InSight

A Journal of Scholarly Teaching

VOLUME 7

A Journal of the
Center for Excellence in Teaching and Learning

PARK UNIVERSITY
CETL
CENTER FOR EXCELLENCE IN TEACHING AND LEARNING

PARK
UNIVERSITY℠

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"A teacher ought therefore to be as agreeable as possible, that remedies, which are rough in their own nature, may be rendered smoothing by gentleness of hand; he ought to praise some parts of his pupils' performances, to tolerate some, and to alter others."
~Quintilian, *Institutes of Oratory*

"Highly effective teachers tend to reflect a strong trust in students. They usually believe that students want to learn, and they assume, until proven otherwise, that they can…Above all, they tend to treat their students with what can only be called simple decency."
~Ken Bain, *What the Best College Teachers Do*

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"Learning as we must understand it today…does not involve people's assimilation of knowledge, it involves people's assimilation into communities of knowledgeable peers. Liberal education today must be regarded as a process of leaving one community of knowledge and joining another."
~Kenneth Bruffee, *The Art of Collaborative Learning*

INTRODUCTION

About Park University...

Park University (originally Park College) was co-founded by Colonel George S. Park and Dr. John A. McAfee in 1875. An independent, private institution, accredited by the North Central Association of Colleges and Schools, Park University currently enjoys a distinguished position in higher education as a growing institution with 43 campus centers in 21 states including an extensive Online degree program. In 2005, Park University created The Center for Excellence in Teaching and Learning to promote the practice and profession of teaching, including scholarly inquiry into teaching across the disciplines. *InSight: A Journal of Scholarly Teaching*, an outreach of the Center's programming, is a refereed academic journal published annually. The editorial staff invites submissions of research and scholarship that support faculty in improving teaching and learning. Open to submissions from all disciplines and institution types, *InSight* articles showcases diverse methods for scholarly inquiry and reflection on classroom teaching.

From the Managing Editor...

I am pleased to present this year's volume of *Insight*, which presents a wide-ranging array of work including an editorial on posthumanism and rhetorical practice, and articles on a range of topics: innovations in teaching college algebra; collaborative research in business schools; work in augmented reality; and innovative doctoral programs and student reflections. New to this issue is the inclusion of a book review, a feature we plan to continue in the future. As always, the journal takes on the personalities of those who write for us; I am very pleased with the range of discourse and of course with the cross-disciplinary perspectives in this issue. I offer a special thanks to Keith Snyder, for his careful copy editing, and to Megan Holder, who takes care of all the nuts and bolts, and without whom we could not produce this journal.

I urge all of you to engage in teacher research and to consider submitting an article for review. I encourage you to think about your own teaching and learning experiences and write a narrative or study of your classroom. As Glenda Bissex, author of many articles and books on teaching and learning and a former teacher of mine, has said so often about the classroom: "Once you begin to observe, everything becomes interesting." And so it does. I think you will see this in the essays included in this issue.

--Lolly J. Ockerstrom

"Research...means looking – and looking again...We do not need new information; we need to think about the information we have. We need to interpret what goes on when students respond to one kind of assignment and not to another, or when some respond to an assignment and others do not. We need to interpret things like that – and then to interpret our interpretations."
~Ann E. Bertoff, *The Teacher as Researcher*

"Problems can become questions to investigate, occasions for learning rather than lamenting. Everything that happens in a classroom can be seen as data to be understood rather than causes for blaming or congratulating ourselves or our students...New approaches to teaching are no longer just risks but opportunities for learning...A teacher-researcher is a learner."
~Glenda Bissex, *What's a Teacher-Researcher?*

Teaching Students to Create rather than Demonstrate and Consume Knowledge: A Posthuman Perspective on Rhetorical Invention and Teaching

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The scholarship of teaching and learning (SoTL) calls for engaging students in the learning process and creating pedagogical environments that foster active learning. For me, such learning has an epistemological dimension whereby students should be taught and encouraged *to create knowledge* rather than merely *to demonstrate and consume knowledge* of issues and questions that already have known answers. Keith Trigwell and Suzanne Shalea (2004) propose a "practice-based concept of scholarly teaching" (p. 535) that resonates with my theoretical concept of active epistemological learning. Of their model they argue that:

> In its descriptive aspect, surely a good conception of scholarship of teaching would accord proper priority to the idea that teaching is an activity that emerges in collaboration with students as partners in learning. In its purposive aspect, surely a good conception of scholarship of teaching would honour and publicly acknowledge the scholarly energy that is creating situations in which students learn, rather than a scholarly energy which creates situations in which teachers instruct. (p. 534)

Although creating situations within the classroom, whether face-to-face, hybrid, or online, that allow learning to take place is a critical strand of SoTL, the role of knowledge in relation to learning has received less attention. For example, Michael Prosser (2008) argues that the main point of SoTL is "to work towards improving our students' learning" (p. 4), but he has little to say about the epistemological dimension of that learning. Similarly, David Dees (2008) explains that "I have now committed myself

...the posthuman has a fluid, emergent ontology rather than a unified stable one. Thus, rather than being a singular, defined individual, the posthuman can embody or become different identities and understand the world from multiple, heterogeneous perspectives.

as an educator to create learning environments *with* my students, not for them... the SoTL project...served to free me as an educator, moving away from an instructor-driven perspective to a more learner-centered approach" (p. 3); but what he means by "learner-centered approach" is assumed rather than articulated. Thus, although notions of teaching as collaboration and engagement with students are running themes in much of the SoTL scholarship, few scholars have taken on the role of knowledge making as opposed to knowledge demonstration, a role that I take up here.

Since my field is rhetoric, I turn to rhetorical invention as a site for a model of teaching knowledge creation and in the process offer a reinvention of *inventio*. As the first canon of rhetoric, invention itself is a complicated, dynamic act with a long distinguished history, dating at least as far back as ancient Greece. As Richard Young and Yameng Liu (1994) point out, "modern reinvention of *inventio* has been a history of inquiries without an agreed-upon end of rhetoric, which has led to an ever richer *copia* of perspectives, theories, models and paradigms" (p. xi). In other words, rhetorical invention is fluid and multiple, itself a source of ongoing debate. Thus, invention itself is the act of reinventing invention.

Here, I turn to a cultural posthuman perspective to explore this dynamic, fluid conceptualizing of invention with its history of competing inquiries that have

hovered over and in time and place. A posthuman perspective on rhetorical invention raises questions such as: What does a posthuman perspective on rhetorical invention have to offer? How does it contribute to teaching and learning? And simply, how do we conceive of a posthuman perspective on rhetorical invention?

Posthumanism and Rhetorical Invention

Posthumanism, of course, is not a coherent, agreed-upon theoretical concept. It is a series of competing and contradictory views, so let me describe the theoretical construct I'm working with here. As Donna Haraway (1991) first theorized, posthuman practice is the ability of the human to easily shift perspectives and enact these through differing identities. That is, the posthuman has a fluid, emergent ontology rather than a unified stable one. Thus, rather than being a singular, defined individual, the posthuman can embody or become different identities and understand the world from multiple, heterogeneous perspectives. Extending Haraway's argument, N. Katherine Hayles (1999), whose own work is central to critical posthumanism, argues that in the late 20th and 21st centuries, liberal humanism—a perspective that splits mind and body, with body being just a placeholder for the mind—has been exploded under the influence of information technology that has called the mind/body connection into question. Within a posthuman perspective, the posthuman is understood as one who relies on context rather than relativity, on situated objectivity rather than universal objectivity, and on the creation of meaning through "play" between constructions of informational patterns. Shannon Bell (2005) thus points out that in comparison with liberal humanism, posthumanism "has a much stronger critical edge attempting to develop through enactment new understandings of the self and other, essence, consciousness, intelligence, reason, agency, intimacy, life, embodiment, identity and the body"—all critical aspects that are key to rhetorical invention.

To understand how this perspective frames theorizing of posthuman rhetorical invention in a manner different from other theories of invention, let me briefly describe some of the more common perspectives.

20ᵗʰ Century Invention

Although now somewhat dated, Karen Lefevre's (1987) *Invention as a Social Act* offers one way of parsing these competing theories into four models that vary in their locus of knowledge and meaning. The first model is *subjectivist*. For the theories under this model, the locus of knowledge is the self; a writer looks inside him- or herself to identify knowledge, meaning, and truth. This perspective views rhetorical invention as a creative process, emphasizing a "generative *subjectivity* as the decisive factor in initiating and sustaining the writing process" (Young & Liu, 1994, p. xi). The second model is *objectivist*. Knowledge resides in the stable world waiting to be uncovered, usually by means other than rhetoric. The theories under this model posit a belief "in a preexistent, *objective* determining rhetorical order whose grasp by the rhetoric holds the key to the success of any symbolic transaction" (Young & Liu, 1994, p.xiii). The writer thus looks outside herself to find what she wants to say. Writing under this perspective is aepistemic and is concerned only with style and arrangement. LeFevre's (1987) third model, what she terms *collaborative*, holds that invention occurs by "interacting with people who allow developing ideas to resonate and who indirectly or directly support inventors. Listeners and readers receive and thus complete the act of invention" (p. 52). Under this model, knowledge and meaning are co-constructed between two or more stable subjects. Invention rests on interaction among people. The fourth model LeFevre terms the *collective*. Under this perspective, knowledge and meaning rest with an all-powerful supracollective such that all humans are written. Invention, then, is primarily a hermeneutical act as agency is closed off.

LeFevre (1987) sets up these categories of theoretical views as a continuum moving from the subjective individual to the social collective. Despite the divergent epistemologies of these models and the multiple theories under each, each depends on a particular model of subjectivity, either an independent, unified sovereign subject that writes or the binary opposite, a passive, dependent subject that is written. The inventing action in three of these models is unidirectional: from the self, the world, or from the supracollective to the self. That is, knowledge and meaning reside in the self, or in the world, or in the supracollective. The collaborative model grants knowledge and meaning in interaction among people, and does so in a bidirectional movement. However, this last model, like each of the others, is subjectcentric, relying on stable and unified active or passive subjects.

Like posthumanists, post-process theorists have challenged this notion of subjectivity as "unified" and "stable," separate from the context and spaces of writing. In terms of writing classes, Christopher Keller (2004) calls for us to "recognize student subjectivities as always on the move, always changing, and always shifting within, among, and between various locations and spaces" (p. 207). He argues that we need to theorize student writers as people traversing in "exile, displacement, immigration, migrancy, diaspora, or tourism" (p. 208). This concept of fluid, constant change is made most visible in cyber environments, in

> the ways that students' identities are always in a state of constant flux because of their 'travels' and 'movements' through these cyberspaces where they are always interpreting and producing various forms of discourse from a variety of social, cultural, and political positions (Keller, 2004, p. 214),

as well as gendered, sexualized, and class positions. This new sense of subjectivities as fluid, moving, and changing, calls for new ways of thinking about invention, and what it is we ask students to do, and how we conceive of *learning*.

Connectivity

Recently, Steven Johnson (2010), the director of TEDTalks, has been exploring where "good ideas" come from, and he argues for a notion of connectivity that he calls "networks" for understanding the origin of good ideas. As he points out, much of our language connected to invention and good ideas limits our conception of these acts, and works against notions of connectivity. Ideas are couched in terms of a "flash, a stroke, a eureka, an epiphany, a light bulb," all of which share a basic assumption that an idea is a single thing, something that happens in a wonderful, illuminated moment to an autonomous, independent agent. But, as he argues, this simply is not the case. Thus, we need to change our models of what deep thinking looks like. He asserts it is more accurate to think of an idea as a new network firing inside the brain. Thus an idea is a new configuration. We see these networks in the intertextual traces that saturate our discourses. Yameng Liu's (2002) observation calls attention to these traces when he notes "what is 'new' is always already saturated with 'traces' of the old, what is 'unique' saturated with 'traces' of the common, what is 'different' saturated with traces of the same" (p. 60). In his words,

The challenge for us as teachers is how to create environments or spaces for students that encourage idea production: that is, to create knowledge rather than merely demonstrate and consume knowledge.

> to be inventive is to strive for the new without attempting a clean severance with the old and to search for the unique through an identification with the common; it is to try to achieve originality, with the understanding that the more original a perspective is, the more deeply it is rooted in the conventional. (p. 60)

This perspective resonates with research findings by David Kaufer and Cheryl Geisler (1989) on authorial newness. Based on their scholarship on academic authorship, they offer four propositions about authorial newness:

1. Newness is less a property of ideas than a relationship between ideas and communities, and less an individual trait than a regularity of communal life and structure.
2. Authorial contributions are . . . never new in the sense of 'brand new' or 'out of the blue.' They are carefully tied to and shown to grow out of existing knowledge.
3. When authors seek to contribute, they search for ideas that flow from existing knowledge and that promise to extend it. Synthesizing the literature they want a place in, authors lay the ground on which they hope to make their imprint. They manage to be new when the imprint they make fits the community standard, and when they can make it before their competitors have a chance to make theirs.
4. Newness turns on a delicate balance between the inertia of the past and the drive to change it. Contributions that respect the past with too little change become tired and predictable. . . . Conversely, contributions that push change with too little rootedness are likely to remain unclassifiable rather than revolutionary. (pp. 299-300)

Authorship is an emergent contribution to circulating discourses that are connected by fluid networks. Irene Clark (2005) notes that "originality in the academic world evolves from the voices of others" (p. 149).

The challenge for us as teachers is how to create environments or spaces for students that encourage idea production: that is, to create knowledge rather than merely demonstrate and consume knowledge. I argue we need to construct inquiry-based sites, or what Johnson calls "liquid networks," where different ideas collide and jostle and yield new notions and students learn how to enter these swirling spaces. This challenge requires a new theory of rhetorical *inventio*.

Reinventing *Inventio*

Here, I propose a theory of invention that is dynamic, multidirectional, and comprises multi-interactive snippets of processes that vary by the different social spheres the rhetor traverses; the differing social and political positionings allowed by the settings in which the rhetor operates; the differing oral, print, and digital discourses the rhetor engages; and the differing material objects the rhetor collides against; as well, a theory that accommodates the multiplicities of a given rhetor. Such a theory recognizes a fluid network rather than a sovereign writer as the site of creation. Debra Hawhee (2002) in "Kairotic Encounters," offers a view that opens up a space for this perspective. She argues for a concept of subjectivity and invention that she describes as "invention in the middle." For Hawhee, "'invention-in-the-middle' assumes that rhetoric is a performance, a discursive-material-bodily temporal encounter, a force among forces" (p. 24). In her model, the subject is fluid—the outcome rather than the source of the rhetorical situation, fluidly acting in the moment to effect change. In her words, "One invents and is invented, one writes and is written, constitutes and is constituted" (p. 18). Hawhee's theory opens a space in which to reconceive of invention as operating, not from a single sovereign subject, but from the practices in which the rhetoric is formed and circulated in networks. Here, I extend Hawhee's invention in the middle.

