variety of problems and even though the office was not able to help all of them, I noticed the effort everybody made to address the problem. I am interested in a similar job where I can interact with people, help them and enjoy and feel good about what I do.

If ePortfolio reflective activities are to have value, then they must have the capacity to move students toward visible introspection. That is, as readers of Paul's ePortfolio, his peers, teachers, and perhaps a wider community of prospective employers can participate in his growth toward a clear and realistic professional identity, anticipate with him the ongoing challenges of the workplace and society, and experience his desire to serve his community. Ideally, as reflection contributes to the deepening of personal meaning, it also helps in defining educational and professional goals. In Paul's words:

> Although as I stated before, I am not sure of my final career goals I know that I want to get my bachelor's degree and also go for my master's degree. I also have been volunteering for the specials elections for City Council in my district. I want to be sure that when I choose my career, I choose the right one. There is still a lot of work that I have to do and a lot of decisions to make but I will not hesitate. I want to enjoy my student life for now but also work for my future.

As students reflect on past choices, they may also describe redirection of career goals and their learning achievement plan. For example, highlighting unanticipated changes, Jocelyn Perez's "Educational Goals" page, created in Fall I 2008, reveals a new calling:

> I'm currently a candidate for an Associate of Arts and have a GPA of 3.7, which I hope may be higher by the time I graduate. I originally started off as a Veterinary Tech major but switched over when I realized that that career did not seem as appealing as it once did. I realized that my calling was environmentalism and wildlife conservation, a field I hope to break into soon.

The opportunity to reflect in ePortfolio allows Jocelyn to present a coherent narrative of change during her Fall II internship:

My internship experience offered me insight into how important a zoo can be, not in an economic respect, but for wildlife as a whole. The zoos play a major part in wildlife conservation, the career path I have chosen for myself, by raising awareness through educational means and interactive exercises.

Readers of Jocelyn's reflection follow a narrative of professional development that chronicles her successful internship, her high evaluation ratings in every category, and her acceptance of an invitation to volunteer at the Queens Zoo. Her final posts reflect upon her future goals, and the power of ePortfolio to facilitate self-inquiry:

Once in my senior college, I hope to pursue a Masters in Developmental Biology and the Environmental Sciences, and possibly minor in Anthropology. I had then planned to move abroad to Costa Rica and work in one of their reptile or avian sanctuaries, but my stay at the Queens Zoo has made me question my original plan….I believe that the type of writing required for the EPortfolio forced me to truly look into myself, evaluate my achievements and experiences, as well as examine their relevance to my future.

Conclusion

The above examples suggest that reflection on experience helps students like Paul and Jocelyn to recognize their abilities, accomplishments, values, and interests. As in other community colleges, particularly those in urban environments, LaGuardia's student population represents individuals at various stages in their lives and decision-making processes. Some of the students know exactly what they want to do in their chosen professions; others are still searching for professional identity. Co-op faculty require each student, regardless of major or prior experience, to think with intention and purpose about their interests, skills, and motivations. To promote this process, Co-op incorporates ePortfolio as a tool for narrating change over time, supporting professional inquiry, and presenting evidence of learning. Acquired in the classroom and deepened by the internship experience, the knowledge collected and made visible in ePortfolio reflects our students' evolving personal and professional identities and their growing capacity to meet the challenges of the workplace and future academic studies.

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Wikis and the Practice of Reflection

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> [S]tudents cannot learn what either teachers or technologies know.
> Rather, students learn from thinking – thinking about what they are
> doing or what they did, thinking about what they believe, thinking
> about what others have done and believe, thinking about the thinking
> processes they use – just thinking. Thinking mediates learning. Learn-
> ing results from thinking.
>
> David H. Jonassen et al.

Introduction

Over the course of three quarters – Spring 2008, Fall 2008, and Winter 2009 – we explored and evaluated the wiki environment as a forum for developing the practice of reflection among English as a Second Language (ESL) learners. As instructors in low- to intermediate-level courses taught at The English Language Center (TELC), the noncredit ESL program of the Division of Adult and Continuing Education at LaGuardia Community College, our exploration has focused on two questions: First, in what ways can a wiki, defined as "a Web site that allows users to add and update content" ("Wiki") be an effective environment for promoting meaningful learning for ESL students? Second, what types of wiki activities engage students in meaningful learning through the practice of reflection?

While the concept of meaningful learning has been defined in various ways by educators and researchers, Jonassen, Peck, and Wilson provide an extensive explanation (7–11). They suggest that meaningful learning occurs when students engage in learning that is simultaneously active, constructive, collaborative, authentic, and intentional. Our research is guided by their view that meaningful learning with technology is a constructive process, one in which students use "technology as a tool to think and learn *with*" (15), as opposed to more traditional views that consider technology to be a tool to be learned *from*. Grabe and Grabe, substituting the term "cooperative" for "collaborative," summarize the key elements of meaningful learning as follows:

- **Active** – learning occurs through interactions with and manipulations of the environment.

- **Constructive** – learning occurs when we reflect on our learning activities in order to assign meaning to them.
- **Intentional** – learning occurs when students can identify the learning goals. and are aware of their progress toward actively achieving the goals.
- **Authentic** – learning occurs when context-based, complex, and relative to real life.
- **Cooperative** – learning occurs through working with others and participating in a learning community (qtd. in "Instructional")

We recognize that the development of student reflection is an essential component of meaningful learning in general and of our own teaching approach in particular. Our exploration of the practice of reflection in wikis has centered on the collaborative, constructive, and intentional attributes of meaningful learning, of which the latter two are most relevant to reflection. (The active and authentic aspects of meaningful learning, already fundamental elements of our teaching, were not explored in our wiki experiments.) Although there was inevitably some overlap, we attempted to focus on a single attribute of meaningful learning – collaborative, constructive, or intentional – as the primary teaching objective in each of the three consecutive wikis.

Collaborative, Constructivist, and Intentional Learning: An Overview
Collaboration is a pedagogical tool treasured by many teachers who consider student interaction in a shared, project-based, or problem-solving activity to be key to meaningful, engaged learning. MacGregor emphasizes the value of collaborative learning:

> Through learning collaboratively, students can also learn the art and skill of building relationships with others. They can recognize the value as well as the challenges of mutual inquiry and problem-solving. Moreover, they can come to new understandings of themselves as responsible creators of their own knowledge and meanings – an essential skill for life-long learning. ([vii])

In our experience with wikis, we found that the collaborative nature of the wiki provided built-in opportunities for students to reflect and comment on one another's work as well as on their own. Specifically,

wiki tools such as the discussion forums and the threads on every page facilitated peer feedback and student exchange of ideas.

The constructive attribute of meaningful learning is facilitated by encouraging students to reflect on what they have learned and to construct "simple mental models to explain their worlds" (Jonassen et al. 7). For language learners, such mental models relate to the theories they develop to make sense of structures or features of the target language, aspects of the culture represented by that language, and the perspectives of fellow students. When students are confronted with something new in the learning process, then by "reflecting on the puzzling experience, [they] integrate their new experiences with their prior knowledge about the world, or they establish goals for what they need to learn in order to make sense out of what they observe" (Jonassen et al. 7). For example, reflection can be observed in students when, actively engaged with source material or with another student's work, they pose questions about what puzzles or interests them. Evaluating and commenting on a different or opposing opinion can lead to the construction of new perspectives, an essential aspect of reflective learning that formed the basis of specific activities in our second wiki.

As discussed, constructive learning emphasizes combining prior knowledge with new information in order to construct new knowledge or perspectives. Intentional learning, the focus of our third wiki, calls for the purposeful recognition and articulation of learning goals, as well as the evaluation of learning strategies designed to achieve specific goals. In this sense, intentional learning underscores Schank's observation that human behavior is ultimately goal-directed (3). As teachers guide students to recognize and reflect on their own learning goals and progress, students can begin to "articulate what they have learned and reflect on the processes and decisions that were entailed in the process: they understand more and are better able to use the knowledge that they have constructed in new situations" (Jonassen et al. 8). Current approaches to teaching and teacher education in the field of language pedagogy demonstrate an interest in student awareness of learning styles, strategies, and self-assessment. Research by cognitive psychologists Garnham and Oakhill stresses the long-term value of encouraging the development of the metacognitive skills inherent in constructive and intentional learning. Although much of the research on teaching students how to think suggests that "it is difficult to teach global skills that improve general thinking ability," Garnham and Oakhill maintain that "the training of metacognitive skills – the ability to reflect on, and

monitor, one's own cognitive processes – is a good candidate for a programme that could improve thinking of all kinds" (287). As language teachers, our role is to provide information about English and opportunities to practice it. But we must also prepare students for a future in which they will need to be not only technologically adept, but also capable of constructing meaning and reflecting upon it, effectively and authentically. In our classes, wikis promised a technology platform to help us achieve these goals.

Why Wikis?

As ESL teachers, we had, for many semesters, designed ePortfolio activities around the practice of reflection. Although the teaching and learning results were generally positive, we observed that these reflection activities remained primarily individual – as opposed to collaborative – learning experiences.

During a spring 2008 International TESOL Convention presentation on the use of wikis in ESL classes, we were intrigued by the potential of wikis as ready-made opportunities for the creation of a community of collaborative learners who could share ideas and perspectives. By their very nature, wikis encourage interaction. For example, wiki pages are designed to offer users the option to share comments on content published in that particular wiki, or to start new threads. The advantages for teaching and learning are abundant: Students can easily post their own reflections in response to an article or to an audio clip; they can create links that allow the teacher or other students to access other materials easily; and they can enjoy creating profiles of themselves, asking questions of each other, and sharing interests by posting new threads. By promoting active, authentic, collaborative, constructive, and intentional learning, wikis allowed us more quickly to deepen the practice of reflection in our classes. Indeed, "the term 'wiki' comes from the Hawaiian phrase 'wiki wiki,' or 'super fast'" ("Wiki"); in our classes, students engaged with wikis with impressive speed and ease, freeing them to focus on the assignment and classroom interaction in a simple and direct way without technology interfering.

Wiki One
Primary Focus: Collaborative Learning

> In collaborative learning situations … students are not simply
> taking in new information or ideas. They are creating some-

thing new with the information and ideas. These acts of intellectual processing – of constructing meaning or creating something new – are crucial to learning. (Smith and MacGregor [1])

Structured around the common theme of "The Environment," our first wiki project focused on fostering collaboration *within* and *between* our low-intermediate and high-intermediate classes, both of which included reading and listening/speaking components. The reading components of each class emphasized research and critical thinking skills and the application of these skills to the selection of materials for class presentations. In addition to oral presentations, the listening and speaking segments stressed discussion of wiki threads and postings. Finally, students from both classes joined together in theme-related field trips.

Wiki One: The Process
Jumping into the world of wikis was an adventure that involved a measure of risk. In our previous work with ePortfolios, the LaGuardia Center for Teaching and Learning had provided us excellent technical training and support, as well as many ePortfolio models for students to explore through its online ePortfolio galleries ("Basic"). Yet one of the many advantages that we discovered in working with the user-friendly wiki provider, Wetpaint.com, was the very lack of any need for extensive technical support. In fact, our students were able to achieve basic wiki proficiency by the first or second class, quickly discovering how best to present their work. Because the students were collaborating on group presentations, those who were more comfortable with technology helped teach their partners how to use some of the wiki functions.

Students visited their wiki page to use a variety of tools including threads, discussion forums, and EasyEdit (the latter for the construction of individual and group pages), and to reflect on and discuss major environmental issues and their own impact on the environment. Specific community-building wiki activities included the following:

- The use of the wiki discussion area (called "Discussion Forum") as a collaborative space for responding to prompts from teachers and peers and for presenting questions to the learning community for reflective comment. Students answered broad questions about environmental protection and questions about personal goals to protect the environment. Students also asked each other for content, clarification, and additional information.