I argue that we need a theory that recognizes the fleeting moments of any writer whose very being both writes and is written, who both ventures into the world and is constrained by it, who both investigates the self and is investigated by it, who both engages and is engaged by former discourses, who both connects and is connected with others. We need, as Kelly Pender (2011) points out in arguing to recoup a robust concept of *techne*,[i] to offer

a response to the either/or mentality—*either we control language or we let it control us; either we use language to represent the world or we free it from representation; either we write for the sake of communication or we write for the sake of writing itself.* (p. 152)

Such dichotomous views have "obscured the contradictory nature of writing as a productive art" as a techne (p. 152). That is, these binaries set up complicated problematics.

Of course, the relationship between binaries is richly complex, as Bruno Latour (2000) reminds us. He argues that conceiving of this relationship in simple dialectical terms is far too restrictive, challenging us to

abandon the mad idea that the subject is posed in its opposition to the object, for there are neither subjects nor objects, neither in the beginning—mythical—nor in the end—equally mythical. Circulations, runs, transfers, translations, displacements, crystallizations—there are many motions. (p. 10)

These motions take place in social circulations in which rhetors participate, e.g., social spaces, whether in private, public, or institutional places. Conceiving of rhetors in posthuman terms, Latour (2005) elsewhere points out that "we tend to limit the social to humans and modern societies, forgetting that the domain of social is much more extensive than that" (p. 6). Animals and plants are social, too. We need to refigure the human as *not* central to all else; we need to understand posthumans as in relation to all social entities. Most important are the sets of relations among social entities.

Social Network Theory

Social network theory is a move in this direction, viewing as it does social relationships in terms of nodes and ties. Nodes are the entities within a network, and ties are the all-important relationships or connections among them. Entities may be organizations, businesses, individuals, or other things and beings we don't think of as human. Such a view assumes, as Giles Deleuze and Félix Guattari (2008) argue, "the only way to get outside the dualisms is to be between, to pass between, the intermezzo" (p. 305). Passing in the intermezzo calls for dynamic theories of literacies that "suggest that becoming literate involves negotiating among competing discourses and cultures moment by moment, a perspective that foregrounds material conditions" (Shroeder 2004, p 61). Thus,

...we need a theory that recognizes the fleeting moments of any writer whose very being both writes and is written, who both ventures into the world and is constrained by it, who both investigates the self and is investigated by it, who both engages and is engaged by former discourses, who both connects and is connected with others.

What was once seen as socialization into standard discourses, such as appropriating or being appropriated of Bartholomae's Inventing the University model, is currently understood as approximate performances based on interpretations and perceived expectations, which are conditioned within the multiple contexts, subject positions, and materials conditions surrounding specific literacy events. (Shroeder 2004, p. 61).

In short, writers negotiate multiple, fluid subject positions and identities, multiple genres, multiple rhetorical situations, and multiple audiences as they invent and craft discourse. Students need to learn how to work in a "liquid network," to use Johnson's term, and how to move among nodes and the relations they are forging among nodes to create knowledge. We need to get them to understand invention not as a flash, or as something brand-new and never thought of before, but as reconfiguring relations among the nodes, and writing as contributing to ongoing, fluid conversations.

I'm not recommending a set of static approaches to invention, but rather a vision of creation or invention that is especially robust and that will challenge us to help students create strategies for negotiating these practices. What, now, does a new invention look like—this new *Inventio*? Putting the pieces together, I offer invention as the practice of creating a web or network of situated nodes—embodied practices that create sets of relations among the writer and her world, the writer and her time, the writer's self and others, the writer's self and supracollectives, and the writer's discourses among varying ongoing discourses. We need to get students to understand that discourses swirl around in a three-dimensional space, as the writer moves among the varying nodes and back again, and onward and back, and so forth. The discourse created gets placed within the other discourses that have been created, and is itself not a stable, coherent, static entity. Every time this discourse is picked up from within the stack or clicked on with a digital space, it offers a new reading. Invention then is a force, a moving forward and folding back on itself—a series of 'Circulations, runs, transfers, translations, displacements, crystallizations.'

If we are to teach students not just to "consume knowledge" and "demonstrate knowledge" (those instances where students give answers to questions already known), but rather to "create knowledge" and "make meaning" that will serve them in a variety of academic, public, civic, and private spaces and situations and other places they traverse, then we need a robust theory of invention. One that doesn't see invention as a process that takes place in the beginning of a project, but one that happens throughout in the drafting, circulating, reading, and remixing—one that is never ending. We need to rethink our process-generated collection of invention strategies—brainstorming, free writing and focused free writing, journaling, outlining, for example—that are typically taught to students regardless of the text they are to craft, or their rhetorical situation for the text, or their own writer's stance. I'm not suggesting that these strategies are in themselves necessarily bad strategies; but they all focus inward, and assume a knowledge that is already known. Such strategies encourage consumption and demonstration of knowledge, rather than invention and meaning making

By contrast, we need to teach our students rhetorical theory and praxis, so that they understand the nodes they already traverse, and the relations they build among the nodes. We need to get them to understand that all discourse—oral, written, and digital—works in this way. We then need to teach students how to build relations among all sorts of aspects of the discursive-bodily-material-temporal nodes, in various discourse genres. In the different intersections—where meaning making takes place in the spaces between—students need to learn how to pose lots of questions, as they consider the world, themselves, other people, supracollectives, and other discourses; they need to learn how to consider the relations they are building among the nodes. Students should be taught *how* to pose questions themselves, so that they can create the heuristics that are useful to them as they explore various genres in various social spaces. We need, that is, to help students create a curious mind that is determined to follow through, and we need to provide an environment (whether in class, hybrid, or online) that both encourages and fosters active curiosity.

I offer this model as one way to think about SoTL, teaching, and invention, and I invite others to participate in (re)inventing *inventio*.

Note

[i] Kelly Pender (2011) articulates the multiple definitions of the term *téchne*, classifying them into five composite definitions. "1. *Techne* as a 'how-to' guide or handbook; 2. *Techne* as a rational ability to effect a useful result; 3. *Techne* as a means of inventing new social possibilities; 4. *Techne* as a means of producing resources; 5. *Techne as a non-instrumental mode of bringing forth*" (p. 16). Janet Atwill (1998) and Janet Atwill and Janice Lauer (1995) draw on a concept of *téchne* to argue for rhetoric as a productive, inventional form of knowledge and knowledge making, as opposed to the more common position of rhetoric as hermeneutical form of knowledge and knowledge making.

References

Atwill, J. (1998). *Rhetoric reclaimed: Aristotle and the liberal arts tradition*. Ithaca, NY: Cornell University Press.

Atwill, J. & Lauer, J. (1995). "Refiguring rhetoric as an art: Aristotle's concept of *techne*." In R. J. Gabin (Ed.), *Discourse studies in honor of James L. Kinneavy* (25-40). Potomac, MD: Scripta Humanistica.

Bell, A. (2005). "Bioart in question: Adam Zaretsky talks with Shannon Bell, Sam Bower, Dmitry Bulatov, George Gessert, Kathy High, Ellen K. Levy, Oron Catts & Ionat Zurrand and Jennifer Willet." *CIAC's Electronic Magazine*, 23. Retrieved from http://magazine.ciac.ca/archives/no_23/en/entrevue.htm

Clark, I. (2005). "Entering the conversation: Graduate thesis proposals as genre." *Profession 2005* (141-52). New York: MLA.

Dees, D. M. (2008). A reflection on the scholarship of teaching and learning as democratic practice. *International Journal for the Scholarship of Teaching and Learning*, *2*(2). Retrieved from http://academics.georgiasouthern.edu/ijsotl/v2n2/personal_reflections/PDFs/Reflection_Dees.pdf

Deleuze, G. & Guattari, F. (2008). *A thousand plateaus: Capitalism and Schizophrenia*. London: Continuum.

Haraway, D. J. (1991). *Simians, cyborg and women: The reinvention of nature*. New York: Routledge.

Hawhee, D. (2002). "Kairotic Encounters." In J. M. Atwill, and J. M. Lauer (Eds.), *Perspectives on rhetorical invention* (pp. 16-30). Knoxville: University of Tennessee Press.

Hayles, N. K. (1999). *How we became posthuman: Virtual bodies in cybernetics, literature, and informatics.* Chicago: University of Chicago Press.

Johnson, S. (2010). "Where good ideas come from." TEDTalks. Retrieved from http://www.youtube.com/watch?v=0af00UcTO-c&feature=channel.

Kaufer, D. S., & Geisler, C. (1989). "Novelty in academic writing." *Written Communication* 6, 286-311.

Keller, C. (2004). "Unsituating the subject: 'Locating' composition and ethnography in mobile worlds." In S. G. Brown, and S.I. Dobrin, (Eds.), *Ethnography unbound: From theory shock to critical praxis* (pp. 201-18). Albany: SUNY

Latour, B. (2000). "The Berlin key or how to do words with things." In P. M. Graves-Brown (Ed.), *Matter, materiality, and modern culture* (pp. 20-32). London: Routledge.

Latour, B. (2005). *Reassembling the social: An introduction to actor-network theory*. New York: Oxford University Press.

LeFevre, K. (1987). *Invention as a social act.* Carbondale: Southern Illinois University Press.

Liu, Y. (2002). "Invention and inventiveness: A postmodern redaction." In J.M. Atwill, and J.M. Lauer (Eds.), *Perspectives on rhetorical invention* (pp. 53-63). Knoxville: University of Tennessee Press.

Pender, K. (2011). *Techne from neoclassicism to postmodernism: Understanding writing as a useful, teachable art.* Anderson, SC: Parlor Press.

Prosser, M. (2008). The scholarship of teaching and learning: What is it? A personal view. *International Journal for the Scholarship of Teaching and Learning, 2*(2). Retrieved from http://academics.georgiasouthern.edu/ijsotl/v2n2/invited_essays/PDFs/Invited%20Essay_Prosser.pdf

Shroeder, C. (2004). "The ethnographic experience of postmodern literacies." In S. G. Brown, and S.I. Dobrin, (Eds.), *Ethnography unbound: From theory shock to critical praxis* (pp. 53-72). Albany: SUNY.

Trigwell, K., & Shale, S. (2004). Student learning and the scholarship of university teaching. *Studies in Higher Education, 29(*4), 523-36.

Young, R. & Liu. (1994). "Introduction." *Landmark essays on rhetorical invention in writing* (pp. xi-xxiii). Davis, CA: Hermagoras Press

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Developing Cross-Disciplinary Competencies through College Algebra

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To argue for the importance of an integrative approach to learning in introductory STEM (Science, Technology, Engineering and Mathematics) and other courses, we present a case study of a project incorporating cross-curricular skills in a college algebra course. We analyze student work on the project and responses to surveys, and find the assignment affects positively students' mastery of specific quantitative skills, perceptions of learning, civic awareness, and sense of relevance of mathematical study. We use the analysis to suggest guidelines for designing other activities aiming to teach the whole student in introductory courses.

At LaGuardia Community College, where the large urban student body is composed mostly of first-generation college-goers, the mission is "to educate and graduate one of the most diverse student populations in the country to become critical thinkers and socially responsible citizens who help to shape a rapidly evolving society" (Mission Statement). Faculty members try to make undergraduate education a transformative experience for students, one that develops and enriches the whole person. We constantly seek to infuse our courses with materials that address the mission of the college, and that revolve around its five stated "core competencies": critical literacy, quantitative reasoning, oral communication, research and information literacy, and technological literacy. As mathematics faculty in particular, we strive to enact in our courses the philosophy articulated by *The Carnegie Foundation for the Advancement of Teaching*, that "community college students will have greater motivation to succeed and persist if their mathematics study is engaging, meaningful, relevant and useful" (Quantway).

...Project Quantum Leap (PQL) was launched to help students learn math through compelling socio-cultural contexts.

As one of many LaGuardia initiatives aiming to address the core competencies and heighten student engagement, Project Quantum Leap (PQL) was launched to help students learn math through compelling socio-cultural contexts. An adaptation to introductory-level mathematics courses of *Science Education for New Civic Engagements and Responsibilities (SENCER)* pedagogies nationally recognized and funded by the National Science Foundation, PQL has yielded many faculty-developed projects that integrate online research, critical reading, math exercises, and analysis of quantitative results into student reflections (Betne, 2010).

In this paper, we present a case study of a PQL project focusing on food and commodity prices. We examine its effect on student learning in an introductory college algebra course, viewed as central in any mathematics curriculum, and as the boundary between high school and college (Steen, 2004, p. 38). We analyze students' work and survey responses to see how the project helps reinforce LaGuardia's core competencies, and we use the analysis to suggest guidelines for activities aiming to teach the whole student.

The Scholarship of Teaching and Learning and Learning Goals

This work has been greatly inspired by the Scholarship of Teaching and Learning (SOTL) movement. In *The Advancement of Learning,* Huber and Hutchings (2005) state that the Scholarship of Teaching and Learning should not be viewed as a fix to something that has gone wrong, but as "a set of habits and dispositions for meeting the challenges that we all face as learners" (p. 1), and illustrate transformational "dispositions" with several examples of faculty pedagogies across the curriculum. Professor Curtis Bennett in Mathematics, for example, wanting each of his students to "think like a mathematician," redesigned his course to allow students "to create definitions, to refine mathematical problems, and to become owners and creators of mathematics" (p. 38). Lee Shulman's (2005) concept of "pedagogical signatures" allows for further exploration of the significance and impact of teaching habits. The "signature" lecture format and board full of equations of an engineering course, like the key bedside training component of a nursing course, not only provide insight into how knowledge is analyzed or accepted in a given field, but also enlighten us as to the limitations signature pedagogies can impose on educators from each field (Shulman, 2005). The identification of different habitual transmissions of knowledge, by inviting us to reconsider "knowledge" itself, allows us to reevaluate our role as educators, and to explore alternative, potentially more effective means of generating understanding in an audience of non-specialist students.

Drawing on Boyer's (1990) "scholarship of integration" (p. 18), we aim in this project to adapt the traditional signature pedagogy of mathematics to students' needs; we want to enable students to become "owners and creators" of knowledge that bridges disciplines and competencies. Through the project, students are expected to deduce the meaning of specialized vocabulary from context, compare their understanding to definitions, familiarize themselves with the many factors affecting a civic issue, and explore mathematical concepts through hands-on examination of real-world data. In addition to educating students about political and economic factors responsible for social orders, the project incorporates targeted mathematical learning goals. It guides students to understand and apply the concepts of average rate of change; graph various data; fit them to given models; predict future values using these mathematical models; and use numbers, graphs, and facts to argue a position.

Project Description

The project consists of eight questions (see appendix). In questions 1 and 2, students are asked to research online various definitions and technical terms regarding commodities and trading. Having students find the definitions of various terms aims to reinforce critical literacy as well as research and information literacy, since they are called upon to judge whether the obtained information and sources used are reliable. Questions 3 and 4 test students' understanding of two articles explaining global spikes in the prices of food staples, and prepare them for the in-depth investigation of question 5, which links mathematical concepts to real-world data and the issues tackled in the articles. Students are first asked to determine various rates of change based on graphs of current commodity price fluctuations. To hone their quantitative reasoning and critical thinking skills, they are then required to evaluate the validity of competing claims purportedly based on the given data, and to use their mathematical results to establish and argue their own position.

Whether students take introductory college algebra as their first course in college or after completing developmental mathematics courses, it is crucial that all master ever-more powerful technological tools, and be able to manipulate these to interpret and draw conclusions from factual data. By having students use Excel to graph real data and build predictive models, question 6 aims to build on mathematical understanding while developing technological literacy. Finally,

questions 7 and 8 seek to reinforce critical literacy by having students write an essay using mathematical arguments and various facts stated in the articles. These two final questions also aim at creating engaged and concerned citizens.

Assessment and Survey Results

After approval by LaGuardia's Institutional Review Board, anonymous surveys were distributed to three sections of College Algebra and Trigonometry to complement instructor assessment and provide a fuller picture of student learning. Students used their own words to describe what they learned, the project features they found most or least interesting, how they evaluated the reliability of websites used to research definitions, and how they would modify the project if given the opportunity. In the remaining 7 out of 12 survey questions, students used a scale of 1 to 5 to evaluate changes in their awareness, confidence, and specific abilities before and after completing the project (where 1 meant "no improvement at all" and 5 indicated "very strong improvement").

Clear trends emerge from the data compiled from 55 survey responses. The first, illustrated in Figure 1 below, suggests significant gains in those quantitative reasoning aptitudes specifically targeted by the project. Over half and two-thirds of the respondents, respectively, reported **strong improvement** (4-5) in their abilities to interpret graphical data, and to graph a given function using Excel-- skills that were heavily called on in the project. (The proportions of students reporting **overall improvement** in these aptitudes—ratings of 3 or above—rise to yet more significant 73% and 90%, respectively.) Other skills, such as sketching a function by hand, or communicating with mathematical notations and symbols, were exercised in class lessons, homework, and class discussions of the project, but were not explicitly targeted by the project exercises. While a majority of students noted overall improvement in these areas, only 35% and 20% of respondents, respectively, indicated strong improvement in these two categories.

Figure 1: Student Perceptions of Improvement
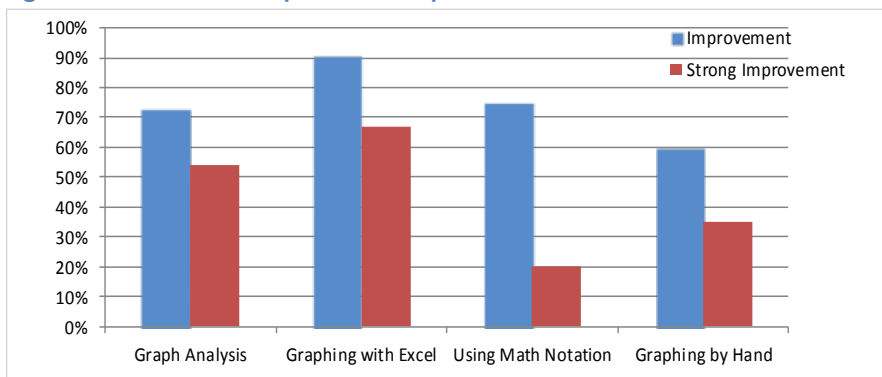
Skills Targeted by Project   **Skills Not Explicitly Targeted by Project**

The survey responses further suggest that linking the practice of quantitative reasoning skills to exploration and research of social issues may raise civic awareness and engagement. While a significant 80% of respondents indicated little to no awareness of factors affecting food prices prior to their work on the project, with 40% reporting "no awareness at all," the overall impact of the project

went beyond raising awareness: 85% of respondents indicated that the learning activity affected their social concerns, and 60% reported they were "strongly affected." The project's influence on student awareness of political and economic issues is further reflected in the free-response summaries of their learning: Indeed, 51 of the 55 respondents stressed learning other content besides quantitative reasoning skills or concepts, mentioning "new words and their meanings"; "how trading works and how it affects the economy"; "what commodities actually are"; that "the US deregulated food commodity trading"; that "there are forces outside of supply and demand that affect prices on the commodities market"; that "corporations can single-handedly affect (*sic*) a spike/rise in a price"; and that "starving in other countries may not be [due] to lack of food [but] rather to an escalation in food prices due to speculation."

Analysis of what students found most interesting in the project reveals a roughly even split between those who preferred the information and analysis provided by the readings, and those who preferred the study and use of online graphs and data to create predictive models in Excel. These results reflect the variety of student interests and learning styles accommodated by the project's integrative approach. The results concerning what students found least interesting also concentrated around two main themes: Almost 60% of students stated that researching and giving definitions was uninteresting, while nearly 40% expressed lack of interest in graph construction. Very few (less than 6%) expressed frustration at having to read or write in a math class.

Instructors were pleased with students' mathematical results: Nearly all students, thanks to project and instructor guidelines, were able to not only compute rates of change—a traditionally challenging concept for this classroom population—but also to correctly use it to predict future prices; and in spite of some students' lack of interest in graphing data, nearly all were also able to fit data to appropriate predictive models. Students also demonstrated good understanding of the two assigned readings through their responses to project questions 3 and 4. However, for all the advantages that instructor assessment and survey responses indicate, the project also reveals some drawbacks. Although question 7 specifically asked students to include data and quantitative analyses to argue their positions, students did not integrate mathematical results or observations in defense of any of their claims. In fact, students' responses were impassioned and tended to forgo argument altogether, as in the following typical example:

> It shocks me how these investors look for anyway to profit even if it's at the expense of others. I think the government need to pay more attention to these speculators because their causing so much economic problems. If the government monitors this then the high increase in commodities can be avoided. I think people should have a say in how food is priced because in the end it's the people who have to buy it. (…) The people to blame are the investors who take advantage of their position and only seek their own selfish desires. Commodities should be regulated since these traders cannot decide on a reasonable price for everyone.

Such writing, impassioned but falling short of argumentative defense, illustrates "the extent to which students' prior understandings of a field situate a person to acquire new knowledge" (Bass, 1999, p. 5). Particular care needs to be taken, through classroom discussions and feedback, to prepare students to transition from their strong positions, and their assumptions about what constitutes reasoned argument, to the use of quantitative and qualitative defenses of a claim, based on data and documented facts.

The impatience that students expressed in the surveys with researching and formulating definitions shed light on another problem that instructors regularly came across in their assessment. Students betrayed uncertainty in their use of

technical terminology and occasionally confused definitions and meanings, such as those of "regulation" and "deregulation". One student argued against the usefulness of formulating definitions for terms, "I found them more interesting and understandable in the article than defining them myself." This discovery of confusion and attendant frustration, however, represents a real teaching opportunity. While the project failed to transmit to students the relevance of definitions, the student's own comment points to the remedy; if challenged as a group to translate their understanding from context to definitions (and only then to compare their definitions to formal ones), students might experience, along with the ambiguity and difficulty of creating and transmitting knowledge, the richness of exploration and discovery their effort provides.

Recommendations

In SOTL, teaching has four defining features: questioning, gathering and exploring evidence, trying out and refining new insights, and going public (Huber & Hutchings, 2005, p. 20-29). The insights gained from analysis of students' work lead us to suggest certain improvements in implementing cross disciplinary projects. As students in introductory courses in all fields struggle to make an argument, we recommend scaffolding and further refining guidelines to argumentative writing tasks (such as question 7). For our purposes, for example, improved guidelines will involve stressing the requirement to incorporate in argument at least two results from previous computations; the inclusion, for comparison, of sample essays illustrating both effective and ineffective argument; and the attachment of a grading rubric clarifying faculty expectations, with point-values assigned to detailed indicators of effective reasoning and communication. Similarly, scaffolding will be built into the assessment by requiring students to revise those weaknesses in argument highlighted by the instructor in the grading rubrics, class discussions, and commented feedback. The importance of feedback and the value of revision, in this integrative approach to instruction, encourages the adoption of Boyer's (1990) "collaborative effort around teaching" (p. 80), and presents the opportunity to build an interdisciplinary network through learning communities or campus-wide, as advocated by Huber and Hutchings (2005, p. 68).

Instructors should also prepare students to research definitions by stressing the link between making sense of specialized vocabulary and mathematical (or other specialized) concepts. In both cases, understanding cannot be reached from a formal statement alone; it implies, and requires, the ability to paraphrase or recast

...it is imperative for educators to help students perceive the relevance of their studies in introductory mathematics and science courses; exploiting the connections between fields and competencies is key to achieving this result.

the formulation, and to apply it in different contexts. As such, "understanding definitions" is a creative act that can directly exercise the core competencies of critical, quantitative, and information literacy. To reinforce the links among these competencies and technological literacy, we further recommend having students refer explicitly to online sources and use technological resources to regularly argue and establish positions and evaluate the validity of claims. In our particular project, this emphasis applies to students' fitting of data to a given model (question 6); for example, they can be asked to find more recent data than that presented in the project tables, and to test whether the validity of the model built from project data still holds. They will also be invited to examine whether their original models are realistic over time, and to consider, for instance, the repercussions of an exponential model.

We were encouraged by the energy students brought to their reflections on the project, the accuracy of their mathematical projections and computations, and

the integrity of their participation in the surveys, and we hope to build on the heightened civic awareness most revealed in their writing. Huber and Hutchings (2005) point out that "education in science, technology, engineering, and mathematics (STEM) has attracted a unique level of national attention… because of these disciplines' centrality to defense, health, the environment, and the economy" (p. 65). Thus, now especially, we feel it is imperative for educators to help students perceive the relevance of their studies in introductory mathematics and science courses; exploiting the connections between fields and competencies is key to achieving this result. Indeed, "teaching is…a dynamic endeavor involving all analogies," as Boyer (1990) notes in *Scholarship Reconsidered*, and at its best, involves "not only transmitting knowledge, but transforming it and extending it as well" (p. 23-24). With self-investment and a sense of progress beyond test-performance, students are able to see themselves as 'transformers and extenders' of knowledge and become more likely to perceive learning and career paths in STEM fields as real opportunities and achievable goals. As one student wrote in a concluding reflection on the project, "I feel like I really learned something, and I cannot wait to share this with everyone".

References

Bass, R. (1999, February). The scholarship of teaching: What's the problem? Inventio: Creative Thinking about Learning and Teaching, 1(1). Retrieved from http://doit.gmu.edu//archives/feb98/randybass.htm

Betne, P. (2010, July 23). Project Quantum Leap and SENCER at LaGuardia Community College. Science Education and Civic Engagement: An International Journal, Summer 2010. Retrieved from http://seceij.net/seceij/summer10/project_quantum.html

Boyer, E. (1990). Scholarship reconsidered. Princeton: The Carnegie Foundation for the Advancement of Teaching

Huber, M., & Hutchings, P. (2005). The advancement of learning. San Francisco: The Carnegie Foundation for the Advancement of Teaching.

Mission Statement. LaGuardia Community College – City University of New York. http://www.lagcc.cuny.edu/About/Mission-Statement/

Quantway. The Carnegie Foundation for the Advancement of Teaching. http://www.carnegiefoundation.org/quantway

Schulman, L. (2005). Signature pedagogies in the professions. Daedalus, 134(3), 52-59.

Steen, L. (2004). Achieving quantitative literacy: An urgent challenge for higher education. Washington, D.C: The Mathematical Association of America.

Appendix

The project is given below. The "Activity Overview" is meant to summarize the project, since it is open to use by all faculty members.

Activity Overview
In this project, students will engage in inquiry-based learning, collecting data about commodities and food commodity trading. They will also read two articles about the practice and effects of speculation on food prices, and do exercises on function-fitting using commodity prices. Three fitting problems are provided (one for linear, one for quadratic, and one for exponential). You will need to spend time in a computer lab to help students with this activity.

- Have students consult the two given websites (http://www.investorwords.com, and http://indexmundi.com/commodities) to learn about what commodities are.
- Before moving on to Reading #1, have students answer questions 1 and 2. Question 2 is a discussion activity that will help to prepare students, in terms of vocabulary and concepts, for the readings and tasks that follow.
- Have students read Reading #1: "People die from hunger while banks make a killing on food" by John Vidal, *The Guardian*. This article can be found at http://www.guardian.co.uk/global-development/2011/jan/23/food-speculation-banks-hunger-poverty. Have students answer question 3 in writing so that you can check their understanding, and see that they can compare and add information to their evolving understanding of the deregulation of food commodities trading after they have done Reading #2.
- Have students read Reading #2: "Rampant Speculation Inflated Food price Bubble" by Stephen Leahy, *IPS News.* The article can be found at http://ipsnews.net/news.asp?idnews=54274
- Have students answer Questions 4 to 7.
- Question 7 will require students to marshal evidence from the two readings and their mathematical results in support of their opinions about the deregulation of food commodities trading.
- Question 8, an ePortfolio reflection, will prompt students to think about their own level of political engagement, their own learning, and the ultimate usefulness of this project.