- Teamwork to research and present information on specific environmental organizations in the New York area after an Earth Day field trip.
- Small group collaboration on researching topics and posting information to a wiki page. After an in-class group discussion of what each student would post, students worked independently from home to add to the wiki group page.
- The requirement to visit each other's profiles and make comments about similar interests.
- A trip to Central Park with an Urban Park Ranger that offered students who had only seen each other's names on the wiki page the chance to meet in person.

We also experimented with a few assignments unrelated to the environment theme. For example, we tried having students find a favorite song on *YouTube* (easily uploaded through Wetpaint.com), locate and post the lyrics on the wiki, and write a reflective comment about the significance of the song in a thread. After individual students shared information about their songs in class, their peers could go back, listen again, and comment. Not surprisingly, students were receptive to the use of music and lyrics as learning tools. Their enjoyment became clear from the high number of peer responses generated during the activity and from the positive feedback from students regarding this assignment at the end of the course.

Wiki One: Student Feedback
Out of thirty-six student responses to very general prompts, we were able to distinguish three main positive response types as well as some specific concerns. The prompts were:
- What did you like best about using a wiki to study English?
- What did you like least?
- What suggestions do you have for improving how we use the wiki?

What Students Liked Best:
One type of positive response focused on the value of wikis as a new style of teaching and learning. Among our ESL students' comments were the following:
- "I think the best thing is that it made us think of environment and attempt to make new class style."

- "I have never seen like this method class before. This is the new style education or communication. We already have sites like this that are Hi5, MySpace, Facebook, etc. We can communicate or talk easily more than in class. It means if we do this style class, students can talk about their opinion exactly or clearly, I guess. It does clearly make enjoyment for presentation in class. It's good to learn and understand from other students' opinions."
- "I like this style. People can have fun or enjoy and discuss about pollution on wiki. It looks like other famous community sites as Hi5, Facebook, and MySpace. I want to have sites like this for any categories like politics or economy ..."

A second type of positive response highlighted the convenience of the wiki in allowing students to work at home or to use the wiki for group work:
- "If we need more time we can study in the house because Internet can be used anywhere and students can see other students' messages also pictures. Then we don't need to work together in the group because we can contact in wiki. Our time can save!!!! Wiki is easy and convenient for our class."
- "I think that wiki is practical and helpful for our class. Also, it made it easier to do presentations and assignments. I like to use wiki ... I don't have any suggestion for it. However, I want many people to use this program."
- "Sometimes I feel it is very convenient because we can do homework at home. This is the top reason why I like wiki."

A third area of positive responses focused on the wiki as a valuable forum for sharing ideas and opinions:
- "I think wiki was very good for me because it helped me to practice my writing. This is also a very good connection when I collaborate among classes."
- "I think wiki is very good for ESL students because we can talk about other students' opinions and figure that out. Also, I can show my opinion to other students. So we share our own ideas, and then that will help to increase our English skill."
- "It's good because we can share everyone's information on this platform."
- "I think that website is very important and helpful for us. We can find out about our friends' opinions on many subjects."

What Students Liked Least, and Their Suggestions for Improvement

Students' suggestions for improvement included increasing the number of conversation opportunities, soliciting more student input into the selection of the theme, and varying the visual interest of the wiki. Of the two students concerned about not engaging in enough conversation, one wrote:

- "WIKI is a useful tool for finding some information, but I think it's not very helpful learning English (maybe except reading skill?) because I couldn't communicate with others at once. However, the amount of information in WIKI is amazing."

In ESL classes that adopt a sustained-content approach, instructors frequently face the problem of finding thematic material of interest to all students. Our choice of the environment as a common theme opened us to the following criticism:

- "Above all, we should have decided to choose topic that everybody is interested. Also, we can ask everybody for their own topic. I think it is going to encourage students to participate in the class."

Another student expressed appreciation for the theme and for the overall experience, but felt that the wiki could have provided more extensive resources or links:

- "I think this is really good for student. The wiki has a lot of things and serve diverse information. Also during progress this project, we learned how to coordinate with each other and experienced importance of environment through this project. But what the wiki need is to connect other website as linking."

Comments on technical aspects of the wiki experience suggested changing the color of the wiki and adding news updates, music, photos, or chat spaces as ways to make the wiki more appealing. In addition, two students who offered generally positive comments about the overall experience also admitted to being challenged by the technology:

- "I've never used this website (wiki) before. Also I'm not good-at-PC person. Therefore, it's hard for me to know how to use this site. However I like the wiki to share with other classmates too, so I think that wiki systems are really good for study."

The tone and specificity of the student feedback to our first wiki experiment helped to ease some of our initial anxieties about using wikis in

the classroom. For example, technology did not prove to be an insurmountable problem as even those students with weaker technology skills enjoyed a positive learning experience. But the feedback also pointed to concerns regarding student input and independence. As we gathered the feedback and reflected on our first wiki semester, we thought about what we might do differently in the future.

Wiki One: Teacher Reflections
Guided by student response, we decided that our second wiki experiment would be more visually stimulating, more open to student design and creativity, and less focused on a single preselected major theme. Instead, we resolved to provide opportunities for students to choose their own topics, around which they would create individual Web pages and, with appropriate teacher support, develop individual, pair, or small-group research projects. A second concern suggested by student feedback, and an ongoing question for the ESL classroom, is how best to use wikis to teach and learn listening and speaking skills. In response to the desire for more speaking opportunities, we continued – and continue – to explore ways in which pairs and small groups can be used in a wiki setting to promote both listening and speaking, including the possibilities of uploading student-created *YouTube* videos or podcasts.

Most important to our primary goal of fostering shared learning in the ESL classroom, we learned that designing activities for student teamwork on group projects had many advantages. Students helped one another with the technology, made direct contact while working together in the lab, and cooperated on the creation of the wiki. The common theme and the single wiki shared by two classes had advantages as well, providing us with a natural basis for combining two classes for field trips and other events, and broadening our wiki community.

But most consequential to our experiments with wikis as an innovative way to foster reflection was the recognition that our students seemed to find the very concept of reflection challenging. In the first semester, this difficulty led to the showcasing of student work as presentation rather than reflection. It also led to our decision to focus more directly on reflection in the following semester. In our next wiki, the area we designated for exploration of teaching and learning was student reflection in response to images.

Wiki Two
Primary Focus: Constructive Learning

> Students are not blank slates upon which knowledge is etched.
> They come to learning situations with already formulated
> knowledge, ideas, and understandings. This previous knowl-
> edge is the raw material for the new knowledge they will create.
> (Brooks et al.)

With the goal of developing habits of constructive reflection in response
to specific images, we encouraged our students to relate their prior
knowledge to images and through this reflective process, to construct
their own understanding and meaning. As teachers, we were eager to
observe how the use of wiki postings would support the sharing of
such reflections.

Wiki Two: The Process
Fundamental to constructive learning is the role of scaffolding, espe-
cially for ESL learners. Summarizing one of its major advantages, Mur-
phy writes, "Scaffolding allows students to perform tasks that would
normally be slightly beyond their ability without that assistance and
guidance from the teacher. Appropriate teacher support can allow stu-
dents to function at the cutting edge of their individual development."

To tap the benefits of scaffolding, we presented students with a
photograph in the wiki every week of the semester and asked them to
offer reflective comments by adding threads at the bottom of the wiki
page. Some of the wiki images reflected aspects of American culture
such as a family Thanksgiving dinner; others were images that might
provoke varied responses, such as a scene featuring a homeless person.

In most cases, our prompts guided students to relate the image, or
the feelings evoked by the image, to their previous experiences. Intro-
ducing our classes to the concept of constructing meaning through
reflection, we pointed to each wiki comment on specific images and
each response to one another's threads as examples of the practice of
reflection. However, as we read our students' initial attempts at reflec-
tion, we realized that the students needed even more scaffolding to
grasp the process of constructive reflection. We found that we needed
to provide more models to help them express connections between
an image and their own experience. Using our own responses to the
images as examples, we began to model reflective expression, which

also helped to guide students toward written language appropriate for this type of reflection.

Our collaborative event for the semester was a trip to the International Center of Photography (ICP). This field trip served as further training for students in the development of their approaches to reflecting on images. Our ICP guide focused on tools that could be used for critical thinking and reflection, including question banks and charts that served as models for inquiry learning and suggestions for teaching about the exhibits. We incorporated these tools into the scaffolding questions that we later used to elicit reflective responses within our wiki.

Wiki Two: Student Feedback

At the end of our second semester of teaching with a wiki, we received thirty-one student responses to the following prompts:

- What do you see as the benefits of using wikis to develop language skills and reflective practice?
- Do you see any disadvantages?

As in the first wiki, many students responded by mentioning the value of exchanging and reflecting on one another's opinions. Typical comments included the following:

- "I think wiki for reflective practice is very crucial for ESL students because it gives students the opportunities to practice English in writing, reading, etc. – helping students to share their ideas together, and also speaking practice."
- "When I use the wikis, I can read classmates' opinions and reply. We can help together."
- "In my opinion, wikis are very helpful for students who learn English. We learn how to fast write in English, we post our opinion about photos and we can read each other opinions. I like wikis."
- "I like wikis because I can read classmates' opinion and can share information or opinion each other. It can help you to improve English skill. It's good !!!!"
- "Other members can comment on your own thread, as a result you can read back their reply and when you read them you will notice if your idea or opinion is valuable or not."
- "It is good to know what other people think. It is very interesting to know many different opinions. It is good that it encourages me to study more English."

One student emphasized the value of wikis for developing a community of learners:

- "I think that wiki is a very good tool to create connections between students, to share information and encourage group's work. Sometimes, it's hard to find the time to meet students, so with wiki, it's easy to work in distance."

The disadvantages of using a wiki, mentioned by four students, included insufficient correction of grammar by the instructor and, as in the case of the first wiki, insufficient speaking practice. One student expressed the opinion that wikis were better for developing writing and vocabulary skills than speaking skills.

Wiki Two: Teacher Reflections
The students began to connect with the concept of reflection in this iteration of the wiki, but the dynamics of the class were different. Because of our greater emphasis on constructive over collaborative learning, the students worked individually more often, reacting to one another's ideas through the technology and not face to face. Although activities in our previous wiki had stimulated student interaction, opportunities for oral communication were less frequent in the second wiki than in the first since we did not focus as extensively on group projects. Wiki Two was successful in helping the students to develop their process of reflection in response to images and the work of classmates. However, we missed the stronger sense of group collaboration we had created in Wiki One, and, as a consequence, we continued – and continue – to explore methods that combine the respective strengths of Wiki One and Wiki Two.

Wiki Three
Primary Focus: Intentional Learning

> When learners articulate what they have learned and reflect on the processes and decisions that were entailed by the process, they understand more and are better able to use the knowledge that they have constructed in new situations. (Jonassen et al. 8)

Three types of activities in our third wiki promoted intentional or goal-directed reflection: peer feedback, student course feedback, and student self-assessment. These activities encouraged students to review

and evaluate their own learning strategies and provided us with insight into their progress.

Wiki Three: The Process

In our final experiment, students engaged in a variety of projects that called for student-to-student feedback within the wiki. In a second type of wiki feedback, teachers and students evaluated student presentations. Finally, at the end of the term, students selected the "best" of their responses and the "best" of their presentations, explained their choices, and discussed their areas of improvement as well as areas in which they still needed work. Following the same approach, they also evaluated the work of a partner, selected what they felt was their partner's best work, and explained their choice. By using the threads at the bottom of each page, students could easily look back and discuss one another's completed work, as well as reflecting on their own.

In Wiki Three, wiki-related activities and small group research projects addressed a variety of themes: social networking, stress, and wellness and health. Each group was responsible for their own research and for its organization into wiki-based presentations. Required to discuss and negotiate how best to present the information, students worked together to develop an introduction, a conclusion, and appropriate transitions. Articles that had served as source material could be accessed easily via links posted on the wiki to the original websites on the Internet so that other students could read and refer to them later. The students also researched EBSCOhost and LexisNexis databases to locate articles related to specific aspects of their research project. In their wiki presentations, they referred to highlights from the articles, and included quotations and statistics of particular relevance. A basic rule was that students had to provide access to their articles so that their classmates could read and offer their own comments. At times, students read the original article and the response of a classmate, and then replied with comments of their own, a kind of layered reflection that engaged students and encouraged a deeper level of critical thinking. Finally, in addition to group work on the wiki, students in the more advanced of our two classes created individual pages where they posted responses to assignments and wrote personal responses to articles and audio clips. Over the course of the semester, we gradually guided the students away from casual and colloquial responses toward a more formal and academic style.

From the beginning of our experience with wikis, we had been particularly interested in creating a community of learners that extended beyond the confines of the classroom so that our students would experience a genuine need for communication in English. We decided to experiment with the third wiki to see if we could use it to promote authentic student discussion around a theme of common interest. We wanted the discussion to be both academic and social, and therefore decided to use the wiki to support a field trip to the PS1 Contemporary Art Center, a nearby affiliate of the Museum of Modern Art.

During the visit to the museum, we took notes on the questions students asked about the exhibitions. One student documented the experience with photos which we posted on the wiki along with the questions that we had recorded. After the field trip, the students visited the wiki in pairs, discussed the questions and photographs, and added their own comments and questions to the threads. Through this experience, we realized that the wiki could easily be used not only for follow-up communicative activities but also in planning and preparing for future field trips.

Wiki Three: Student Feedback
Due to scheduling changes in the program, one of us used the third wiki with a low-intermediate listening/speaking class that met for just four hours a week. This new schedule represented a departure from previous semesters, in which the wikis had been a component of an eight-hour class that combined the skills of listening/speaking and reading. For logistical reasons, only the students in the more advanced, eight-hour class provided feedback at the end of the semester. The three questions to which they responded were:

- Which activity or activities have helped you the most in learning English?
- Which activity or activities were the most interesting to you?
- What part of working with a wiki has been the most enjoyable?

Of the sixteen students who responded, twelve felt that writing responses to images or readings and commenting on one another's ideas were the most helpful activities. Representative comments included the following:

- "I think that the most useful activity was writing responses. It really helped students to improve vocabulary and analysis skills that are basics for attending college and getting a degree."

- "The activity that has helped me in learning English in our wiki is to use it for writing my reflections and responses about topics I studied."
- "The most important at my point of view is 'the response' because I can express by myself, researching in the Internet, and also I acquire knowledge step by step."

In response to the second question, just over half of the students mentioned the use of wikis for presentation purposes as the most interesting activity. A few students commented specifically on the value of wikis for evaluating presentations, an activity designed to promote intentional reflection on learning strategies. Among the student comments were the following:
- "The wiki is helpful during the presentations in class, and it is perfect to view how the others are evaluating my presentations by posting their comments. Really, I have learned a lot of thing from their comments."
- "Posting evaluations for other is helpful, but actually I wanted more criticisms or strict advice from others."
- "The most interesting activity was the use of the lab and to be able to talk with other students and correct each other."

Opinions on the most enjoyable aspect of the wiki ranged from posting and sharing cultural information to interacting with other students and making group presentations. One student commented:
- "Wiki has been the most enjoyable site for students because it lets you share information together, learning from each other, and seeing some image or photo from different countries."

Another student summarized as "enjoyable" many of the advantages of wikis that we ourselves had come to recognize: "to research on internet, create my own opinion about the different topics, correcting my mistakes and growing up in the way to write and speak."

Wiki Three: Teacher Reflections
Based on student response and progress, we can consider the experimental use of wikis to promote intentional learning to have been a success. Our concern over the appropriateness of wikis for listening and speaking classes was allayed by the frequency of presentations that required students to participate actively in group negotiation and

preparation. In addition, the wiki clearly helped students to reflect on and evaluate their own learning processes. However, some students were reluctant to provide direct commentary on a classmate's work, and we realized that, as scaffolding for this intentional learning activity, we could have incorporated more guidance in giving constructive criticism in English. Nevertheless, at the end of the semester, approximately two-thirds of the class participated in the evaluation activities and provided comments on a partner's wiki "portfolio" as well as on their own. In a long ten-week quarter, it would help to use such an activity not only at the end of the term but also at midterm.

In sum, several aspects of a wiki allow both teacher and student to participate in and benefit from intentional reflection. It is a simple process, for example, to highlight grammar or vocabulary errors in wikis, and we used this capability as a feedback tool in vocabulary and collocation assignments. Similarly, whenever students give oral presentations in a computer lab, they can receive immediate feedback from the teacher as well as from classmates who can offer their comments by posting a thread at the bottom of the presenter's page. The comments can be posted either during the presentation itself or within two or three minutes of its conclusion, and the presenter can then respond to the feedback by replying to the thread. Teacher feedback on particular assignments can also be added to a thread at the bottom of each student page. It is also possible for an instructor to receive an email each time a student adds information to the wiki (accessible through "Settings/Email Notification") – still another avenue for immediate teacher feedback and student response.

Conclusions: The Value of Wikis for the Practice of Reflection
Our wiki experience has led us to view wikis as technology tools that can facilitate the practice of reflection among ESL learners. Wikis are potential conduits for meaningful learning in all of its aspects, i.e., learning that is not only active and authentic but also collaborative, constructive, and intentional. We have found wikis to be successful in supporting collaborative learning through group projects and presentations both inside and outside the classroom. Students can also collaborate on the construction and design of the wiki, generating rich language as they navigate the wiki environment.

Second, wikis encourage constructive learning through the design of opportunities for students to research and collect information and to actively engage in constructing new knowledge in visible,

concrete ways. Wikis easily facilitate the design of assignments that require students to relate new information to their own individual backgrounds, to construct new perspectives on a variety of topics, and to share these perspectives with others. Finally, wikis provide a published record of student achievement, an advantage that is crucial for the promotion of intentional learning. Students can see physical evidence of their own accomplishments, as well as the accomplishments of their classmates, allowing for mutual reinforcement and more effective self-evaluation.

We are convinced that, facilitating reflection in all of its aspects, wikis offer productive potential for collaborative, constructive, and intentional learning in a focused, sharing, and reflective community of learners.

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Reflection as a Learning Tool in Mathematics

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Undergraduate students in developmental math classes tend to have a narrow view of what mathematics is and fail to see its connection to the world around them. For many such students, math is only a set of formulas that they must learn and manipulate to obtain numerical answers. Contributing to this situation is the way in which math is traditionally taught: Techniques and procedures are emphasized, and little attention is paid to the purposes behind the formulas or to the interpretation of numerical results. In discussing a comparative study of math classes in seven countries and the factors that correlate with student success, Watson and De Geest discount the importance of

> superficial aspects [of pedagogy] such as whether teaching is whole-class or not, students work in groups or not, students discuss together or not, how the board is used, when homework is discussed and so on. The common features of successful countries appear to be more subtle, the most significant characteristic being the way that mathematical concepts are presented. The complexity of the concepts and methods is preserved, rather than simplified, in the ways teachers work. (213)

In the workplace and in everyday life, many problems are best addressed through logic and quantitative analysis, but they are often too complex to be reduced to the form of a typical math problem. As a result, I have come to believe that reflection is the most valuable tool for developing the ability of students to use mathematical concepts to address a variety of practical concerns and to engage in deeper thought about the issues involved.

The Limitations of Procedural Knowledge

Many math classes focus primarily, or even exclusively, on procedural knowledge, which means the ability to carry out step-by-step calculations using certain formulas and mathematical operations (addition, multiplication, etc.) to arrive at a numerical or algebraic answer to the

problem at hand. To solve a math problem in this way, students first have to translate the statement of the problem into mathematical concepts, then use math procedures to arrive at a numerical or algebraic solution, and finally interpret the solution in a way that answers the question posed in the problem. This traditional approach to mathematics can be illustrated with the following problem, which is typical of those encountered in a basic math course and which can be solved with simple procedural knowledge:

> Problem: Sugar is to be packaged in 200-, 250-, or 400-gram packets. Determine the smallest quantity of sugar required so that any of the three sizes of packet can be used, all packets will be completely filled, and no sugar will remain unpacked. Also indicate the number of packets of each size that is needed to handle this quantity of sugar.

To solve this problem, students must first translate the statement of the problem into a mathematical procedure. In this case, an exact number of packets is needed, so students must look for multiples of 200, 250, and 400. So that packets of any of the three sizes can be used, the students must then look for common multiples; and to ensure that the smallest quantity of sugar is used, they need to determine the Least Common Multiple (LCM). This step-by-step procedure leads to an LCM of 2000. Finally, to arrive at the number of packets of each size that is needed, the students must divide the LCM by 200, 250, and 400, with the answer to the last part of the problem being 10, 8, and 5, respectively.

Students tend to find this type of problem boring and unimaginative, and it leads them to view the study of math as little more than the mastery of procedural steps. What students fail to see, and what math teachers often fail to teach, is the application of procedural knowledge to real-life situations. In the preface to *Calculus*, Hughes-Hallett et al. state:

> Calculus has been so successful because of its extraordinary power to reduce complicated problems to simple rules and procedures. Therein lies the danger in teaching calculus: it is possible to teach the subject as nothing but rules and procedures – thereby losing sight of both the mathematics and its practical value. (v)

Math instructors cannot ignore procedural knowledge since, without it, students cannot build the confidence to handle real-life problems; procedural knowledge alone, however, is useless if students do not develop the skill to apply it. Both skill areas must be integrated in mathematics lessons.

A second example of the limitations of procedural knowledge can be found in a typical lesson from an elementary statistics class. When students are introduced to the concept of standard deviation (the average deviation from the center of the data), the teacher will usually give a definition (a measure of the spread of data values), provide the formula to compute standard deviation, and use a set of numbers to show the computations step by step. Problems from a textbook may then provide some practice. It is rare, however, for students to see the application of such procedural knowledge. If, for example, they are given commute-time data for two trains and asked to select the more dependable train, most students will calculate the average commute time for each train and select the one with the lower average. If the average commute times for the two trains are the same, most students will not think to take the problem a step further and use standard deviation as a helpful tool in making their decision.

While the need to apply procedural knowledge is very common in the workplace, most tasks do not come in the form of a traditional math problem. In most cases, the statement of a problem is in the common language of the trade, but the solution required must be expressed with the precision of math. In the workplace, there is a great demand for employees who are able to understand and reflect on practical issues using math. The question thus arises: How can math instructors prepare their students for the demands and challenges of today's workplace?

The Power of Reflection

As early as 1910, Dewey discussed the importance of using reflection as a learning tool. In *How We Think,* he defined reflective thinking as the examination of one's beliefs, the evidence that supports them, and the conclusions to which they lead (7). He argued that a crucial component of reflective thinking is the adoption of an attitude of suspended judgment and the mastery of various methods of seeking out evidence to support or refute the first suggestions that come to mind (12). In *Democracy and Education,* Dewey further explained that the objective of reflective thinking is greater "efficiency of action" as well as "learning more about ourselves and the world in which we live" (152).