Materials and Resources
- Students are expected to retrieve information from online sites: http://www.investorwords.com, and http://indexmundi.com/commodities
- Reading #1: Vidal, John. (2011, January 23). *Food speculation: 'People die from hunger while banks make a killing on food.' The Guardian.* Retrieved February 29, 2012 from http://www.guardian.co.uk/global-development/2011/jan/23/food-speculation-banks-hunger-poverty
- Reading #2: Leahy, S. *Rampant Speculation Inflated Food Price Bubble. IPS News.net.* Retrieved February 29, 2012 from http://ipsnews.net/news.asp?idnews=54274

Questions

1) a. Paraphrase the definition of "commodity" as shown at
   http://www.investorwords.com

b. List the various categories of commodities displayed at http://www.indexmundi.com/commodities

2) Pre-Reading Group/Class Discussion
   a. What does "speculation" mean? How is it different from "investment"?

   b. What does "deregulation of global commodity markets" mean? Why do you think the US would deregulate food commodity trading?

   c. What do the following words and phrases mean?
      o staples
      o hoarding
      o subsidise (Br.) (subsidize, Am.)
      o sub-prime mortgage crisis
      o pension fund
      o hedge fund

3) Answer the following questions about Article #1: *Food speculation: People die from hunger while banks make a killing on food*
   a. What is hedging? Give an example.

   b. What is "deregulation of global commodity markets"? Why do you think the US deregulated food commodity trading?

   c. How do experts at the UN explain the rise in food prices?

   d. What theory does the author believe is behind the rise in food prices?

   e. How did the speculation in food prices begin?

   f. Why did the price of chocolate peak recently?

4) Answer the following questions about Article #2: *Rampant Speculation Inflated Food Price Bubble*
   a. What is the meaning of "bubble" in this reading?

   b. The article illustrates "speculation on speculation" by examining how Farmer Brown's wheat futures contract can now be sold and resold, itself becoming a commodity. Can you foresee any potential problem(s) caused by such increasing speculation?

   c. Why did the US deregulate food commodity trading? What was the result?

   d. Why did food commodity speculation become a "hot ticket" in 2008?

   e. After spikes in the price of food in 2008 caused deadly famine and riots around the world, the UN cited rising food prices as a top threat to global security. Why did food prices spike again in 2010?

   f. Why did multinational grain companies in the business of exporting wheat want Russia to *ban* wheat exports in 2010?

g. According to GRAIN research, why weren't wheat exporters penalized for cancelling their export contracts with Egypt, Bangladesh, and other countries?

5) The following three graphs illustrate the 15-year price fluctuations in wheat, natural gas, and poultry, respectively. Use the graphs to answer the questions below:

a. Based on the graphs, which of the three commodities would you say is the most volatile? Which commodity would you say has experienced the greatest *increase in volatility*? Explain.

b. Estimate the price per pound of poultry (rounding to nearest cent) in February of 1996 and 2011, respectively. What was the average yearly rate of change in the price of poultry over this 15-year period? Based on this rate of change, how much will a pound of poultry cost in February 2012?

c. John argues that natural gas prices *should not be subject to regulation because they are relatively stable:* The price per thousand cubic meters only increased from approximately $140 fifteen years ago to $160 today. Compute the corresponding percent increase in price. Does the graph support his claim?

d. Judy argues that natural gas prices are at least as volatile as those of wheat, and that both natural gas and wheat prices *should be subject to regulation*. She says wheat prices went from a low of approximately $160 per metric ton to a high of approximately $440 over the last five years. Compute the corresponding percent increase in price. Does the graph support her claim?

e. Class Discussion: What's your position on the regulation of commodities? Do you agree with John or Judy? Are commodity prices stable or volatile? Should they be monitored and regulated by an independent body? Find information from these graphs or others at http://www.indexmundi.com/commodities to support your point of view. Take notes. You will need these notes again for Exercise 8.

15-Year Price Fluctuation in Wheat
U.S. dollars per metric ton
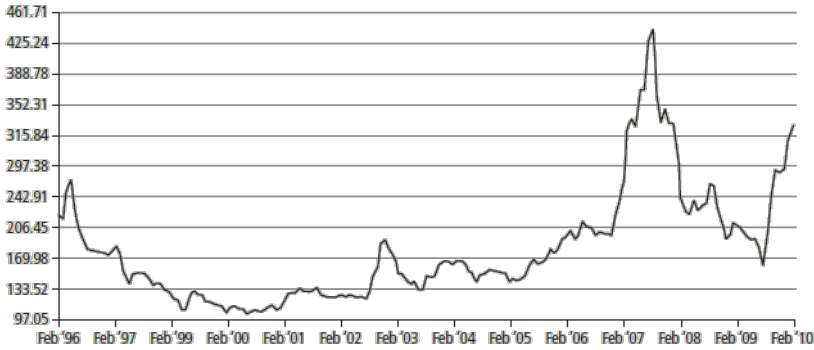
Source: IndexMundi.com. (n.d.) Wheat Daily Price. Retrieved March 2, 2011 from http://www.indexmundi.com/co
mmodities/?commodity=wheat&months=180

15-Year Price Fluctuation in Natural Gas
U.S. dollars per thousand cubic meters of gas
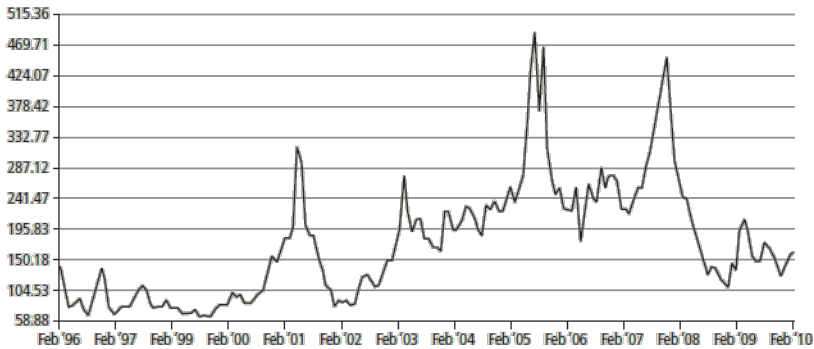
Source: IndexMundi.com. (n.d.) Natural Gas Monthly Price – US Dollars per thousand cubic meters of gas. Retrieved
March 2, 2011 from http://www.indexmundi.com/commodities/?commodity=natural-gas&months=1800

15-Year Price Fluctuation in Poultry
U.S. cents per pound
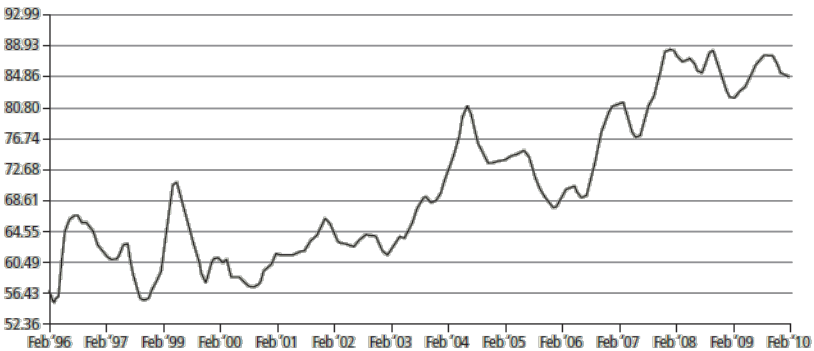
Source: IndexMundi.com. (n.d.) Poultry (chicken) Daily Price. Retrieved March 2, 2011 from
http://www.indexmundi.com/commodities/?commodity=chicken&months=180

6) Exercise with Excel:
    a. Linear Fit
        i. The following table shows the average monthly price of cocoa beans, in U.S. dollars per metric ton, between March 2009 and December 2009.

Average monthly price of cocoa beans
U.S. dollars per metric ton

Mar 2009	2,493.98
Apr 2009	2,541.70
May 2009	2,554.60
Jun 2009	2,699.61
Jul 2009	2,805.48
Aug 2009	2,956.66
Sep 2009	3,149.51
Oct 2009	3,372.50
Nov 2009	3,379.33
Dec 2009	3,517.54

Source: IndexMundi.com. (n.d.) Cocoa Beans Monthly Price – US Dollars per Metric Ton. Retrieved March 2, 2011 from http://www.indexmundi.com/commodities/?commodity=cocoa-beans&months=180

        i. Using Excel and starting with March 2009 as month #0, graph the price of cocoa beans as a function of the number of each month (March 2009 =0, April 2009 =1, etc.)

        ii. Fit the data to a linear function. Write the equation that the data fits to. Find the slope.

        iii. If the trend had continued, what would the price of cocoa beans have been in February 2010?

    b. Quadratic Fit
        i. The following table shows the average monthly price of coconut oil, in U.S. dollars per metric ton, between August 2009 and January 2011.

Average monthly price of coconut oil
U.S. dollars per metric ton

Aug 2009	747.00
Sep 2009	701.00
Oct 2009	706.00
Nov 2009	729.00
Dec 2009	768.00
Jan 2010	784.00
Feb 2010	798.00
Mar 2010	921.00
Apr 2010	939.00
May 2010	932.00
Jun 2010	993.00
Jul 2010	1,031.00
Aug 2010	1,170.00
Sep 2010	1,275.00
Oct 2010	1,412.00
Nov 2010	1,521.30
Dec 2010	1,715.00
Jan 2011	2,063.00

Source: IndexMundi.com. (n.d.) Coconut Oil Monthly Price – US Dollars per Metric Ton. Retrieved March 2, 2011 from http://www.indexmundi.com/commodities/?commodity=coconut-oil&months=180

    i.   Using Excel and starting with August 2009 as month #0, graph the price of coconut oil as a function of the number of each month (August 2009=0, September 2009=1, etc.)

    ii.   Fit the data to a quadratic function (on Excel, use polynomial of order 2). Write the resulting equation.

    iii.   If the trend had continued, what would the price of coconut oil have been in July 2011?

c.   Exponential Fit
    i.   Commodities are traded daily, their prices changing even by milliseconds—just like the prices of stocks in the stock market. Commodities fall into several categories: energy, beverages, cereals, fruits, meat, sugar, vegetable oils, etc... Commodities include many food categories, prompting debate as to whether the prices of commodities should be allowed to fluctuate without control. When the prices of such commodities as wheat or sugar increase dramatically, many in developing countries are left without access to food. The following table shows the average monthly price of cocoa beans, in U.S. dollars per metric ton, between June 2001 and October 2002.

Average monthly price of cocoa beans
U.S. dollars per metric ton

Jun 2001	973.29
Jul 2001	965.32
Aug 2001	1,032.48
Sep 2001	1,026.20
Oct 2001	1,084.86
Nov 2001	1,231.55
Dec 2001	1,337.43
Jan 2002	1,385.93
Feb 2002	1,490.39
Mar 2002	1,592.03
Apr 2002	1,568.15
May 2002	1,604.70
Jun 2002	1,656.46
Jul 2002	1,872.00
Aug 2002	1,959.27
Sep 2002	2,167.41
Oct 2002	2,201.50

Source: IndexMundi.com. (n.d.) Cocoa Beans Monthly Price – US Dollars per Metric Ton. Retrieved March 2, 2011 from http://www.indexmundi.com/commodities/?commodity=cocoa-beans&months=180

    a.   Using Excel and starting with June 2001 as month #0, graph the price of cocoa beans as a function of the number of each month (June 2001 =0, July 2001 =1, etc.)

    b.   Fit the data to an exponential function. Write the resulting equation.

    c.   If the trend had continued, what would the price of cocoa beans have been in February 2003?

7) Writing Task:
    a.   This project has shown you the results of the deregulation of food commodities trading. Do you think the trading of food commodities should be monitored and regulated by an independent agency, or do you think deregulation is preferable? Write an essay expressing your opinion. To strengthen your argument, refer to the ideas exchanged during the class discussion (see Question 5e), to the readings, and to the graphs in Exercise 4 or other graphs at

. Support your point of
view with specific details.

8) ePortfolio Reflection (optional)
   a. Has this activity affected your social concerns, political awareness
      or engagement in any way? If so, how? Will your own behavior be
      affected by this class activity? If so, how?

   b. Before you graphed the tabled data in questions 6 and 7, what
      would you have predicted as future prices of coconut oil and cocoa
      beans?

   c. What do you see in the graphs that you didn't see in the tabled
      data in questions 6 and 7?

   d. Why do you suppose this project asked you to identify equations
      of graphs? Why is it useful to recognize equations from a given
      graph?

   e. Why might it be useful to do the reverse—to be able to graph a
      given equation?

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The Future of Learning and Training in Augmented Reality

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Students acquire knowledge and skills through different modes of instruction that include classroom lectures with textbooks, computers, and the like. The availability and choice of learning innovation depends on the individual's access to technologies and on the infrastructure environment of the surrounding community. In this rapidly changing society, information needs to be adopted and applied at the right time and right place to maintain efficiency in all settings. Augmented reality is one technology that dramatically shifts the timing and location of learning. This paper describes augmented reality, how it applies to learning, and its potential impact on future education.

The General Meaning of AR

Augmented reality (AR) is a technology that allows computer-generated virtual imagery information to be overlaid onto a live direct or indirect real-world environment in real-time (Azuma, 1997; Zhou, Duh, & Billinghurst, 2008). AR differs from virtual reality (VR) in that VR users experience a computer-generated virtual environment, whereas in AR, the environment is real, but extended with information and imagery from the system. In other words, AR bridges the gap between the real and the virtual in a seamless way (Chang, Morreale, & Medicherla, 2010). To better understand AR, two real-world examples can be taken from televised sporting events to show the basic concept of adding computer-assisted contextual layers of information over the real world, creating a reality that is enhanced or augmented. The first example is the yellow line drawn on the field of an American football game to add virtual information over the real game and show TV viewers a "magic line" that players must reach for the first down. The second example is from car racing, where an annotation provides viewers with additional information on the speed of a competing car.

The Origin of AR in Learning and Training

According to Johnson, Levine, Smith, and Stone (2010), the history of AR goes back to the 1960s, when the first system was used for both augmented and virtual reality. An optical see-through, head-mounted display was tracked by either a mechanical or an ultrasonic tracker. Due to the limited processing power of computers at that time, only very simple wire frame drawings could be displayed in real time (Sutherland, 1968). Since then, augmented reality has been put to use by a number of major companies for visualization, training, and other purposes. The term 'augmented reality' is attributed to former Boeing researcher Tom Caudell, who is believed to have coined the term in 1990.