Silcock expands on Dewey's ideas in defining reflection as "a ubiquitous, cognitive process, not only reworking tacit knowledge into skill, but providing, through symbolic transformations, a means for linking social and knowledge-contexts, and for translating one sort of experience (e.g. academic) into another (e.g. practical)" (274). Thus, in a mathematical context, reflection involves examining the procedural knowledge used in everyday practice in such a way that its application can be broadened beyond immediate circumstances.

Both Wheatley and Sigel describe reflection in math as a process of "distancing oneself from the action of doing mathematics (Wheatley (citing Sigel) 535)." As Wheatley states:

> In the process of reflection, schemes of schemes are constructed – a second-order construction. Persons who reflect have greater control over their thinking and can decide which of the several paths to take, rather than simply being in the action.
>
> It is not enough for students to complete tasks; we must encourage students to reflect on their activity. (535)

Banker agrees that reflective pedagogy in the mathematics classroom leads to a deeper understanding of the subject matter:

> Those teachers who provide opportunities for students to communicate about mathematics cultivate a supportive, nonthreatening environment that can deepen the understandings that students need to make mathematics meaningful and to connect informal ideas about mathematics to the symbols and notation in the language of mathematics. (2)

Evans has discussed the strengths and weaknesses of various teaching approaches geared towards connecting mathematical abstractions with everyday life.

Despite the advantages of a reflective approach, relatively few math educators make reflection a central part of their classroom pedagogy. My own goal in incorporating reflection-based activities into the curriculum is to help my students to draw on their own ability to reason, to examine the applications of procedural knowledge, and, thereby, to develop into mathematical thinkers.

Toward a Reflective Math Pedagogy

With these ideas in mind, I have designed and used reflection-based activities in my mathematics classes. Encouraged to think beyond formulas and numbers, students will learn to use mathematics as a tool to resolve real-life problems and to articulate the thinking processes that they apply to solving such problems.

Environmental issues have provided a rich source of material for reflection by my math students. In one activity, the students learned from their readings that the percentage of greenhouse gases in the earth's atmosphere (including carbon dioxide) is less than 1% (Hanson). They then examined a pie-chart on the official website of the United States Energy Information Administration ("U.S.") which showed all greenhouse gases and indicated that the percentage of carbon dioxide is 82%. Classroom discussion focused on the following question: Does the information on the pie-chart mean that the earth's atmosphere is filled with carbon dioxide and that it contains very little oxygen or other gases? This question required students to think carefully and critically in order to understand the discrepancy between two seemingly contradictory numbers: The percentage of greenhouse gases is 1%, while the percentage of carbon dioxide, which is a greenhouse gas, is 82%. In order to resolve the apparent contradiction, the students had to synthesize the information given about greenhouse gases and reflect on their understanding of the mathematical concept, *a percent of a percent*. In this case, the percentage of carbon dioxide in the earth's atmosphere is 82% of 1%, which is only 0.82% (less than 1%) of the total amount of all gases in the atmosphere. A second question was then posed: Why should scientists worry about greenhouse gases if the total amount of these gases is less than 1%? In the ensuing discussion, the students came to realize that there is a delicate balance among the gases in the earth's atmosphere and that even a slight change in the amount of a gas such as carbon dioxide can have a significant impact on the earth's climate.

In another assignment, used in a basic math class as part of Project Quantum Leap (PQL)[1], students learned from an article on "Global Warming," that "the average surface temperature of the earth [has risen] by more than 1 degree Fahrenheit since 1900." They then looked at a second article which mentioned that the widespread use of asphalt and concrete has turned New York City into an "urban heat island," in which nighttime temperatures are estimated to have risen by 7 degrees Fahrenheit over the past century (Tierney). The students were asked

to compare what they had read in the two articles and to discuss the apparent contradiction between the numerical facts. They were also asked to use numerical information to support their argument.

This example presents various opportunities for reflective thinking since it involves a number of commonly-held beliefs. First of all, most students believe that the phenomenon of global warming implies higher temperatures everywhere, but this is not, in fact, the case. Secondly, for most students, *average* means the result of adding all the values and then dividing the sum by the number of values. If the average temperature rise is 1 degree, which is a small number, most students would not be aware that an individual temperature rise could be as high as positive 7 degrees. It is also less than obvious that if the average temperature is a positive value, the individual values could be a mix of positive and negative values. In this assignment, therefore, students discover that *average* is the equal distribution of the sum total. It is possible to have a 7-degree rise in temperature in one place and a 5-degree drop in temperature in another place, and the average will still be a rise in temperature of 1 degree. This is also an opportunity for students to discuss whether they find *average* to be a meaningful measure in a situation in which action needs to be taken to control the rise in temperature.

When I use reflective assignments in class, my own role as teacher becomes one of posing a series of guiding questions in order to lead the students toward a greater understanding of both the mathematical concepts and the real-life issues that are involved. In the above example, I guide the students with questions such as these: What are the numerical facts that are presented in the articles? What is the process for finding the average surface temperature of the earth? What does it mean if the average surface temperature of the earth increases by 1 degree Fahrenheit over the course of a century? How can the average rise in temperature be 1 degree when the temperature has risen by 7 degrees in a single location? Does global warming mean that temperatures rise everywhere? In a period of global warming, how can temperatures in some places decrease rather than increase? These are the types of questions that help students to deepen their understanding of mathematical concepts and to use these concepts to understand a real-life issue. At the same time, they are engaging in a lively discussion that helps to motivate them and to keep the level of enthusiasm high.

I have noticed, however, that for some students, the increased level of motivation continues while, for others, the motivation is only for a limited time. Why? I think the answer to this question is that reflection-

based activities cannot be used in isolation but need to be part of every lesson and integrated into the entire curriculum in order to have a major impact on student learning and success. The short-term benefits of reflective pedagogy may be limited, but the long-term benefits of a sustained approach can be significant.

Developing a curriculum that focuses on reflection-based pedagogy involves its own set of challenges, not the least of which involves the question of assessment. The standardized tests in current use neither evaluate nor encourage reflective thinking on the part of students. Teaching in such a system places great pressure on instructors since they must not only complete the predetermined syllabus but also prepare their students to succeed on the standardized tests, all within strict time limits. If we want to foster reflection in the classroom, we need to develop new tools for assessment that are more relevant for evaluating the skills that are required in the students' subsequent professional careers. As articulated by Dapueto and Parenti,

> it is necessary to outline a new set of *basic skills* and a new balance between experiential and reflective learning, to develop new criteria for the assessment which exploit the opportunity for *dynamic evaluation* (day-to-day, in various activities,...) that differs from pre-set and ad hoc testing, but overcome the risk of prejudicial evaluations. (19, emphasis in orig.)

An example of such "dynamic evaluation" would be open-ended project assignments that encourage students to demonstrate the depth of their understanding of mathematics rather than simply arrive at a single correct answer. Not only would this form of evaluation be more meaningful, but it would also more closely resemble the types of problems actually encountered in the workplace. Similarly, student ePortfolios can also be used for evaluation purposes by both educational institutions and prospective employers ("About ePortfolio"). Having students explore an exam topic in the form of an essay could also be a useful form of evaluation since writing requires students to express a deeper understanding of the topic, encourages them to engage in higher-order thinking, keeps teacher expectations high, and makes learning more challenging.

For most students, participating in a reflection-based math class brings challenges faced most probably for the very first time, and a sin-

gle semester does not necessarily provide enough time to demonstrate improvement. Nevertheless, being trained to reflect on the applications of math to real-life problems should help students in their future studies and careers. Such an approach deepens knowledge by asking students to examine the facts, to draw on fundamental concepts of math to respond to specific questions, to use appropriate formulas to arrive at logical results, and finally, to modify their understanding not only of the relevant mathematical concepts but also – and equally important – of the real-world problems that math can help to address and resolve.

Notes

1. PQL is a FIPSE (Fund for the Improvement of Postsecondary Education)-funded program run by the LaGuardia Center for Teaching and Learning to develop curriculum materials for teaching basic-skills math courses using the SENCER (Science Education for New Civic Engagements and Responsibilities) approach. SENCER is a National Science Foundation (NSF)-funded project that promotes the development of courses that teach science and advanced mathematics through "compelling contexts," i.e., complex, capacious, and unsolved public issues.

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Habits of Heart, Habits of Mind

Deborah McMillan-Coddington, *Health Sciences*

> *The creation of meaning out of an experience is at the very heart of what it is to be human. It is what enables us to make sense of and attribute value to the events of our lives.*
>
> <div align="right">Carol Rodgers</div>

> *Real learning gets to the heart of what it means to be human.*
>
> <div align="right">Peter Senge</div>

As a method to clarify awareness, goals, and identity, reflection is a useful practice for all students, whatever their course of study. For LaGuardia's nursing students, however, the practice of reflection is pervasive throughout their studies, and has an ethical dimension that connects science to humanity. This paper discusses the ethical, philosophical, and pedagogical underpinnings of reflection in nursing education and illustrates the development of reflective practice with selected writing by students looking back at pivotal moments in which they struggled to align personal feelings with professional choices and behaviors. Their words illustrate what reflection actually looks like when practiced by entering and senior nursing students as they attempt to care for patients who challenge the nurse's core values and feelings.

The Use of Reflection in Nursing Education

The *Code of Ethics for Nurses* of the American Nurses Association (ANA) is introduced to nursing students at LaGuardia in the first-semester course, Perspectives in Nursing (SCR150), and discussed again in the last-semester course, Trends in Nursing (SCR260). Although the concept of ethics is addressed only briefly in these writing-intensive and nonclinical courses, its elements are explicated and exemplified by LaGuardia faculty in corequisite courses that have a clinical component. In both classroom and clinical settings, students learn the Provisions of the *Code*. The first Provision reads: "The nurse, in all professional relationships, practices with compassion and respect for the inherent dignity, worth, and uniqueness of every individual, unrestricted by considerations of social or economic status, personal attributes or the nature of health problems." In addition, the *Code of Ethics for Nurses* requires advocating for the health and integrity of the patient, self-regulation and personal accountability, and advancement

of the profession of nursing. Adhering to the *Code* in its educational objectives, LaGuardia's nursing program is committed to providing the student with the competence to deliver responsible, ethical, and empathic care to a culturally diverse society, to think critically, and to seek opportunities for professional growth and development. Among several forms of assessment, the practice of reflection can demonstrate growth of the ethical behaviors that promote good nursing.

Most classroom learning requires that students read, research, and write about disciplinary content. Course offerings differ, however, in the amount of emphasis placed on "lived experience," which the philosopher Robert Burch defines as "something distinctive, a class of significant or memorable events, whose true meaning … is something we come to recognize in retrospect." LaGuardia's pioneering nursing program stresses a "curriculum of engaged reflection" throughout its sequence of required courses. At the beginning of each day in the clinical area, nursing instructors identify those learning situations in the unit that might represent significant or "teachable moments," a birth, for example, or a dying patient. At the end of each clinical day, students are required to reflect on the *what* and the *why* of the "lived experience," a practice that reinforces self-inquiry: "What did I take away from this experience?" "What could I have done differently?" "What would I do differently the next time a similar situation arises?" "Why did I react the way I did? What did I learn about myself from this experience?" "What meaning has this experience brought me?" The demands, unpredictability, and emotional upsets of modern life can make questions like these useful to any of us who wish to understand ourselves more deeply. But the ancient Greek encouragement to "know thyself" is particularly valuable for the professional and emotional growth of aspiring nurses and healthcare workers committed to providing better care for others.

If used as an intentionally integrative and meaning-making pedagogical strategy, the practice of reflection can help students to connect nursing theories taught in class to the professional skills systematically developed in the clinical setting. Lee S. Shulman, president of the Carnegie Foundation for the Advancement of Learning, and formerly a professor of medical education, describes three habits infrequently balanced in the professions of medicine and law: habits of the mind (disciplined acquisition of content), habits of the hand (skilled practice of learning), and habits of the heart (empathic commitment to service) ("Signature" 56). For the nurse educator, the pedagogical aim of reflection is to help students improve upon the integration of these three

habits in the clinical setting. In a rapidly changing field, the practice of reflection can help modern nursing students integrate theory ("habits of the mind"), actions ("habits of the hand") and emotional relations with patients, colleagues, and the wider hospital environment ("habits of the heart"), and prepare them to face profound experiences of life and death with the self-confidence necessary to provide compassionate care.

Facilitating the awareness of "lived experience" imparted by reflection is a challenge for the nurse educator. When introduced to the concept of reflection in the first semester of the nursing program, students frequently ask for specifics of what to do. As Somerville and Keeling write, "Nurses are constantly being encouraged to be reflective practitioners. While many articles have been written on the subject … there is little practical advice for nurses on how to reflect critically." My classroom solution to the puzzle of reflection is to define two kinds: introspection and retrospection. "What do you see when you look into the mirror?" I ask initially. "You see a reflection of your physical self – flaws and all. You see as much or as little as you want to see. The more open you are to exploring the image before you, the more clearly you will see beneath the surface and the more easily you will analyze what you see. In this way we can understand introspection." To present the concept of retrospection, I offer metaphors for revisiting past experiences, such as pressing a mental rewind or TiVo button, for reliving milestones and important moments, or storing these for future visits.

How do these reflective processes of introspection and retrospection lead to recognition of previously undetected potential, and thus the choice, if an event reoccurs, to speak or act differently? "Reflection is more than description and requires linking practice with theory, evidence, actions, thinking, values, and beliefs" (O'Malley 4). At LaGuardia, students are introduced to weekly reflective journaling about their clinical experiences in their first semester of the nursing program. After instructors make their written comments, students post their original weekly reflections on Blackboard for response and comment from each of their peers. In the light of commentary from teacher and classmates, students write again, this time rethinking the initial action and feelings, and projecting a future course of action. The final version of the reflection is then deposited by the student in her or his personal ePortfolio.

Illustrating the Development of Reflective Practice: Sample Writings
The pieces of writing by LaGuardia students presented below provide evidence of the development of three ethical qualities – self-regulation,

collegiality, and empathy – through the practice of reflection. At first, student "reflections" are often little more than simple narratives detailing highlights of the clinical day – the nursing care provided, conversations shared, and actions and behaviors observed. Below is one illustration of journal-writing in the first-semester class, Perspectives of Nursing.

Sample 1: Engaging the Patient

> The feeling of being assigned a patient was really exhilarating. I was excited as well as very nervous. Our patient was an African American woman. She was welcoming and smiled at us when we introduced ourselves as student nurses from LaGuardia. She was watching TV so we asked what she was watching in order to lead a conversation. She told us about the characters in the soap opera she was watching and also mentioned that she was waiting for the "Judge Judy" show. She knew exactly at what time the show comes on TV. However, we did not ask her what she was admitted for, and we did not even ask her about her cultural beliefs because we thought it would be probing to do that. So, basically what we talked [about] was the soap operas. Before we were about to leave, she wished us good luck and told us that she would pray to god for us which was really nice of her. We did not gather much information about her but it was our first time and now we know what we should do the next time.

Writing an early entry in her journal, this student offers a narrative of (rather than a reflection about) a conversation with her patient. For first-semester nursing students, entering a patient's room to strike up a therapeutic conversation is especially difficult. This "very nervous" novice accurately recognizes that her reluctance to intrude keeps her from properly assessing her patient: "we did not even ask her about her cultural beliefs." Over time, she will learn that reflection is more than simple recognition of what was done or not done, less a matter of self-criticism than of self-awareness that, when combined with critical review and analysis of her actions, will lead to better patient care. She offers few concrete strategies for "what we should do the next time." However, the student recognizes that she must be better informed about the patient, and thus points toward an educational journey that will teach her to integrate self-awareness, nursing theory, and performance.

Over a period of two years, the nursing faculty will guide and assess each critical learning stage, asking questions and responding to performance in ways that will provoke this student and her peers to record, examine, and reflect upon feelings and actions related to professional practice. Collected in ePortfolios and assessed by faculty, the documents generated will provide evidence of strengthened connections between theory and application, critical awareness of problems approached and solved, and the emergence of new perspectives.

Sample 2: Acting Ethically

The evolution from simple recollection of events to analysis of events in relation to self often occurs gradually. Sometimes, however, changed awareness is dramatic, the result of a radical and transformative experience. Nursing education is hands-on, and much of it occurs on the clinical floor, a vast theater of intense human emotions and physical suffering that the beginning nurse may not wish to encounter. Yet if the obligation to provide compassionate care is to be fully satisfied, heightened sense of self and other must be secured. This transformation will come, write Boyd and Fales, as the result of the "process of internally examining and exploring an issue of concern, triggered by an experience, which creates and clarifies meaning in terms of self, and which results in a changed conceptual perspective" (100).

In Fall 2008, I asked my Trends in Nursing students to write a reflection on their past two years in the nursing program. Initially, these were posted on Blackboard for peer and instructor commentary; in the light of these comments, students revised their reflections and saved them in their ePortfolios. In the final versions of the essays, students elaborated on their most memorable clinical experiences and compared the ideas, actions, and feelings of their first and last semesters. During class discussion and in their writing, the students consistently expressed amazement at their evolution over two years of learning in the nursing program. Most described coming into the nursing program to develop the specific knowledge and competencies that would result in better patient care. They recalled the early fear accompanying their first clinical experiences, how, for example, they dreaded entering a patient's room alone to conduct a simple interview or to administer medications. For some students, even the thought of giving injections had caused anxiety. Reading through their very first essays collected in ePortfolio, the students recognized how far they had come in knowledge and awareness. If early reflections merely described passing out

medications and taking vital signs, later entries demonstrated a deeper understanding of personal feelings and professional responsibility to promote health, resolve illness, and provide nonjudgmental and non-discriminatory care.

Excerpted from a late reflection journal, the following passage discloses the writer's personal fear, hurt, and, ultimately, moral insight:

During my clinical rotation as a student practical nurse at Elmhurst Hospital, I had one of the most challenging experiences that I ever had to deal with. Upon getting the report from my instructor for my patient, I was eager to introduce myself and provide my patient with the best possible nursing care. But lo and behold, my patient did not like the color of my skin. I am African American. My patient proceeded to call me degrading and derogatory names that I took as a personal threat. I was totally devastated and didn't want anything to do with this racist individual who had a diagnosis of end stage renal disease. When I informed my instructor of the situation she said, "You are the only nurse on assignment for this patient, so do your best to handle the situation." I went into the bathroom and cried, how was I to deal with a person with such hatred because of the color of my skin …When I reviewed the chart I realized that this client was a widow who has no children, no one to care for her and was living in a nursing home, this client was severely depressed. That is when I realized that her outlook had nothing to do with me personally, this was not an isolated incident, she had these negative and harmful statements for anyone and everyone whom she dealt with.

So I disregarded the hurtful statements and provided empathy and understanding. This is when I realized my role as a nurse was to provide the best possible care for the best possible outcome of my patient regardless of any situations. As a nurse I have a moral obligation and must be accountable for my actions, I must not pass judgment on someone, because if I do I will not be fulfilling my role as a nurse. I would be doing this client an injustice by not performing up to my nursing standards and could neglect the care that I need to provide to enhance their quality of life.

This reflection traces a trajectory of change: The experience of a painful encounter is reflected upon, integrated into nursing content, and transformed into empathetic nursing care. Initially eager and caring, the student experiences devastation, the threat of racial hatred, humiliation, and finally, ethical awareness. After initial panic and tears, she gains self-control: "I would be doing my patient an injustice," she writes, "by not performing up to my nursing standards." Confronting a wide range of powerful emotions, this student demonstrates an ability to think about an experience as it happens, make sense of that experience, and react appropriately. The result is a "changed conceptual perspective" (Boyd and Fales 100). Understanding that chronic illness, social isolation, and depression could cause anger, the nurse self-regulates. Letting go of her personal feelings and responding compassionately, she heeds her ethical responsibility to deliver the care that protects her patient's autonomy, dignity, and rights.

Sample 3: Building Empathy
The excerpt below is an example of reflective writing that documents a pivotal moment in the development of a student nurse's empathy. Lee Shulman has argued that "[s]tudents must invest emotionally for deep learning....They need to believe that this is something that matters, that there is something at risk if they do not learn" ("Shulman: Balanced"). This student, optimistic in the way of most students in their first clinical round, had looked forward to a "meaningful" encounter with a "nice patient" who would smile and wish her well at the end of the day. Instead, she experiences anger when prevented from delivering the compassionate care she had practiced in the nursing lab:

> [H]e could not do anything by himself, even communicate with other people. He was seventy-one years old then, which was the same as my father's age. However he looked as if he was 10 years older than my father because of his illness.
>
> The very first time we met, I could feel he was not welcoming me. He was yelling and screaming whenever I talked to him or tried to touch him. Due to his reaction, I was unable to communicate with him. I was so embarrassed and got angry because he did not allow me to take care of him. Since the first day we met was also my first clinic experience day, I expected and imagined that I could spend a meaningful time with a nice patient smil-

ing at me. However, in reality, the environment of hospital was not much of happy place for patients. So, I just sat down next to him quietly and started to think of my father, reflecting on myself. Looking at the patient, I appreciate God for good health of my father since he was not so weak like the patient.

To resolve the awkwardness, I started to talk to him about my father and wish he could recover like my father. Then I found myself feel sympathy toward patient rather than complaining about his first reaction. If my father was ill like him and a nurse who has never seen a patient before came in to touch him with clumsy hands, my father would have felt bad and insecure. I looked at his eyes for a while with those thoughts on my mind. I have no idea how long I spent time sitting next to him. Perhaps no one will understand what happened to me since then or how these attitudes have changed about me. Few minutes later, when I was bathing the patient, I noticed that he stopped yelling at me and was in full cooperation with me.

Then I realized that if I empathize with patients they would feel my feelings and my truth, even though I may have said nothing. Although the patient was unable to talk because of his illness, I could understand what was on his mind. Through short experience with him, he taught me precious fundamentals of nursing.

As necessary to nursing as theory and ethical guidelines are Shulman's "habits of the heart," which nurture true and deeply felt human connections. In the presence of her difficult patient, his limbs "contracted as a result of his immobility," this student achieves an awareness that complements and completes academic ("habits of the mind") and professional nursing knowledge (habits of the heart"). Her reflection recalls a momentous clinical experience that teaches her the fundamental necessity of caring for each patient as if a member of one's own family. Looking back, she remembers her "clumsy hands" and her changed attitude: "reflecting on myself...I realized that if I empathize with patients they would feel my feelings and my truth... ." Two years later, the image of her patient remains with her "like a carved seal" on her heart. For the nurse educator, this journal entry confirms the usefulness of reflection upon "lived" experiences as evidence of the deepened understanding that leads to professional growth.

Sample 4: Finding Professional Direction

Finally, reflection can help nursing students find their personal direction in the broad field to which they have committed their working lives. Frequently referred to as a profession that "eats its young," nursing often puts excessive pressure on novice nurses. Guided by the *Code of Ethics for Nurses,* two Provisions of which include collegiality and collaboration (American), nurses contribute to the effectiveness of the healthcare team and influence positive patient outcomes often under very difficult circumstances. The way stressful encounters are handled by clinical instructors often makes just as much of an impression on the students as the incidents themselves. Reflection provides a coping mechanism for both new and experienced nurses: In a time when staffing is low, supplies are short, and tempers rage, "nurses … benefit from a tool to help cope with the real issues they face every day at patients' bedsides" (Craft 55).