Marker- and Markerless-based AR

According to Johnson et al. (2010), augmented reality systems can either be marker-based or markerless-based. Marker-based applications comprise three basic components that include a booklet for offering marker information, a gripper for getting information from the booklet and converting it to another type of data, and a cube for augmenting information into 3D-rendered information on a screen. On the other hand, markerless-based applications need a tracking system that involves a global positioning system (GPS), a compass, and an image recognition device instead of the three elements of marker-based systems. Markerless

applications have wider applicability because they function anywhere without the need for special labeling or supplemental reference points.

Adopting AR in Learning and Training

According to Chang et al. (2010), several researchers have suggested that students and trainees can strengthen their motivation for learning and enhance their educational realism-based practices with virtual and augmented reality. In spite of a great amount of research during the last two decades, adopting AR in learning and training is still quite challenging because of issues with its integration with traditional learning methods, costs for the development and maintenance of the AR system, and general resistance to new technologies. Now, however, AR promises to attract and inspire learners with the exploration and control of materials from diverse perspectives that have not been taken into consideration in real life; AR in education and training is thus believed to have a more streamlined approach with wider user adoption than ever before, due to the improvements in computer and information technology. Kerawalla, Luckin, Seljeflot, and Woolard (2006) stated that even though many AR applications have been developed for educational and training purposes since the advent of AR in the late 1960s, AR's potential and pragmatic employment has just begun to be explored and utilized in real life. He emphasized that AR has the potential to further engage and motivate learners in discovering resources and applying them to the real world from a variety of diverse perspectives that have never been implemented in the real world.

> **...AR has the potential to further engage and motivate learners in discovering resources and applying them to the real world from a variety of diverse perspectives that have never been implemented in the real world.**

How AR Applies to Learning and Training

Johnson et al. (2010) stated that "AR has strong potential to provide both powerful contextual, on-site learning experiences and serendipitous exploration and discovery of the connected nature of information in the real world" (p. 21). AR has been experimentally applied to both school and business environments, although not as much as classic methods of learning and training during the last two decades. In addition, now that the technologies that make augmented reality possible are much more powerful than ever before and compact enough to deliver AR experiences to not only corporate settings but also academic venues through personal computers and mobile devices, several educational approaches with AR technology are more feasible. Also, wireless mobile devices, such as smart phones, tablet PCs, and other electronic innovations, are increasingly ushering in this technology, AR, into the mobile space where the AR applications offer a great deal of promise, especially in learning and training.

AR in School

Professionals and researchers have striven to apply AR to classroom-based learning in subjects like chemistry, mathematics, biology, physics, astronomy, and other K-12 education or higher, and to adopt it into augmented books and student guides. However, Shelton (2002) estimated that AR has not been much adopted into academic settings due to insufficient funding by the government and lack of awareness regarding the needs for AR in academic settings.

AR in Business

In corporate venues, AR is a collaborative, skill-learning, explainable, and guidable tool for workers, managers, and customers. Additionally, businesses have better environments than those of educational settings for maintaining the costs and support of AR applications. Many corporations are interested in employing AR for the design and the recognition of their products' physical parts. According to the evaluation by Shelton (2002), for example, enterprises can not only imagine designing a car in 3D, in which they are able make immediate changes when needed, but can also create virtual comments explaining to the technicians what needs to be fixed.

The Current Position of AR in Learning and Training

During the last few decades, many professionals and researchers have been developing pragmatic theories and applications for the adoption of AR into both academic and corporate settings. By virtue of those studies, innovations of AR have been developed and are being used to enhance the learning and training efficiency of students and employees. In addition, a great number of studies are being conducted to improve the compatibility and applicability of AR in real life. However, according to Shelton and Hedley (2004), many questions still linger about its use in education and training, including issues of cost effectiveness, of the efficiency of AR instructional systems as compared with conventional methods, and the like.

Augmented Astronomy

In an astronomy class, students learn about the relationship between the earth and the sun. For the sake of students' understanding, educators may employ AR technology with 3D-rendered earth and sun shapes.

Shelton's (2004) study described the following:

> The virtual sun and earth are manipulated on a small hand-held platform that changes its orientation in coordination with the viewing perspective of the student. The student controls the angle of viewing in order to understand how unseen elements work in conjunction with those that were previously seen (p. 324).
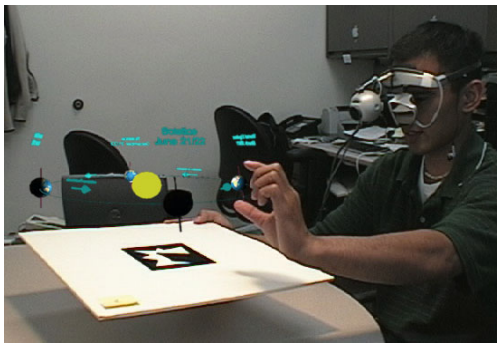
Figure 1. A view of a student interacting with real objects (foam core card, table, wall) and artificial objects (Sun, Earth, annotations) through the augmented reality interface. This view is that seen through the lens of an HMD (Shelton, 2004).

As another example of AR's use in astronomy, Johnson et al. (2010) described Google's SkyMap as an application using AR technology. SkyMap overlays information about the stars and the constellations as users browse the sky with the see-through view from the camera on their smart phones (p. 23).

Figure 2. Google SkyMap (Retrieved from http://www.youtube.com/watch?v=p6znyx0gjb4).

Augmented Chemistry

Augmented chemistry is an interactive, educational workbench that can show students how and what an atom or a molecule consists of via AR. Three elements, a booklet, a gripper, and a cube, are required to implement this task with both hands. Fjeld and Voegtli (2002) said that the booklet displays components by a printed picture and a name. One hand browses the booklet with a gripper which has a button used to connect an atom to the molecular model. According to Fjeld and Voegtli (2002), users first bring the gripper around the element in the booklet and get information about the element by clicking the button of the gripper. Second, users move the gripper next to a cube, called a platform, which holds a molecule. Subsequently, by rotating a cube operated by the other hand, users can determine where and how the element connects to the molecule.
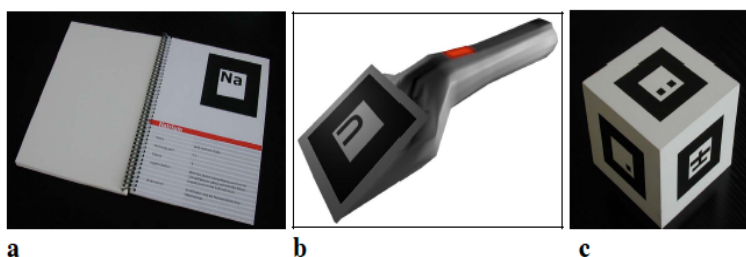
Figure 3. a) Booklet offering one element per page–here Na, sodium. Each element is represented by a pattern. b) Gripper with a button (red) and a pattern. c) Cube with one distinct pattern for each surface (Fjeld & Voegtli, 2002).

Figure 4. System set-up with a typical situation of use: charging the Gripper with an element from the booklet (left). The platform (right) holds an unsaturated atom, with which a binding with the charged atom may be triggered (Fjeld & Voegtli, 2002).

Augmented biology

AR can be used to study the anatomy and structure of the body in biology. The Specialist Schools and Academies Trust (SSAT) demonstrated that teachers could use AR technology to show what human organs consist of and what they look like by watching 3D computer-generated models in the real classrooms. Moreover, students may be able to study human organs independently with their camera-embedded laptops and AR markers that connect PCs with AR information about biological structures of the human body. (Retrieved from https://www.ssatrust.org.uk/achievement/future/Pages/AugmentedReality.aspx)
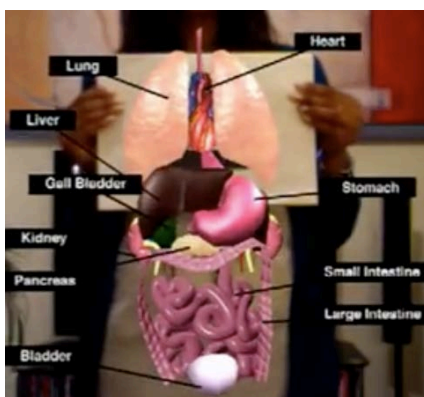
Figure 5. A model of human internal organs with AR technology that can be used in biology class (Retrieved from http://www.learner.org).

Mathematics and Geometry Education

With AR technology, teachers and students can collaborate by interacting with each other for some issues on shapes or arrangements. According to Chang et al. (2010), an AR application called Construct3D specifically designed for mathematics and geometry education with 3D geometric construction models (as

cited in Kaufmann, 2006; Kaufmann & Schmalstieg, 2002; Kaufmann, Schmalstieg, & Wagner, 2000). This application allows multiple users such as teachers and students to share a virtual space collaboratively to construct geometric shapes by wearing head-mounted displays that enable users to overlay computer-generated images onto the real world.

Figure 6. Students working with construct3D inscribe a sphere in a cone (Kaufmann & Schmalstieg, 2002).

Furthermore, Kaufmann (2009) determined that AR can be used in dynamic differential geometry education in a wide range of ways. For instance, using the AR application, teachers and students can intuitively explore properties of interesting curves, surfaces, and other geometric shapes.

AR in K-12 Education

Freitas and Campos (2008) developed the System of Augmented Reality for Teaching (SMART), an educational system that uses AR technology for teaching 2nd grade-level concepts, such as the various means of transportation and types of animals. This system superimposes three-dimensional models and prototypes, such as a car, truck, and airplane, on the real-time video feed shown to the whole class. Because most children spend a great deal of time playing digital games, game-based instruction is one way to engage children in learning. Freitas and Campos (2008) performed several experiments with 54 students in three different schools in Portugal. The results of a number of studies by Freitas and Campos (2008) indicated that SMART helps increase motivation among students, and that it has a positive impact on their learning experiences, especially among those who are less academically successful.

How AR is Applied to Business Training

Cultural Heritage

From cultural and traditional perspectives, AR can be used as an influentially interactive tool in cultural heritage sites by showing visitors the original images of the sites and informing travelers of historical episodes of the places with 3D effects. Vlahakis et al. (2002) demonstrated in their research of Augmented Reality-based Cultural Heritage On-site Guide (ARCHEOGUIDE) that the AR tour assistant system provides on-site help and augmented-reality reconstructions of ancient ruins, based on the user's position and orientation in the cultural site, and real-time image rendering. ARCHEOGUIDE is based on computer and mobile technologies, including AR, 3D-visualization, mobile computing, and multi-modal interaction techniques. The equipment consists of a head-mounted display (HMD),

an earphone, and a mobile computing unit. But other versions include a PDA or a lightweight portable computer with a simple input device. With these AR devices, individuals can visit historic sites and tour around, comparing an original image to an augmented modeling as well as viewing three-dimensional models of what the construction was and looked like in the past, and who the person was, even though the original edifice no longer exists or is in a state of ruin.

a.   b.

Figure 7. a) The original image of a heritage site b) An image of AR modeling. Examples of ARCHEOGUIDE's original image and AR modeling (Vlahakis et al., 2002).

Industrial Maintenance

In the field of industrial maintenance, AR offers very practical assistance to staff in their highly demanding technical work. Henderson and Feiner (2009) observed that corporate sectors such as military, manufacturing, and other industries are the applied fields where AR thrives in competition and expands the scope of the technology itself. According to studies (Henderson & Feiner, 2009) that concentrate on the military sector, with the assistance of AR technology, military mechanics in particular can conduct their routine maintenance tasks in a bulletproof vehicle more safely and conveniently. To do this requires several devices and apparatuses such as a tracked head-worn display to augment a mechanic's natural view with text, labels, arrows, and animated sequences designed to facilitate task comprehension, location, and execution.

a	b

Figure 8. a) A mechanic wearing a tracked head-worn display performs a maintenance task inside an LAV-25A1 armored personnel carrier. b) The AR condition in the study: A view through the head-worn display captured in a similar domain depicts information provided using augmented reality to assist the mechanic (Henderson & Feiner, 2009).

The same concept of using AR technology in military maintenance can be applied to manufacturing industries. A great deal of research in the field of augmented reality has been paving the way for companies to employ AR technology in their own sectors. For instance, BMW, one of the famous German motor vehicle companies, has been interested in utilizing AR techniques in their car maintenance and repair divisions and has developed an AR maintenance and repair system and data glasses (Retrieved from http://www.bmw.com/com/en/owners/service/augmented_reality_introduction_1.html). And they are just about to use contextually and interactively advanced AR technology as a means to support their service staff in their complex and technical work environments. According to BMW, technicians, wearing special data goggles and connecting to their computer servers, have all the information at their disposal, precisely where they need it: in the workplace, at the vehicle. By wearing AR glasses, for example, mechanics receive additional three-dimensional information on the part they are repairing to help them in diagnosing and solving the fault. Apart from the real environment, they see animated components about the part that needs replacing and the tools to be used, while an audio instruction talks to mechanics about each of the working steps through headphones integrated inside the goggles.
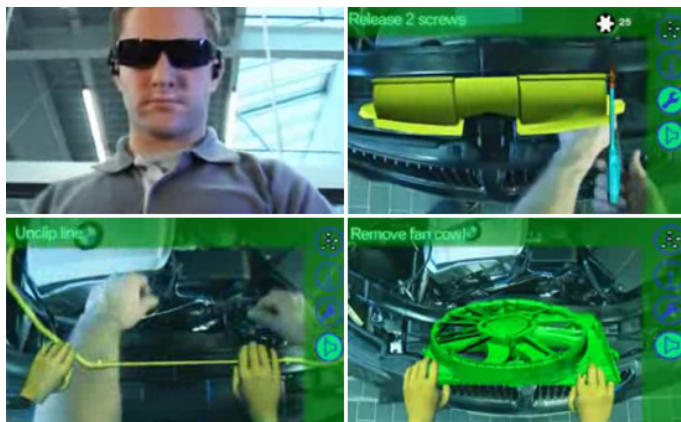
Figure 9. BMW's AR goggles and system, which assist mechanics in performing maintenance on the company's cars (BMW, 2010).

Conclusion

The future of augmented reality as a visualization technology looks bright; this is evident from the interest generated in business and industrial circles as well as discussed in popular periodicals and research papers in the learning and training fields. Many questions still linger in terms of cost-effectiveness when compared to traditional methods, particularly given the investments needed in research and design. However, there is much optimism about AR's role in learning and training for the future. New technologies and information communications are powerful and compact enough to deliver AR experiences via personal computers and mobile devices; they are also sufficiently well developed and sophisticated to combine real world with augmented information in interactively seamless ways.