The student writer quoted below, observing the relationships among nursing instructors and their students, decides to pursue the career of nurse educator. Her plan for the future combines love of nursing with passion for teaching:

> Shakespeare defined [reflection] as the reverting of the mind to that which has already occupied it. To me, reflection is not only looking back but also continuously giving careful consideration for the past while looking forward to the future. …I've always loved teaching. Ever since high school I've been the one to tutor other students. I even helped some of my friends pass the LPN N-Clex. So the question remains, knowing what I know now would I still pick nursing as a career? The answer is yes. I love helping people and nothing will please me more than helping to train future nurses. In my teaching I will stress the importance of teamwork and the power of collaboration.

Using her reflection to guide her future educational and career plans, this student shows clear thinking about the direction of her life. It is important that, as nurse educators, we remember that we are working with students who are neophytes in the healthcare system – anxious and fearful at times, they question their career choices more often than we think. Reflective writing assignments help many students understand that even negative experiences can foster learning and growth. Indeed, several students reflected on learning not only from clinical successes

but from errors in judgment as well. Most such incidents, fortunately, did not harm the patient; but they did offer the student nurses opportunities to examine how and why questionable situations could transform their personal and professional perspectives.

Conclusion

By their final course with a clinical component, Medical-Surgical Nursing II (SCR290), LaGuardia students have deposited into their ePortfolios reflective pieces accumulated over a two-year period. Looking back over their reflections, they and their instructors can measure the development of their writing from mere chronicles of the day's events to serious reflections on the significance of those events. As a nurse educator, I use a pedagogy based upon the practice of reflection as one way to assess degrees of student knowledge, confidence, and self-regulation in the clinical area. Reading their reflections, I can judge progress made in the application of nursing theory to humane management of illness and pain. Above all, students may see in their reflections a record of their own personal and professional growth in identifying and providing ethical, effective, and empathic care.

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Reflection on Concepts, and the Concept of Reflection

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> *Conceptual understanding is considered lasting if the concept represents a "big idea" having lasting value beyond the classroom, resides at the heart of the discipline, requires uncoverage of misconceptions, and offers the potential to engage students.*
>
> <div align="right">Darmofal, Soderholm, and Brodeur</div>

When I was in seventh grade, I failed math. In India, to fail math is to risk the admiration of family and friends, and so I struggled under the pressure to prove myself; yet for two years, I barely passed the exams. In ninth grade, when my parents insisted on tutoring, I spent each day after school working out a minimum of fifty practice problems. The results were amazing! Completely transformed, I scored second highest in math, surprising everyone in my class. Even now, when I return home to India, my former classmates remain astonished that I chose to teach engineering and math. But a teacher of engineering and math indeed is what I have become, and my memories of those early troubles now guide my strategies to help my students become better learners.

In India, we were taught fundamental math principles in traditional lectures. The professor explained equations while writing them on the board, his back to the class, as we took notes in silence. After the lecture, we did the assigned homework, memorized formulas, and returned to class for the next day's lesson. My fellow students and I either "got it" or didn't "get it;" if we had misconceptions, they were ours to discover and work out before an examination.

Later, when I began to teach statics, I too followed the traditional teaching method, but I knew – and cared – that some of my students were not getting it. By the time I came to LaGuardia in 2007, I had already begun a practice of questioning and revising my teaching methods to emphasize a more interactive, student-centered development of conceptual knowledge. In my first Engineering Mechanics: Statics class (MAE211) in the Spring I 2008 semester, my students were well prepared and highly motivated, grasped fundamental concepts easily, determined forces with confidence, and asked impressive and spontaneous questions when critiquing solutions to design problems. But in the

following semester, Fall I 2008, my students had a completely different attitude toward engineering. Unfamiliar with the requirements of the discipline, this group of students seemed to lose focus from one assignment to the next. Some students solved the problems by just following the design steps; most demonstrated only the vaguest understanding of concepts basic to engineering, proof that the concepts had not been fully internalized to begin with. They were confused, for example, by the difference between internal and external forces, and seemed unfamiliar with the importance of applying conceptual knowledge to real-world problems. In the first few weeks of the fall, too frustrated to engage creatively with the material, the class moved slowly while I, growing anxious about coverage of material, reverted to the traditional lecture format. Listening passively, my students copied problems and formulas as I wrote them out on the board. Instead of transforming the traditional classroom, I was, to my chagrin, reproducing it.

What to do when there is not a perfect fit between our pedagogy and our students? My new class of students had underestimated the demands of the material, while my mistake had been to think that all students would be like those of the previous spring – eager, interested, and confident in their applications of conceptual knowledge. To "get" the material and not be left behind, my new students needed skills more complex than the passive plugging in of numbers into equations. For me, the challenge was to modify my methods to deal with this unexpected deficit in student preparedness and, at the same time, cover a dense and demanding syllabus. Most important, I had to learn about my students' abilities and attitudes, and make teaching decisions accordingly and quickly, within the first weeks of class. In my second semester at a new college, I did not want my students to fail while I was figuring out how to teach them.

The teaching problem before me, then, was how to build acceptable levels of conceptual understanding and redirect learning habits. I needed to guide my students away from rote memorization and routine recitation of rules and formulas and toward active participation in their engineering education. Fortunately, earlier that year, I had joined the Carnegie Seminar on the Scholarship of Teaching and Learning, a professional development opportunity offered by the LaGuardia Center for Teaching and Learning to faculty interested in sustained and systematic reflection upon a single course. I used the coincidence of problem class and professional development seminar opportunity to consider ways to adjust my pedagogy to accommodate varied levels of student readiness.

Of course, I knew that doing so would require time, very little of which remained after creating lessons, grading work, attending meetings, and actually being in class or in conference with students. However, I found the seminar's consistent schedule of reading and writing, and the discussions with peers about teaching and learning to be a source of energy, allowing me to identify and resolve the contradictory elements between what I wanted my class to be and what this class actually was.

The main seminar goals were to identify a line of scholarly inquiry into teaching and learning in a targeted course and to document pivotal points of that inquiry in reflective memos. First shared with colleagues for feedback and commentary, these reflections on classroom practice were then archived in personal electronic course portfolios that mapped our inquiries into three pedagogical dimensions: the syllabus, the design and implementation of activities, and the assessment of student learning. My investigation was into ways to build acceptable levels of conceptual understanding, in order to redirect learning habits, and successfully guide skeptical students toward active participation in their engineering education. As I questioned my practice and looked for the causes of obstacles to learning, alternative approaches to the course began to emerge. With the development of disciplinary conceptual understanding as my goal, I decided to bring some of the Carnegie emphasis on reflection into my classroom, and turned my attention to increasing student awareness of their own learning processes. If I could question and reflect on my teaching, my students could also actively and profitably reflect upon their learning of primary engineering concepts.

Questioning as Reflection

Since Socrates, question-asking has been valued as a pedagogical tactic to focus the mind and foster disciplined inquiry, weigh alternate points of view, and critique data. In my quest to model concept building, I restructured several learning activities to include sets of questions that called upon students to think systematically about engineering problems. I designed PowerPoint presentations that, depending on learning needs, could be accelerated or slowed down. I also assigned oral presentations and group work, activities perhaps less necessary among self-motivated students who engage each other and course material without prompting. Taken together, these adjustments to my course would, I believed, clarify the understanding of real-world engineering problems, stimulate unexpected applications and solutions, and lead to

the effective design of engineering projects. Discussed below are two strategies: the use of *question prompts* to motivate reflection on previous solutions to problems, and the use of *concept questions* to determine students' understanding of key ideas. As overlapping strategies, both are intended to stimulate purposeful dialogue, interactive critical analysis of problems, and alternative perspectives.

Essential knowledge for anyone who wishes to pursue a career in civil or mechanical engineering, statics is a tool that, along with other theories, is used to predict the behavior of real objects. To avoid misunderstanding of statics, students must be able to distinguish the concept of *moment* (measure of the tendency for rotation about a point due to a force) and the concept of *couple* (two parallel forces with the same magnitude but opposite in direction and separated by a perpendicular distance). These two concepts form the basis for engineering design and practice, and lay the foundation for subsequent courses in the dynamics and mechanics of materials. Thus, exposure to the forces and moments that act between, or within, objects must be part of the student's introduction to the discipline. If the student is to interpret and apply the disciplinary concepts of "force," "moment," "couple," and so on, basic conceptual knowledge must be firm.

My inquiry into my students' learning began with my observing the extent to which they could internalize and apply key course principles to a range of design problems appropriate to their level of study. Uppermost in my mind was the objective of more intentionally and interactively teaching students to "think with" concepts. In its simplest sense, thinking conceptually in this course requires both familiarity with the language of statics and the ability to use disciplinary definitions with precision. At the very least, command of primary concepts should reduce overdependence on the words "whatever" and "thing"! In planning my lessons, my first decision was to de-emphasize formulas in favor of concepts whenever possible. Second, in the belief that students needed more consistent hands-on experience with the course material, I assigned design problems to be worked out collaboratively in groups. In a typical class, students thought through and demonstrated their solutions together, and I moved from team to team, asking questions and listening for correct usage of engineering concepts. As students tried to justify alternative and diverse solutions, I could quickly and easily evaluate their progress away from the foggy language of "whatever" toward clear communication of the fundamental attributes and applications of the concepts of statics.

To generate interactivity as well as the more substantial and flexible conceptual understanding that I expected from the students, I set up three stages of solving real-world design problems – interpret, plan, execute –, an approach that I have adopted for subsequent classes. Connected to each other by a series of questions, the three levels of problem-solving progress from basic analysis to more complex reflections on actions. The first and most straightforward learning stage requires teams of students to read the problem statement, break it down to its constituent parts, and demonstrate that they can identify and define its essential terms. Guided by the staged questions, the teams determine what information is provided by the problem statement, what remains to be worked out, and what assumptions must be made in order to reach a solution. In the second stage, students think about multiple approaches, looking for and, if possible, identifying more than one solution to the problem. As a team, they then choose and justify a "best" plan.

In the third stage, students describe possible relations of in-class engineering problems to real world industry. For example, shown a picture of a fracture in the concrete support of a bridge, the teams respond to a pair of cause-and-effect questions aimed at systematic reflection upon what may have gone wrong and why: "What has happened? Why has this happened?" Here students offer modifications, and begin to work out design steps.

In my Fall 2008 class, several advantages to using such questions were immediately apparent, especially in relation to student attitude. Students who had formerly displayed lack of interest now wanted to know the purpose of learning an engineering topic, curious about the relation of the abstract topic to real situations. No longer simply copying a problem while watching and listening to me work it out on the board, students now solved the problem in discussions with each other, providing immediate assistance and feedback. As team members, students participated more collaboratively in class discussions; as individuals, they were more confident and displayed more personal accountability when demonstrating a solution process before the entire class. By observing students as they worked and by asking them questions that required reflecting upon their solutions to problems, I could better evaluate weaknesses and strengths in conceptual understanding. I could see the degree to which students would persist in finding solutions, and, for their part, students could see their accomplishments or lapses and thus get a clear sense of their progress. The challenge,

described above, to define terms and reflect upon solutions, out loud and in teams, improved communication within the class, reduced the fear of proposing incorrect answers, and minimized the number of conceptual errors students made. Overall, students worked with more conviction and approached problems with more success.

A second method, the use of multiple-choice concept questions, helped me to assess my students' homework preparation, and their progress in defining and applying fundamental concepts. A pedagogical technique pioneered in the late 1980s by Harvard Professor of Physics and Applied Physics Eric Mazur, the in-class use of concept questions aims at assessing and improving students' abilities to "apply knowledge across a variety of previously *unencountered* instances" (Darmofal, Soderholm, and Brodeur T3A-1; emphasis in orig.). In other words, strengthened conceptual understanding improves ability to work out solutions to new problems, and imagine and make predictions about the possibilities and consequences of future designs (Darmofal, Soderholm, and Brodeur T3A-1).

Practiced in class alongside reflection questions, and dependent upon completed homework assignments, concept questions replace memorization of definitions and formulas and prompt self-assessment and critical understanding. Drawing upon Mazur's pedagogy and Felder and Brent's application of Bloom's theory of learning to the engineering classroom, I decided to align the first four levels of Bloom's taxonomy – knowledge, comprehension, application, and analysis – with concept questions. Classifying course content, I designed four levels or types of questions. At the first level, basic *knowledge* questions require my students to demonstrate their understanding of fundamental definitions such as vectors, forces, moments, product of two vectors, scalars, and so on. The next level of questions moves beyond simple memorization of definitions to *comprehension* of concepts, i.e., *determining* moment at a point due to a force or a resultant force at equilibrium. At a more challenging level, *application* concept questions involve making necessary assumptions and applying prior knowledge. Finally, *analysis* concept questions evaluate the degree of higher-level applications of content and design techniques. Of course, as suggested in the examples below, these four levels are overlapping and integrative:

Knowledge Question

For any two vectors A and B, where A = Ax i + Ay j + Az k and B = Bx i + By j + Bz k, which of the following is true?

    a. A·B = Ax Bx i − Ay By j + Az Bz k
    b. A·B = (Ax + Bx) + (Ay + By) + (Az + Bz)
    c. A·B = Ax Bx + Ay By + Az Bz
    d. A·B = (Ax + Bx) i + (Ay + By) j + (Az + Bz) k

To answer successfully (choice c), students must know the definition of a vector and understand the differences between a dot product and a cross product. They should be able to show that the resultant of a dot product is always a scalar quantity and not a vector, and that the dot product of two vectors is A·B = Ax Bx + Ay By + Az Bz.

Comprehension Question

The following force system will be in static equilibrium only if
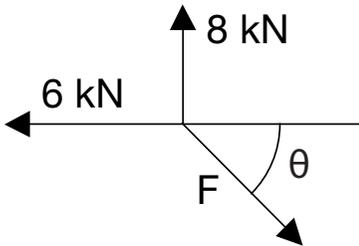
    a. F = 10 kN and q = 53.13º
    b. F = 14 kN and q = 53.13º
    c. F = 10 kN and q = 36.87º
    d. F = 14 kN and q = 36.87º

After learning the fundamental definitions in statics, students demonstrate understanding of concepts both in class discussion and in quickly administered quizzes. In order to answer this problem successfully (choice a), not only must students be familiar with the definitions of the concepts of *vector operations, resolving forces,* and *static equilibrium,* but also, importantly, they must understand the implications of the interactions among them.

Application Question

If the moment of a force about a point A is MA = {5 i − 6 k } N–m, its moment about line AB, whose unit vector is UAB = 3 i + 0.2j, has a magnitude of

    a. 1 N–m
    b. 15 N–m
    c. −18 N–m
    d. −1.2 N–m

In my Fall 2008 class, students experienced confusion when confronted with problems that required application of the concept of *moment*. To answer successfully (choice b), students must know the definition of moment and unit vector. But the complexity of the challenge here is that they must also be able to apply the concept of *moment about a point* in order to determine *moment about a line*. In our class, constant practice reinforced the concept that the moment about a line is calculated using a unit vector that is along that line.

Analysis Question

Truss ABC is revised by increasing its height from h to 2h. Width l and force F are kept constant. For the revised truss as compared to the original truss, which one of the following statements is true if it is in static equilibrium?
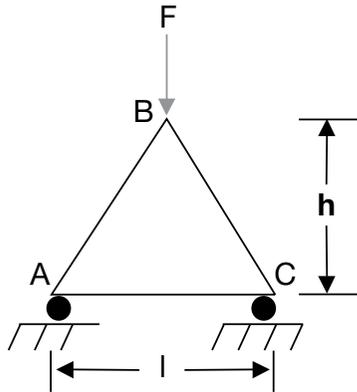
a. Forces in all its members have remained the same.
b. Forces in all its members have increased.
c. Forces in all its members have decreased.
d. None of the above

To answer successfully (choice c), students must now demonstrate the ability to make predictions based upon sound assumptions. In addition, at this stage, their analysis should reflect the ability to apply content and design methods consistently. Here, students need first to apply equations of equilibrium for both original and modified truss and then analyze their calculations in order to conclude that forces in the members decrease.

It is not unusual for students to get lost sometimes in trying to find the right step to solve the above problems. At these junctures, they require additional assistance and continuous practice with similar problems to help them adapt to the learning challenges. Both weak and strong students benefit from working in teams on concept questions such as those explained above and reflecting upon and justifying their responses. Weaker students can more clearly reveal gaps in their understanding to

stronger students; the latter may progress more consistently and, at the same time, justify their results by explaining approaches and processes to their peers.

Conclusion

As a teacher newly arrived at LaGuardia, I did not want to fall into the traditional approach that had trapped me as a young student in India. By designing active learning strategies that reinforced continuous practice of statics concepts, I hoped to move my students toward a realistic awareness of the rigors and expectations of the profession they had entered into. To understand that sophisticated and effective engineering solutions rest upon firm conceptual knowledge, they had to first learn to speak the language of engineering and they had to demonstrate a disciplined approach to analysis and prediction, skills that were internalized through systematic questioning of theory and its real-world applications. Although the reflection and concept-based questioning techniques consumed a significant amount of instructor time in both their initial preparation and periodic improvement, I found that these lessons consumed less class time than lectures, and could easily be used together with my PowerPoint presentations and student presentations of their assignments. The combined methods of team reflections on problem-solving solutions and concept questions also helped me to assess quickly student understanding of the material, saving in-class lecture time.

Most important, these techniques significantly improved student scores on homework and exams. My end-of-term analysis indicates that the use of such in-class assignments helped increase student scores by an average of 40%. In their evaluations of the course, students commented that both reflection and concept questioning were useful in promoting their understanding of key engineering concepts and design steps. In addition, the use of these strategies made evident to me that students wanted to know not just how to solve problems mechanically: they wanted to know the *purpose* of learning a topic. The presentation of images of fractures in structures described above excited their imaginations and motivated discussions about causes, forces, resistance, and so forth. As I had hoped, these demonstrations and conversations brought home to my students the implications of their efforts to learn these concepts in our class.

In the words of educator Ann Richert, "To think about one does and why – assessing past actions, current situations, and intended

outcomes – is vital to intelligent practice, practice that is reflective rather than routine." I had turned away from my lapse into the "back-to-the-class" pedagogy typical of the traditional engineering classroom to encourage active, visible, and "thinking out loud" learning. Facing each other, engaging in problems together, and reflecting on our practices, my students and I began to transform our approaches to teaching and learning. It is this potential to change, as I had done as a young student in India, as our students do every day at LaGuardia, that lies at the heart of the reflective classroom.

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Contributors

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Prabha Betne has taught mathematics and statistics courses at LaGuardia since 2004. She is an Associate Professor in the department of Mathematics, Engineering, and Computer Science. Previously, she was a research statistician at Columbia University, and a credit risk manager with Citigroup. She has a PhD in statistics from the University of Missouri-Columbia and an MStat from the Indian Statistical Institute. Her research interest is in the development of strategies to improve the teaching of basic mathematics and statistics.

Marina Dedlovskaya, Associate Professor in the department of Mathematics, Engineering, and Computer Science, earned her doctorate in 1997 from Moscow State Pedagogical University. Her research interests are in abstract algebra and math pedagogy. Marina joined LaGuardia Community College in 2004. Since then, she has taught mathematics at different levels from developmental to advanced. Currently, she is actively involved in exploring new approaches to improving the teaching of basic mathematics courses.

Louise Fluk is Coordinator of Library Instruction at LaGuardia, teaching targeted sessions to help students write their research papers as well as the Library's credit courses on traditional and Internet research. She holds a BA from the University of Toronto, an MLS from Columbia University's late, lamented School of Library Service, and an MA from New York University. Her paper on research narratives arises out of her experience with rubric assessment of information literacy at LaGuardia.

Jennifer Horton Benichou has taught ESL for over twenty years. She was the first ePortfolio coordinator at the English Language Center (TELC) and initiated other TELC technology projects such as an online

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Kathleen Huggard has worked as an adjunct lecturer in non-credit ESL programs in the New York area for over fifteen years. She participated in the English Language Center's first ePortfolio project and is very interested in creating and exploring meaningful applications for technology in the ESL classroom. She holds an MA in Teaching English as a Second Language (TESL) from Hunter College and a BS in Marketing and International Trade from the Fashion Institute of Technology.

Deborah McMillan-Coddington is an Assistant Professor in LaGuardia Community College's Registered Nursing Program. She earned her AAS in Nursing at LaGuardia and New York State RN licensure in 1996. She continued her education at Hunter-Bellevue School of Nursing, earning her BSN and MS in Community Health, and recently her Post-Master's degree in Nursing Education. She obtained Certification in Hospice and Palliative Nursing Care and is a member of Sigma Theta Tau and the National League for Nursing.

Gary Richmond teaches in LaGuardia's Humanities department and coleads the CTL faculty development seminar, "Focus on Learning Communities." He holds degrees in music and education, and has done extensive postgraduate work in interdisciplinary studies. He has been invited to speak at several international conferences and workshops, and writes often on issues of philosophical pragmatism, for example, the lead article, "Cultural Pragmatism and The Life of the Sign," in a special volume of *Critical Arts* (2008).

Deborah Robinson is a faculty member in the department of Cooperative Education where she teaches classes related to the internship experience and places students at internship sites that represent a myriad of public and private businesses and organizations. She holds a BS from the CUNY Baccalaureate Program at the Graduate School and University Center, and an MS in Urban Affairs from Hunter College. Her interests include student-centered academic and professional development and community issues in New York City.

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Patricia Sokolski has a MA in English and a *Licence d'Anglais et Français Langue Etrangère* from the University of Rouen. She was an adjunct lecturer at LaGuardia in the Humanities department and the English Language Center for twelve years before becoming a full-time lecturer in the Humanities department. She has been involved in learning communities and teaches most of her courses in pairs, First-Year Academies, and clusters.

Valerie Taylor-Haslip is an Advanced Practice Registered Nurse who received her BS degree in Nursing from Howard University, an MS degree from Lehman College, and a Post-Master's Certificate as a Family Nurse Practitioner from Adelphi University. She is currently a doctoral student at the CUNY Graduate Center, interested in the study of distance learning in nursing education. Valerie has been a professor in the Natural and Applied Sciences (now Health Sciences) department for four years and has taught in both the Practical Nursing and Registered Nursing programs. She is currently the Coordinator of the PN-RN Advanced Pathway program.

Kyoko M. Toyama is an Assistant Professor in the department of Counseling and has been a counselor in the College Discovery program for over twenty years. She is the coordinator of the Graduate Intern program in the department, providing training and supervision for graduate students in counseling. She has conducted workshops in the areas of cross-cultural counseling and women's career development, particularly related to Asian women. She has an MEd from Teachers College, Columbia University, and a PhD from New York University, both in Counseling Psychology.