> **AR not only has the power to engage a learner in a variety of interactive ways never possible before — it can also provide each individual with their own unique discovery path with rich content from computer-generated, three-dimensional environments and models.**

The Future of Learning and Training with AR

Several cutting-edge AR applications to date have been mostly developed for location-based information, social networking services, and entertainment. New AR tools for other purposes such as learning and training, however, will continue to be developed as the technology evolves and becomes more advanced than ever. A considerable number of professionals and researchers from the field of learning and training science predict that simple AR applications in education will be realized within a few years.

Interactive Education

It is highly likely that AR can and will make educational environments more productive, pleasurable, and interactive than ever before. AR not only has the power to engage a learner in a variety of interactive ways never possible before --

it can also provide each individual with their own unique discovery path with rich content from computer-generated, three-dimensional environments and models.

Simplicity

As shown in a great deal of previous research and professional opinion, AR could probably be focused on simplicity and ease of providing learning and training experiences, so that students and trainees can accept knowledge and skills with 3D simulations generated by computers and other electronic devices. In addition, related industries and technologies (such as computer and mobile industries, information and communication technologies, and Internet network infrastructures, including both wired and wireless services) might enable AR in learning and training to be much more straightforward and succinct to approach and utilize than ever before.

Contextual Information

In the view of many professionals and experts in the field of educational AR, it is possible that AR can improve the extent and quality of information by making learning and training environments, i.e., schools and businesses, more educational, productive, and contextual. In this perspective, there seem to be many contextual elements that could possibly be embedded in educational AR applications; such elements could enhance the quality of learning and training by producing and delivering rich, constructive, and gainful content. For instance, Geo tag information for historical and cultural heritages could be connected, and annotation regarding complex physical objects and artifacts could readily be added to AR tools in both business and school venues.

Efficiency and Effectiveness

AR has the potential to promote efficiency of learning and training in academic and corporate surroundings by providing information at the right time and right place and offering rich content with computer-generated 3D imagery. AR may appeal to constructivist notions of education, where students take control of their own learning, and could provide opportunities for more authentic learning and training styles. Besides, there are no real consequences in terms of dangerous and hazardous work environments if mistakes are made during skills training. As the results of several studies have shown, AR systems can provide motivating, entertaining, and engaging environments conducive to learning. In addition, AR applications in educational settings are attractive, stimulating, and exciting for students and provide cost-effective support for the users.

Constraints of AR in Teaching and Training

Despite the actual and potential advantages of using AR in teaching and training, there are a few constraints on employing AR for educational purposes. People can question the use of AR in learning and training in light of the efficiency between AR system investment and the significance of problems in both academic and corporate settings. In addition, companies or schools may have suspicions about the effectiveness of AR technology compared with traditional methods.

References

Augmented reality. (n. d.). Retrieved from https://www.ssatrust.org.uk/achievement/future/pages/AugmentedReality.aspx

Azuma, R. T. (1997). A survey of augmented reality. *Presence: Teleoperators and Virtual Environments 6*(4) (August 1997), 355-385. Cambridge, MA: The MIT Press.

Billinghurst, M., Kato, H., & Poupyrev, I. (2001). The magic book--Moving seamlessly between reality and virtuality. *IEEE Computers, Graphics and Applications, 21*(3), 2-4.

Billinghurst, M. (2002). Augmented reality in education. *New Horizons for Learning.* Retrieved from http://www.newhorizons.org/strategies/technology/billinghurst.htm

Chae, C., & Ko, K. (2008). Introduction of physics simulation in augmented reality. *ISUVR 2008 International Symposium on Ubiquitous Virtual Reality*, 37-40.

Chang, G., Morreale, P., & Medicherla, P. (2010). Applications of augmented reality systems in education. In D. Gibson & B. Dodge (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2010,* 1380-1385. Chesapeake, VA: AACE.

Duarte, M., Cardoso, A., & Lamounier Jr., E. (2005). Using augmented reality for teaching physics. *WRA'2005 – II Workshop on Augmented Reality*, 1-4.

Dünser, A., Steinbügl, K., Kaufmann, H., & Glück, J. (2006). Virtual and augmented reality as spatial ability training tools. *Proceedings of the 7th ACM SIGCHI New Zealand chapter's international conference on Computer-human interaction: design centered HCI*, 125-132. Christchurch, New Zealand.

Fjeld, M., & Voegtli, B. M. (2002). Augmented chemistry: an interactive educational workbench. *Proceedings of the international symposium on mixed and augmented reality (ISMAR '02)*. Damstadt, Germany.

Freitas, R., & Campos, P. (2008). SMART: a System of augmented reality for teaching 2nd grade students. *Proceedings of the 22nd British Computer Society Conference on Human-Computer Interaction (HCI 2008)*, 27-30. Liverpool John Moores University, UK.

Henderson, J., & Feiner, S. (2009). Evaluating the benefits of augmented reality for task localization in maintenance of an armored personnel carrier turret. *Proc. Int. Symp. on Mixed and Augmented Reality (ISMAR '09)*, 2009, 135-144.

Johnson, L., Levine, A., Smith, R., & Stone, S. (2010). Simple augmented reality. *The 2010 Horizon Report,* 21-24. Austin, TX: The New Media Consortium.

Kaufmann, H. (2009). Dynamic differential geometry in education. *Journal for Geometry and Graphics, 13*(2), 131-144.

Kaufmann, H., & Dünser, A. (2007). Summary of usability evaluations of an educational augmented reality application. *Second International Conference, ICVR 2007.* Beijing, China.

Kerawalla, L., Luckin, R., Seljeflot, S., & Woolard, A. (2006). Making it real: Exploring the potential of augmented reality for teaching primary school science. *Virtual Reality , 10*(3-4), 163-174. London, United Kingdom: Springer-Verlag London Ltd.

Kondo, T. (2006), Augmented learning environment using mixed reality technology, Proc. E-Learn, 83-88.

Liarokapis, F., Mourkoussis, N., White, M., Darcy, J., Sifniotis, M., Petridis, P., Lister, P. (2004). Web3D and augmented reality to support engineering education. *World Transactions on Engineering and Technology Education, 2004 UICEE Vol. 3. No. 1.* Melbourne, Australia.

Schrier, K. L. (2005). Revolutionizing history education: using augmented reality games to teach histories. Master Thesis, Massachusetts Institute of Technology, Cambridge, MA.

Shelton, B. E. (2002). Augmented reality and education: Current projects and the potential for classroom learning. *New Horizons for Learning.* Retrieved from http://www.newhorizons.org/strategies/technology/shelton.htm

Shelton, B. E., & Hedley, N. R. (2002). Using augmented reality for teaching Earth-Sun relationships to undergraduate geography students. *The First IEEE International Augmented Reality Toolkit Workshop.* Damstadt, Germany.

Shelton, B. E., & Hedley, N. R. (2004). Exploring a cognitive basis for learning spatial relationships with augmented reality. Technology, Instruction, Cognition and Learning, *1*(4), 323-357. Philadelphia, PA: Old City Publishing, Inc.

Sutherland, I. (1968). A head-mounted three-dimensional display. *Proceedings of Fall Joint Computer Conference, 1968*, 757-764.

Vlahakis, V., Ioannidis, N., Karigiannis, J., Tsotros, M., Gounaris, M., Almeida, L., .Christou, I. (2002). ARCHEOGUIDE: First results of an augmented reality, mobile computing system in cultural heritage sites. *Computer Graphics and Applications, IEEE,* 52-60.

Wichert, R. (2002). A mobile augmented reality environment for collaborative learning and training. In M. Driscoll & T. Reeves (Eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2002*, 2386-2389. Chesapeake, VA: AACE.

Zhou, F., Duh, H. B. L., & Billinghurst, M. (2008). Trends in augmented reality tracking, interaction and display: A review of ten years of ISMAR. *IEEE International Symposium on Mixed and Augmented Reality*, 15-18. Cambridge, UK.

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Benefits of Collaborative Finance Research in Business Schools

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Collaboration in business research provides outcomes and results that are more efficient than those due to individual efforts. The integration of diverse environments and disciplines often generates creative ideas. Collaboration increases the quality of research and effectiveness of discoveries, and promotes the dissemination of knowledge. Cases of collaborative finance research in the business schools are illustrated in this study. The findings include many significant benefits in knowledge stimulation, education advancement, community connections, and other rewarding results. Benefits of collaborative research outweigh the challenges and contribute to faculty development, student education, and advancements in the field of business.

Introduction

"Although business students account for approximately 22 percent of undergraduate degrees in the U.S., business is one discipline that has been largely absent from the discussion about undergraduate research" (Bartkus 2010, p.5). Professor Bartkus has introduced the Research Group model to encourage greater involvement of faculty and students. Since then, the Research Group in the Jon M. Huntsman School of Business at Utah State University has continued to evolve and provide benefits to both students and faculty members.

Business research requires support in many forms, i.e. expertise in the disciplines, data resources, the collection and analysis of data, documentation, and review process. When compared to individual efforts, collaboration provides more efficient outcomes and results. Creative ideas stem from the integration of diverse environments and disciplines. Collaborative research efforts can also reduce the risk of there being misjudgments, adverse outcomes, unnecessary wastes, and worn-out ideas. Collaboration increases the quality of research and effectiveness of discoveries, and promotes the dissemination of knowledge.

Academic and research collaboration has the advantages of creating a new type of working culture that supports teamwork and partnerships, and encourages innovations and advancement of knowledge.

Collaborative research activities are essential to the professional development of faculty and the education of students in the business area. Nevertheless, the resources and culture that support scholarship vary greatly from school to school. Faculty and students now have higher and more noticeable expectations of engaging in such activities. The demand for sharing solutions to challenges, identifying opportunities, and strengthening the scholarly environment is growing significantly in many schools of business. Such research activities depend on there being institutional support, available funds, and eligible expertise. In addition, collaborative research can assist faculty development and fulfill their training requirements. A solid research-to-education program would emerge, implement, and evaluate creative and innovative educational materials for the advancement in business areas.

Review of Collaborative Business Research

A primary purpose of the early research collaboration in many U.S. universities was to respond to the demand from the local economies. Many of such

research collaborations were initiated before World War II in the area of engineering, i.e., "start-up companies based on university research, university-industry-government research centers, faculty consulting, and licensing of university-generated inventions" (National Academy of Sciences, 1999, p.6). Later, the Bayh-Dole Act or the Patent and Trademark Laws Amendments of 1980 (PL 96-517) enacted and abridged the federal policy on patenting and licensing of the publicly funded research by nonprofit institutions.

Although business schools generally include a three-fold mission on education, research, and service, some institutions have a primarily educational focus and conduct little research. Collaboration in these cases usually refers to the relationship between collaborators who are involved with the project as coauthors of the resulting publications. They attend meetings, participate in conference calls, and are intensively involved in two-way collegial communication with other collaborators. Fishbaugh (1997) has defined this collaboration as a formal body established by two or more autonomous partners, none of whom is under contract to another but whose aim is to attain substantive or symbolic goals that no partner could achieve independently.

Academic and research collaboration has the advantages of creating a new type of working culture that supports teamwork and partnerships, and encourages innovations and advancement of knowledge. Partnerships usually include:

> Students, faculty, and community members who collaboratively engage in research with the purpose of solving various pressing community problems or reflecting some social changes. Participants are those who involved in educating themselves for social change or may be used by academics in conjunction with key social institutions (Strand et. al., 2003, p.3).

In terms of personal growth, Lopatto (2006) has pointed out that the participation in undergraduate research contributes to personal growth in students' self-confidence, tolerance for obstacles, interest in their discipline, and sense of accomplishment.

Katz and Martin (1995) explained in their paper about why collaboration is very difficult to define:

> Partly, this is because the notion of a research 'collaboration' is largely a matter of social convention among scientists. Mostly, there was little consensus on where other as well as less formal links between scientists 'end' and collaboration 'begins'. What some might deem collaboration, others may merely regard as a loose grouping or a set of informal links (p.26).

They concluded that collaboration constituted varies across disciplines, schools, industries, and regions, and that it probably changes over a period of time.

Subsequently, the study by Loan-Clarke and Preston (2002) showed collaboration between a Business School and a National Health Service Trust in the UK. They indicated various tensions exist, including "theory versus practice; generalizability versus specificity of knowledge; research rigor versus research relevance; long(er) versus short timescales of work; 'outsider' and 'insider' perspectives" (p.169). They suggested that section pressures could lead to differing priorities for the two institutions involved in the collaboration.

Furthermore, Adams et al. (2006) emphasized that "interdisciplinary research would better reflect the realities of modern businesses, where people from different specialties collaborate with each other, rather than compete" (p.32). They emphasized that crossing disciplinary boundaries for research projects were not to the benefit of academic journals only. It also made professors more valuable to their schools, and helped them provide a richer and more important interdisciplinary approach to research. It would "provide more creative, thorough, and readily applicable solutions for the increasingly complex problems in real-world business" (p.34).

More recently, Bartkus, Mills, and Olsen (2010) have proposed the Research Group framework as an approach to help systemize the process and

thereby facilitate higher quality undergraduate research experiences for students. They motivated their students to have their research presented at such undergraduate research venues as Research Day at the State Capital and the National Conference on Undergraduate Research. The papers on whose research many students had collaborated with faculty had led to publications in scholarly journals and conference proceedings. Others had presented their research reports to the collaborative companies.

Influences of Collaborative Business Research

For researchers, the major benefit of working together is in achieving the common goal of producing new systematic knowledge. Generally, if researchers collaborate to advance a specific area of knowledge, they begin with exchanging ideas on hypotheses, experiments, measurements, and documentation of the discovered results. Further, they develop theoretical models and perform the valid testing procedures. Members of a research group will not only communicate among themselves but will also seek advice and help from others to achieve their goal.

One important factor in collaboration is the mounting costs of research and the shrinking state budget for higher education. In many areas, costs have increased substantially merely for an introduction of basic research. As a result, it has often become impossible for funding agencies to provide the necessary funds to all the research groups working in an area. Resources have had to be pooled at different levels, such as district, regional, national, or even global. Consequently, many researchers have tried to reduce the constantly rising costs by collaborating more closely.

The breakthrough of advanced communication in Internet technology has made collaboration among researchers easier than ever. Furthermore, the development of such a technology has often greatly reduced the time needed to travel or to exchange the ideas. Subsequently, informal links between institutions and networks have become very common for collaborating researchers in recent years.