Source of quotation on page *i*:
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The LaGuardia Center for Teaching and Learning

The LaGuardia Center for Teaching and Learning (CTL) offers faculty-led programs designed to promote innovative teaching, deepen student learning, and advance the scholarship of teaching and learning. Founded in fall 2001 to support professional collaboration, reflection, and exchange, the Center draws upon the expertise of the entire college community to better serve students. The Center helps the college face exciting educational challenges and opportunities, among them the questions raised by new educational technologies, issues of interdisciplinary literacy, and strategies for addressing the rich and growing diversity of our student community.

Working with Center staff, faculty develop and lead a wide range of programs that catalyze transformation throughout LaGuardia, focusing on creative pedagogy and effective integration of new media. More than half of LaGuardia's full-time academic faculty are engaged in Center programs, as are growing numbers of adjuncts and Continuing Education faculty. The Center supports and coordinates these programs, assisting faculty efforts to connect to each other and to broader national conversations taking place in venues ranging from discipline-based professional associations to the Carnegie Foundation for the Advancement of Teaching and Learning, the League for Innovation in the Community College, and the Association of American Colleges and Universities.

For more information about the LaGuardia Center for Teaching and Learning, please visit http://www.lagcc.cuny.edu/ctl.

The LaGuardia Center for Teaching and Learning Professional Development Seminars 2009–10

Carnegie Seminar on the Scholarship of Teaching and Learning

In an interdisciplinary and collaborative professional community, LaGuardia faculty engage in systematic inquiry into their own practice, documenting their work for the purposes of research, reflection, and publication.

Professor Evelyn Burg, *Communication Skills,* Dr. Michele Piso, *LaGuardia Center for Teaching and Learning,* and Professor Sigmund Shen, *English*

Connected Learning: ePortfolio and Integrative Pedagogy

Both an introduction to ePortfolio for faculty who are new to the technology and a challenge to experienced ePortfolio practitioners to deepen their practice, Connected Learning aims to strengthen students' integration of their own learning through ePortfolio pedagogy. It explores various ways that this dynamic educational tool can cultivate connections between students and faculty, between students and their peers, and between students and a range of external audiences, including their families, friends, and potential employers. The seminar also supports integration across disciplines and semesters, helping students to move past fragmentation and find coherence and meaning in their educations.

Professor Avis Anderson, *Business and Technology,* Assistant Dean Bret Eynon, and Craig Kasprzak, *LaGuardia Center for Teaching and Learning,* and Professor Ellen Quish, *Adult Learning Center*

Critical Thinking Across the Curriculum

Faculty explore the cognitive process and create new classroom activities and assignments that help students develop higher order thinking, problem-solving, and reasoning abilities.

Professor John Chaffee, *Humanities*

Designed for Learning 2.0

The recent explosion of Web 2.0 digital technologies offers new resources and challenges for educators. How can we leverage new "social web" tools – technologies that draw inherently on collaboration, creativity, and active participation – to help us engage students, deepen their learning in the disciplines, and develop the skills they need as learners and leaders? This question is the focus of the Designed for Learning 2.0 faculty seminar. Using inquiry-based pedagogy with technologies such as blogs, wikis, social networking tools, ePortfolio, and virtual worlds, we will develop ourselves as learners, educators, and practitioners in a supportive, cross-disciplinary community of practice.

Josephine Corso, *LaGuardia Center for Teaching and Learning,* Professors Ximena Gallardo, *English,* and Abby Schoneboom, *Social Science,* and Priscilla Stadler, *LaGuardia Center for Teaching and Learning*

ePortfolio and Assessment Mini-Grant Program

This initiative aims to advance the comprehensive integration of ePortfolio into curricula, and to advance the college-wide Periodic Program Review (PPR) process by offering departments and academic programs mini-grants in support of faculty development and needed curricula revision processes.

Dr. Mercedes del Rosario, Assistant Dean Bret Eynon, and Ros Orgel, *LaGuardia Center for Teaching and Learning*

Faculty Scholars Publication Workshop

This year-long faculty development seminar is designed to assist faculty in their scholarly writing and publication. It seeks to help faculty complete academic writing projects and place them in external, peer-reviewed publications.

Professors Nancy Berke, *English,* and Angela Wu, *Business and Technology*

Focus on Learning Communities

Faculty who are teaching in a range of learning community structures (First-Year Academies, ESL and Project Quantum Leap pairs, Liberal Arts clusters) meet with partners, learn new approaches to interdisciplinary teaching, and plan their shared courses.

Professor Marina Dedlovskaya, *Mathematics, Engineering, and Computer Science,* Ros Orgel, *LaGuardia Center for Teaching and Learning,* and Professors Gary Richmond, *Humanities,* and Phyllis van Slyck, *English*

Making Connections

Making Connections provides support for professional development to universities who wish to advance their use of ePortfolio. Funded by a major 2009 grant from the Fund for the Improvement of Postsecondary Education (FIPSE), Making Connections has provided mini-grants and a sustained seminar to twenty-four college teams from New York and the surrounding area. Participating colleges have included CUNY schools (Bronx Community College, College of Staten Island, Hunter College, and Queens College), St. John's University, and Long Island University in New York; Rutgers University and Montclair State University in New Jersey; and Norwalk Community College, Molloy College, and Tunxis Community College in Connecticut. Applications for the 2010 program were released in October 2009.

Professor Clarence Chan, *Health Sciences,* Assistant Dean Bret Eynon, Carolyn Henner Stanchina, and Jiyeon Lee, *LaGuardia Center for Teaching and Learning,* Professor Max Rodriguez, *Education and Language Acquisition,* and Dr. Judit Török, *LaGuardia Center for Teaching and Learning*

New Faculty Colloquium

In this year-long orientation to teaching and learning at LaGuardia, new full-time faculty begin to adjust to a new educational setting. They learn from each other and from senior colleagues about LaGuardia students, and the various pedagogies found to be effective at LaGuardia, and consider some of their options for future growth and development as teaching faculty.

Josephine Corso, *LaGuardia Center for Teaching and Learning,* and Professors Ana María Hernández, *Education and Language Acquisition,* and Gordon Tapper, *English*

Project Quantum Leap

Now in its third year, this seminar brings together faculty from mathematics and other disciplines to adapt the nationally recognized Project SENCER (Science Education for New Civic Engagements and Responsibilities) approach of teaching science and higher-level mathematics in "compelling contexts" to a new setting and population: LaGuardia's high-risk urban community college students in basic skills mathematics classes. Working in two cohorts (Introduction to PQL and Advanced Leadership and Curriculum), mathematics faculty deepen their understanding of PQL pedagogies and create new lessons using the themes of environment and global warming, public health, and business and finance.

Professors Prabha Betne, Gordon Crandall, and Yasser Hassebo, *Mathematics, Engineering, and Computer Science,* Assistant Dean Bret Eynon, Ros Orgel, and Dr. Judit Török, *LaGuardia Center for Teaching and Learning,* and Professor Frank Wang, *Mathematics, Engineering, and Computer Science*

Rethinking the Capstone Experience
Grounded in explorations of models and best practices in capstone education across the country, this seminar guides faculty through the processes of constructing, piloting, and re-visioning capstone courses in their respective disciplines at LaGuardia. Faculty participants consider critical questions including how to help students synthesize and reflect upon their classroom and extracurricular learning; how best to prepare them for transition to either a four-year college or the workplace; what role capstones play in institutional assessment at LaGuardia; and how ePortfolio can help to scaffold capstone pedagogy.

Professor J. Elizabeth Clark, *English,* and Assistant Dean Bret Eynon, and Craig Kasprzak, *LaGuardia Center for Teaching and Learning*

Student Technology Mentors (STMs)
Working in unique student-faculty partnerships that help faculty to design and use interactive technologies, STMs benefit from intensive training and support that prepare them for success in education and career.

Ali Abdallah and Josephine Corso, *LaGuardia Center for Teaching and Learning*

Writing in the Disciplines (Affiliated Program)
Part of a nation-wide interdisciplinary effort, the year-long Writing in the Disciplines seminar supports full- and part-time faculty as they develop and test writing-intensive assignments for integration into their courses. Seminars are facilitated by interdisciplinary teams of LaGuardia faculty and CUNY Writing Fellows.

Professors Marian Arkin and James Wilson, *English*

The Flourishing Mind
Sustainability and Mindfulness in Teaching and Learning

In Transit: The LaGuardia Journal on Teaching and Learning (V5, 2010).

Sustainability consciousness, emerging from the environmental movements of the 1960s, is generally expressed as collective and conscientious regard for the vulnerability of the Earth and its limited resources. As a concept, sustainability has application to a broad spectrum of human disciplines and activities; its principles and values are now well integrated into the everyday dimensions of the present needs and future goals of diverse communities from across the continents:

- Community activists, politicians, and artists think in new ways about climate change, renewable energy, carbon footprints, light, and water.
- Philosophers and theologians view sustainability in the context of the politics of abundance and consumption, equity and justice, animal rights, and fair trade.
- Corporate leaders explore sustainable relations of well-being in the workplace.
- Urban designers plan sustainable cities and eco-architecture.
- Faculty and administrators create ecological literacy requirements.
- Teachers and students confront ethical and practical choices demanded by social and environmental crises.

Across CUNY Colleges, students select from an array of majors and minors in environmentalism. At LaGuardia, in response to changing economic and vocational trends, the Division of Adult and Continuing Education has created "green" programs, and the Department of Natural Sciences will soon offer a concentration in Environmental Science. Throughout our college, faculty incorporate sustainability topics into math, philosophy, urban studies, and dietetics. The grant-funded Water Monitoring Project at Newtown Creek currently engages an interdisciplinary group of students and faculty. But the sustainability movement has a philosophical side as well, rooted in the social criticism of Henry David Thoreau and Lewis Mumford, and derived from nature-oriented thinkers, artists, and spiritual practices, the poetic mysticism of Gary Snyder, for example, or the Romantic paintings of Casper

image from http://www.earthzine.org

David Friedrich. Both offer images of stillness associated with contemplative practice, the sustained awareness described by Thoreau as *wakefulness*.

Attentiveness to thought, or mindfulness, commonly undertaken in solitude, is now increasingly practiced in courses as diverse as nursing and phenomenology. Among its pedagogical objectives are renewed inner nature; increased flexibility, clarity, and generosity of thought; deepened listening; contemplative inquiry; and a more open interrelatedness between self and other. Current research on mindfulness-based practice in higher education confirms its potential to sustain and "enhance performance, character, and depth of the student's experience," writes Tobin Hart, author of "Opening the Contemplative Mind in the Classroom."

The Flourishing Mind (*In Transit*, V5, 2010) will explore the variety of scholarly perspectives from which faculty and administrators teach and model issues of sustainability and mindfulness. The call for papers encouraged interested members of the college community to submit proposals addressing any of the following, or similar, themes emerging from classroom work with students, curricular and cocurricular development, or administrative responses to challenges of sustainability:

- Responding to images of nature in painting, film, and literature
- Developing capacities for attention and awareness in the classroom
- Minding our places; inquiring into natural and cultural environments
- Designing and engineering in response to environmental changes
- Planning sustainable cities; building eco-municipalities
- Rethinking food: cultivation, just distribution, and choice
- Enhancing ecological literacy; identifying causes of climate change
- Increasing awareness of energy consumption and waste
- Engaging new technologies for sustainable economies and communities
- Caring for animals; protecting biodiversity and ecosystems
- Clarifying values in community health
- Greening businesses and economies
- Exploring ties between contemplative practitices and eco-awareness
- Sustaining campus and community by helping our college make a mindful transition to a greener future.
- ...And many others!

In Transit: The LaGuardia Journal on Teaching and Learning serves the exchange of knowledge about good practice and research, and supports faculty and administrators in the advancement of the scholarship of teaching and learning in higher education. Our purpose is to expand scholarly writing, build intellectual community, and promote professional advancement across the disciplines.