Another aspect of collaboration is the growing need for specialization within certain areas that require complex research procedures. In order to carry out research, one may need to bring together experts in such tasks as gathering and analyzing data, relating the results to theory, writing up the results, presenting the findings, applying research grants, liaising with the management, managing the collaboration, and adding other administrative responsibilities. Therefore, a team or collaborative effort is required to accomplish or resolve the complex tasks and problems in business research nowadays.

Cases of Collaborative Business Research

1. Collaboration between Faculty and Student

The first such case involved collaboration between faculty and student in the University's Honor Program. The university degree with honors program features faculty highly motivated to work with academically exceptional students. The focus of the program during the final two academic years allows students to engage in a self-designed exploration of a topic about which the student feels passionately. Students interact with a faculty mentor who guides their exploration of the research subject. Honors Program students receive one-on-one attention designed to help them realize goals that include contributions to local and global communities, internships, study abroad, graduate school, and careers. Students can also participate in collaborative research to develop their leadership potential.
I had an opportunity to serve as a mentor for a senior business student who was in the Honors Program. The goal of this study was to access the financial knowledge of

university students, and prepare recommendations for creating a nonprofit organization that would serve as an instrument to promote financial literacy among students. This proposed organization is to increase financial awareness among college students through the use of literature, educational seminars, and other awareness events.

The project began by taking a selection instrument survey of all student participants to determine their eligibility. A self-assessment survey and a financial literacy quiz were conducted to assess their financial knowledge and their interest in a financial literacy of nonprofit organization. The results of the study showed students' interests in a financial literacy of nonprofit organization. Also, it suggested that the use of appropriate pedagogical methods and marketing tools is the essential to form the organization. The results concluded that a nonprofit organization specializing in financial literacy along with other pedagogical means would meet the need and improve the financial literacy level of college students in the short-run. It would also help to prevent financial crises in the future. Through this faculty and student collaborative research project, the student completed the survey and study as well as presented in the conference. The student received the People to People International 2011 University Chapter Leadership Award and was recognized at the Board of Trustees meeting in Brussels, Belgium.

2. Collaboration between Faculty

The complexity and magnitude of business research has increasingly required more varieties of knowledge, skills, and technologies. Often, there is no one involved who has the ability and skills to meet the research requirements alone. Although someone who can handle and resolve a particular problem might be available, this arrangement can be very time consuming. When a group of researchers collaborate on a particular project, their various trainings and skills can help to accomplish the tasks more thoroughly and efficiently.

The second case of faculty collaboration in business research involved faculty partners who taught at private and state business schools and collaborated on research in the finance area. The state school had funded databases, and its faculty partner provided the data analysis. The private school's faculty partner collaborated by providing the results of analysis and writing the research manuscript for their study analyzing the financial ratio of major US companies. Both collaborating business faculty members shared their knowledge and skills in this project. One undergraduate student in the business school was also involved in this study, and worked on the data preparation. The cross-stimulation of ideas and dissemination of results included data extraction, hypothesis testing, theoretical modeling, manuscript preparations, conference presentations, and publications. The student also had an opportunity to present the paper at the business conference. Furthermore, faculty partners in the business schools incorporated the collaborative research findings in their teachings.

The benefit from this collaboration and team work is the intellectual companionship created. The entire collaborative process of this research project may be divided into the following phases: construction, operation, assessment, documentation, and dissemination. Collaboration can thus ensure effective use of partners' talents and save time by transferring knowledge or skills.

3. Collaboration between Faculty, Student, and Institution

The third case involved research collaboration between the business school and an outside nonprofit organization. One business student was also involved in this project, and enrolled this research as an Independent Study credit. The scope of the project included analyzing the organization's current financial statement, reconciling capital inflows and outflows with different channels, and implementing the financial revenue statements for different venues. The results benefited all the

collaborative partners: The nonprofit organization would benefit from implementing the efficient and automated financial reporting system for their different business venues. The student received degree credit and gained experience from working with the outside company. The faculty also benefited from contacting the outside business partner and helping student throughout the project.

This type of research collaboration generates cross-stimulation of viewpoints that may in turn create new approaches and perspectives that the company, with its limited resources, would not otherwise be able to achieve. The improved financial recording system in the area of business operations would increase the effectiveness and clarity of financial reports for the company's ticket sales and revenue reports in several sales venues.

Such collaboration could also widen the researchers' network in their specific communities, institutions, or regionals and beyond. By using their network of contacts, collaborators can disseminate their findings in numerous formats, including community involvement, seminar demonstration, conference presentation, or simply informational discussions. Together, collaborators are likely to achieve a greater degree of visibility for their research findings. The outcomes are therefore likely to have greater influence in related fields.

Summary and Conclusion

Efforts to collaborate in business research provide many beneficial outcomes and help to integrate diverse disciplines among faculty and students. Besides reducing the risk of misjudgments, adverse outcomes, unnecessary wastes, and worn-out ideas, collaboration increases the quality of research and effectiveness of discoveries, and promotes dissemination of knowledge in the field of business. Such collaborative activities are essential to the professional development of faculty and the education of students. Inevitably, the resources and culture that support scholarship vary greatly from school to school. Yet faculty and student expectations of engaging in such activities have become higher and more evident than ever.

The demand for sharing solutions, identifying opportunities, and strengthening the scholarly environments is growing notably in many business schools. Such research activities depend on there being supportive institutional mechanism, available funds, and eligible expertise. In many cases, collaborative research can also assist faculty development and fulfill their training requirements. A solid research-to-education program would emerge to implement and evaluate the creative and innovative educational materials for advancement in the business field. Faculty often incorporate their collaborative business research findings in classes as supplementary lecture materials. Collaborative business research has provided the opportunity for

...the benefits of collaborative research outweigh the challenges, and contribute substantially to faculty development, student education, and the advancement of business knowledge.

school and business and students to work together. When invited into the project, business managers can reinforce the applications, provide additional viewpoints to the contents, and develop long-term relationships with organizations.

Despite the many substantial benefits of collaboration, some challenges still remain. In some circumstances, business research collaborations are not attested to co-authored papers, and the interactions between partners are too insignificant to result in coauthored publications. Occasionally, additional funding may be needed in collaborative research when interschool, interregional, and international researchers are involved. The demand for additional time may often occur during the collaboration. Sometimes, researchers may need time and patience to resolve the differences in their collaborative project. Challenges might arise because of divergent views, priorities, methods, reward, and promotion issues, and

arbitration may be required to resolve the differences. Collaboration may entail certain unexpected costs: There may be a need for additional administrative procedures, the resolution of cultural differences, and distinctive applications during the phrases of collaboration. However, the benefits of collaborative research outweigh the challenges, and contribute substantially to faculty development, student education, and the advancement of business knowledge.

References

Adam, S., Hadlock, C., Houghton, D., & Sirbu, G. (2006), A Recipe for Collaborative Research, BizEd, September/October.

Bartkus, K., Olsen, D., Mills, R., & Barlow Hills, S. Utah State University (2010), Collaborative Research in Business Schools: Benefits from the Research Group Model, Council on Undergraduate Research, fall, Volume 31, Number.

Bartkus, K., Mills, R., & Olsen, D. (2010), Fostering Undergraduate Research Experiences in Management Information Systems Through the "Research Group" Framework, American Journal of Business Education, Volume 3, Number 6.

Bayh-Dole Act - Public Law 96-517 (1980), An Act to Amend the Patent and Trademark Laws, 96th Congress, 94 STAT. 3015, December 12.

Fishbaugh, M. S. E. (1997), Models of collaboration. Needham Heights, MA: Allyn & Bacon.

Katz, J. S. & Martin, B. R. (1995), What Is Research Collaboration? Science Policy and Research Evaluation Group, ESRC Centre for Science, Technology, Energy and Environment Policy Science Policy Research Unit, University of Sussex, Falmer, Brighton, UK, March.

Keeble, D. & Lawson, C. (1998), Collective Learning Processes, Networking and 'Institutional Thickness' in the Cambridge Region, ESRC Centre for Business Research, University of Cambridge, Department of Applied Economics, United Kingdom. Paper presented at the 38th Congress of the European Regional Science Association, Vienna, September.

Loan-Clarke, J. & Preston, D. (2002) 'Tensions and benefits in collaborative research involving a university and another organization', Studies in Higher Education, Vol. 27, No. 2, pp.169-185.

Lopatto, D. (2006), Undergraduate Research as a Catalyst for Liberal Learning. Peer Review, Vol. 22, No. 1, pp: 22-26.

National Academy of Sciences (1999), Overcoming Barriers to Collaborative Research, Government-University-Industry Research Roundtable sponsored by the National Academy of Sciences, National Academy of Engineering, and the Institute of Medicine, ISBN 0-309-17245-4.

Strand, K., Marullo, S., Cutfoth, Stoecker, R., & Donohue, P. (2003), Community-Based Research and Higher Education-Principles and Practices, Jossey-Bass: A Wiley Imprint, San Francisco, CA.

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From Theory to Practice to Experience:
Building Scholarly Learning Communities in Nontraditional Doctoral Programs

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Demands of the modern workforce, coupled with rapid advances in educational technology, have created a new paradigm of doctoral learning. No longer designed with the traditional academic in mind, doctoral education has expanded to accommodate the expectations, demands, and expertise of working professionals. Simultaneously, traditional academic voices have articulated more vibrant and diverse understandings on the development and socialization of doctoral learners. Considerations of the methods, interventions, and outcomes for the development of scholars are being investigated; as highlighted by Gardner and Mendoza (2010), successful doctoral programs should consider a wider variety of scholarly outputs, development methodologies, and stakeholder perspectives. In this reflection, I focus on the considerations unique to adult learners, with a focus on the scholar-practitioner model. By understanding (and embracing) adult epistemological development, effective doctoral programs can simultaneously meet the needs, schedules, and demands of adult learners in a manner that socializes them for the various expectations of the profession. While the theoretical underpinnings of modern doctoral education have been established in the literature (see Gardner and Mendoza, 2010, for an overview), it is less clear how these andragogical principles translate into the organizational and structural foundations of a scalable doctoral program in a manner that fosters a vibrant learning organization. In this essay, I draw on my experience in creating doctoral programs designed explicitly for the modern adult learner and discuss, in collaboration with current doctoral learners, the impact of these programmatic initiatives on the learning experience.

> By understanding...adult epistemological development, effective doctoral programs can simultaneously meet the needs...of adult learners in a manner that socializes them for the...expectations of the professions.

When discussing nontraditional, scholar-practitioner-oriented doctoral programs, it is important to highlight the characteristics that distinguish these unique programs from their more traditional counterparts. Nontraditional doctoral learning is designed for adult learners with 15-25 years of professional experience who enter the program with master degrees and significant knowledge and experience in their current field of practice. As such, there is a dedicated shift in emphasis away from acquisition of content knowledge; rather, the goal is to create opportunities to engage in applied research that synthesizes learners' current expertise and scholarly engagement. These conditions create a unique opportunity to develop a scholarly learning community in innovative ways that capitalize on the strengths, knowledge, and passion of the learners.

Over the past ten years, I have led the doctoral offerings for two universities; embracing a more holistic model, this leadership extends beyond academic oversight to include faculty and support operations. In these universities, the doctoral programs are housed in a separate college (or school) distinct from the parent academic disciplines. I have experience overseeing programs ranging from DM in Management to PhD in Nursing to EdD in Higher Education (this is only a sampling of the range of offerings) and I currently lead doctoral programs offering DBA in Business Administration, PhD in General Psychology, and EdD in Organizational Leadership. I highlight my experience in this broad range as a means of showcasing the applied nature and focus of these non-traditional advanced

degrees. In this unique setting, I have had the opportunity to create the programmatic structure that supports scholarly learning communities in a manner that aligns with trends in online education, adult learning theory, and workforce expectations. Although we have achieved considerable success (both in terms of graduates, program growth, and applied scholarship), we are at the early stages of creating the opportunities for greater collaboration in scholarship that takes advantage of interdisciplinary perspectives, geographically dispersed participants (faculty and learners) with unique scholar-practitioner experiences, and enhanced coordinated research agendas for scholarly output.

Reflecting on our initiatives (including both successes and failures), two theoretical assumptions emerge as essential components of programs that foster effective intellectual growth at the doctoral level:

- Adult learners with professional experience have significant overt and tacit knowledge to share and develop.
- Adult learners in these doctoral communities have intentionality to improve their community/organization using the scholarship, critical thinking, and analysis developed throughout their education.

Underlying these assumptions is the need to foster an interactive community of learners: not simply a cohort to serve as support, nor a social grouping that progresses as a shared collective, but rather, a learning community that is explicitly designed with the needs, goals, and expertise of each individual learner driving the format, content, and progression of interactions.

Nontraditional doctoral learning is designed for adult learners with 15-25 years of professional experience who enter the program with masters degrees and significant knowledge and experience in their current field of practice.

These types of learning communities often emerge as the natural by-product of close-knit research groups in a traditional, face-to-face institution; with a single faculty member leading a hand-picked group of prodigies, the natural dynamics of a social group take over to foster an intellectual give-and-take. In contrast, modern online programs must be explicit in the development of a programmatic structure that supports this type of intellectual exchange. While there is obviously not a single, isolated route that institutions must take to foster scholarly learning communities while serving a geographically dispersed population, I will highlight three initiatives that we found to be particularly successful with our learners: intentionality emphasis, residency programs, and scholarly networks.

Intentionality Emphasis

Taking a developmental approach to building a scholarly learning community (and recognizing the characteristics of learners who choose this type of program), we have been mindful of the transition process as learners enter doctoral education and are introduced to the associated opportunities. Creating conversations with potential learners and prompting them to clarify their intentionality and their understanding of what meanings are associated with entering a doctoral journey is vital to maximize their opportunity for success. We conceptualize the initial application, conversations, essays, orientations, and first few classes as a vital period of engaging doctoral learners. It is a time to encourage reflection by the potential learners on their intentionality; not only their personal positions, but an integrated process of considering their intentionality for professional and scholarly development. We believe that for success they need to enter with a vision and dedication born of their experience and a passion for what they will develop as scholar-practitioners.

The curriculum of the initial classes is explicitly designed to assist learners in differentiating their conceptualization from a master's to a doctoral program. Emphasis is placed on fostering learners' responsibility for their learning, the questioning of the material, and the early development of critical analysis and reflection. Through an emphasis on independence and intentionality, the program encourages learners' extracurricular involvement in the scholarly learning community. We believe that while it is vital to provide opportunities for scholarly engagement within classes with an integrated curriculum and outside the confines of each class, it is equally important to foster a mindset that prepares learners to effectively take advantage of the initiatives provided.

Residency Programs

The reality of the modern workforce necessitates the inclusion of online coursework as a foundation of many scholar-practitioner-oriented doctoral programs. While online education has an established record of effectiveness, it is also important to provide opportunities for face-to-face interaction via residency programs. Our unique focus in residency opportunities is to bring the community of scholars together with faculty that are experts in research and dissertation development. Since we have an integrated curriculum that threads content and scholarly inquiry throughout the program in a developmental fashion, the residency is used as a pivotal event to clarify the scholarly goals, ascertain progress, and establish a clear path for the next phase in the learners' program.

> **While online education has an established record of effectiveness, it is also important to provide opportunities for face-to-face interaction via residency programs.**

During the initial online experience of the program, camaraderie develops in the online classrooms where learners engage in thoughtful and meaningful dialogues around specific course content. When learners meet face-to-face for the first time in residency, an immediacy and intimacy of mind (i.e., thinking and understanding of the others' perspectives) emerge in the interactions. The residency program is designed to foster an active community of scholars focused primarily on the development of the prospectus, proposal, and the dissertation. These residency experiences punctuate integrated learning to guide the most difficult part of the doctoral journey.

Doctoral Community Network ©

The Doctoral Community Network (DC) is a scholarly network that re-creates many aspects of the residency in a vibrant online community available throughout the doctoral journey. Many individuals that complete a traditional doctoral program report that much of their learning and professional growth resulted from interactions and activities outside the confines of an individual class. Rather, the informal discussions and interactions that occurred in the hallway, coffee shop, or student lounge were just as important as the formal activities that occurred during scheduled classes. The simple proximity and availability of others with shared interests, goals, and content knowledge creates a natural breeding ground for intellectual banter. In nontraditional doctoral programs, faculty and learners often do not have the luxury of physical proximity, so it is vital that institutions create unique opportunities for these students to interact in a scholarly community that does not revolve around a specific course. The Doctoral Community Network (DC) is a learner-driven, scholarly community designed to help learners successfully complete their program of study; it provides a rich collaborative environment that includes resources, roadmaps, references, and tools to support learners in becoming independent scholars (Berman, in press).

Even though the Doctoral Community Network (DC) is in its adolescence, learners and faculty are already actively engaged in scholarly dialogue resulting in growing research agendas and interdisciplinary scholarship. As learners post research ideas, other learners and faculty reflect, share resources, and encourage articulation of thought. The enhanced scholarly dialogue stems from outside of the classroom (similar to hallway conversations available in face-to-face programs) and capitalizes on the experiences and expertise of our geographically dispersed population. Unlike general social networks, the Doctoral Community Network (DC) explicitly focuses on promoting quality scholarship, fostering successful completion of the program, and encouraging engagement in the larger academic community through opportunities to publish and/or present research.

Conclusions

Fostering vibrant learning communities for adult learners in nontraditional doctoral programs requires explicit attention to the unique needs of this population. Institutions must design programs that create opportunities for scholarly interactions in a manner that fits the needs, goals, and schedules of the adult learner.

Extending beyond the confines of a single class, effective learning communities emerge when programmatic structure allows adult learners to drive interactions that capitalize on their professional expertise and intentionality. As such, programmatic initiatives must maintain a critical balance between structure and freedom. Successful programs provide the structural foundation that supports and encourages collaboration, yet allows sufficient freedom for doctoral learners to formulate and direct their role within the larger structure. Nontraditional doctoral programs must create opportunities for learners to interact and maximize professional connections in order to capitalize on the broader perspectives and expertise available.

In the following reflective annotations, you will see the progression from the theoretical underpinnings highlighted by Gardner and Mendoza (2010) to the experiences of doctoral learners currently immersed in a nontraditional program designed to foster an integrated scholarly learning community. Through the reflections of doctoral learners on targeted chapters of socialization and development, you see an emerging scholarly learning community. It is heartening to see a resonance between the program vision and the actual experiences of the learners. Clearly, this is an ongoing dialogue where learners, faculty, counselors, and administration collaborate in the creation of scholar-practitioners within a vibrant scholarly community. This exercise, in and of itself, aligns with our inherent process of continually defining, dialoguing, and enhancing our program for graduates to develop purposeful scholarship.

Reference

Gardner, S., & Mendoza, P. (Eds.) (2010). *On becoming a scholar: Socialization and development in doctoral education*. Sterling, VA: Stylus.

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Reflective Annotations: On Becoming a Scholar

Socialization for Teaching

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In most institutions there are four principal areas of faculty work: research, service (institutional and disciplinary), community outreach, and pedagogical activity. Socialization is the process by which doctoral learners acquire the necessary knowledge, skills, and dispositions to be effective in each of these areas. The existing literature on doctoral socialization has defined the following set of core competencies to support these four areas: conceptual understandings (the development of a professional identity, expertise in the discipline); knowledge and skills in the above four areas (including specific skills regarding teaching and learning); interpersonal skills (written and oral communication collaboration); and professional habits (ethics and integrity, professional development). Additionally, there are a number of stakeholders—students, faculty, departments, universities, and external agencies—that play a role in the successful socialization of doctoral learners.

Although the desired outcomes for doctoral preparation are clear, and are supported by a robust body of research, in practice there is greater emphasis on certain areas of doctoral learning than on others. Most doctoral programs have a strong focus on the development of skills and knowledge around research and expertise in the discipline. With regard to pedagogical activity, however, it is evident that there is little, if any, formal and intentional preparation for teaching in most doctoral programs. What socialization does occur is often a result of interacting with faculty members and/or of any teaching assignments the doctoral student may have at the institution. Does this discrepancy reflect a flaw in the design of doctoral programs? Or do certain competencies in reality have greater value in the academic community than others? For an online doctoral student, the availability of a teaching assistantship is rare or even nonexistent. Interaction with faculty is primarily asynchronous. So how will I develop the core competencies described in the literature? Or will my experience mimic that of the traditional doctoral student, with less than adequate emphasis on the preparation for a teaching role?

> **If...online doctoral programs are going to develop doctoral learners whose skill addresses the competencies identified in the literature, the design of those programs must include mechanisms arising from the modality.**

If institutions that provide online doctoral programs are going to develop doctoral learners whose skills address the competencies identified in the literature, the design of those programs must include mechanisms to address the differences arising from the modality. Programs should be designed with the core competencies in mind. Learning activities that develop skill and knowledge regarding teaching and learning must be built into the curriculum. Residencies that include the opportunity to discuss teaching and learning should be available. As a doctoral learner, I have a measure of responsibility to seek out opportunities to address areas that I need to develop. I'm certain that being an online doctoral student is a very different experience from that of a traditional campus doctoral student. However, if we accept the development of core competencies as being key to a doctoral program, then our focus shifts from the challenges and variations in experience to the development of the learner.

Reference

McDaniels, M. (2010). Doctoral student socialization for teaching roles. In S. Gardner & P. Mendoza (Eds.), *On becoming a scholar: Socialization and development in doctoral education* (pp. 29-44). Sterling, VA: Stylus.

Socialization for Service

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The role of the faculty member extends beyond guiding students through the process of research and writing components required for graduate school. More importantly, faculty members socialize students into the culture of the discipline. They clarify and reinforce what is expected of the scholar. They lead by example. There are three important responsibilities for each member of faculty: research, teaching, and service. Depending on the type of college or university the faculty member is a part of, the duties for each responsibility may vary. However, the three are still consistent. The first two, teaching and research, are somewhat self-explanatory. Service is where the grey areas tend to blend for most faculty and sometimes can be overlooked. It is important that each area be clearly defined and that duties be understood as the graduate student evolves into the role of faculty member. As graduate students learn the responsibilities of professional faculty, it is crucial not to underestimate the importance of all aspects of service.

> **...faculty members socialize students into the culture of the discipline. They clarify and reinforce what is expected of the scholar. They lead by example.**

Service is an expression of the impulse or desire to make a contribution. Winkle-Wagner, Johnson, Morelon-Quainoo, and Santiague (2010) present three components of service, which are analyzed in this reflective article: service as part of the mission for higher education, service within higher education, and service beyond campus. These are somewhat broad in definition and are adaptable to the type of institution the faculty member serves. From my perspective as an online doctoral learner, part of the mission of service is to prepare graduate students to contribute to society as a whole. This service is particularly suited for the area in which the online doctoral student lives and works because it extends the campus to their community, as in the case of, the doctoral learner researching the benefits of community health fairs.

Service within higher education refers to how faculty support the internal functioning of the institution and their discipline, and how this support contributes to the success of their institution. Discipline associations and universities are known by the quality of their faculty. Those that serve on committees and share duties such as hiring contribute to a shared governance of the institution. This can be a bit challenging for the online doctoral learner, since he or she has not actually taken on the responsibilities of a faculty member. However, some associations and universities appoint a student member. This appointment orients the face-to-face student to the duties associated with the internal functioning of the institution. This could also be an avenue for the online doctoral learner.

Finally, there is service that extends beyond the campus; for example, serving local and state government by providing expertise in the realm of decision making and public policy. This service is particularly suited for the area in which the online doctoral student resides, because it extends the campus to local governing bodies. Due to the fact that online doctoral learners reside all around the world, the

institution and its faculty service have the potential to make an enormous impact in so many areas.

Throughout my experience as an online doctoral learner, I am able to refine my skills as a researcher, building theoretical knowledge so that I can walk with confidence as an emerging scholar. Many online doctoral programs state that they are intended for professionals who want to make a difference in their field and in their communities. My experience was different, however; it allowed me to collaborate with doctoral faculty independently, as well as within the program. Together, we focused on real problems to come up with solutions using research and reflective dialogue. This program included group discussions, dissertation preparation throughout the program, and residencies. Every week in our group discussions, we addressed in-depth, thought-provoking questions that required the learner to interact and provide real insights based on research. Unique to many other doctoral programs, and starting with the initial course, the learner is required find their passion. Within that passion, he or she will discover their dissertation topic to research. Indeed, finding and knowing your passion is essential to completing your dissertation. This dissertation process started in the opening course and continued with literature research, writing, and being matched with a dissertation chair in my field of study, to guide me throughout the rest of the degree program. Doctoral residencies provided opportunities to network and study with professionals in my field, in a face-to-face environment. I was able to get detailed guidance as I prepared to write my dissertation. During residency, the learners have the opportunity to practice their group research and presentation skills. This experience as a doctoral learner in an online program has enhanced my leadership skills in my organization and allowed me to make a difference in the community through the use of research, theory, and practical experience

Reference

Ward, K. (2010). Doctoral student socialization for service. In S. Gardner & P. Mendoza (Eds.), *On becoming a scholar: Socialization and development in doctoral education* (pp. 57-76). Sterling, VA: Stylus.

Sense of Belonging

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A sense of belonging affects academic persistence in graduate programs, especially for students of color, who are the ethnic minority. The qualitative, grounded-theory study in this chapter by Gardner (2010), which was part of a larger multiple institution research effort, explored the socialization factors that affect the persistence of students of color in campus-based, advanced-degree programs. The sample population included eight first-year graduate students enrolled in a university in the Midwestern United States. Four of the participants were women of color (i.e., one Latino and three African-American students) enrolled in an education doctoral program, while the other four participants were African-American law students (i.e., one male and three female). The researchers emailed all students in each discipline and employed a purposeful sampling technique to select the participants. Data collection used semi-structured focus groups in which participants shared their experiences with the researchers. The data were coded and then analyzed through an iterative process that included participants reading drafts of the study to provide further clarity on interpretations of the interviewers. The findings supported the theoretical framework suggesting that a sense of belonging is important in academic persistence, and that support from the institution, faculty,

and community impacts such persistence, especially for students of color in advanced-degree programs in which the students are the ethnic minority.

Achieving relatedness, or a sense of community, with other doctoral learners is even more challenging in courses delivered online. While I am not a person of color, the broad focus of this chapter is social inequality, a topic of importance to me personally. The emergent theme of family and community support highlighted learners in the study who were first-generation graduate students. As I am a first-generation doctoral learner, I personally identified with this theme, and this made me reflect more deeply on my academic experiences. The participants in the study repeatedly referred to challenges in understanding the academic and social "system." Not being familiar with the institutional norms, socialization patterns, and protocols for reaching out to faculty members contributed to feelings of isolation. The message of this chapter parallels the challenges to socialization and learning online, in which time and space can create psychological distance, and hence feelings of isolation. I am fortunate to be currently enrolled in a doctoral program delivered online where building a sense of community has been the central focus. Through residency events, interaction with peers and faculty through the college-administered online scholar network, engaging in publishing and presentation opportunities offered by the college, and through the steadfast and caring disposition of my dissertation committee, I have not only overcome feelings of isolation but also achieved relatedness with my doctoral community.

> **...a sense of belonging is important in academic persistence, and...support from the institution, faculty, and community impacts such persistence, especially for students of color in advanced-degree programs in which the students are an ethnic minority.**

Stigma is often attached to distance education. Questions of quality and feasibility persist. Is it equal in quality to the face-to-face counterpart? How does one overcome the psychological distance that may occur? Is this delivery method good enough to produce scholars of merit? These questions are further compounded by the prominence of online doctoral programs designed for working adults, which begs the central question: Can online doctoral learners who are also working adults engage in scholarly inquiry equal to that of full-time doctoral learners in campus-based programs? The answer to this question hinges on what is meant by community and the importance of community in motivating doctoral learners to consistently excel at scholarly inquiry. As researchers have noted, psychological distance is a phenomenon that may occur in either face-to-face or distance education (Moore & Kearsley, 2012). Psychological distance may be caused by differences in time, space, ethnicity, or lack of common experience. The future of doctoral learning rests on the realization that excellent scholarly inquiry is as much influenced by relatedness as it is by competence. These constructs work hand in hand. When viewed in this light, the juxtaposition of pure face-to-face scholarly inquiry with part-time online scholarly inquiry becomes a false dichotomy. The future of doctoral learning is a future where such false dichotomies atrophy, where excellence in scholarly inquiry is defined not by delivery method but by the merit of contribution to the body of scientific knowledge. Whether through online, face-to-face, or hybrid delivery methods, the future of doctoral learning relies on reducing social inequality through providing greater access to doctoral study, fostering a sense of community for doctoral learners, providing access to resources that support such learning, and encouraging scholarly endeavors, regardless of the delivery method. For the past two years, I have been fortunate to participate in such an endeavor, one which is changing what it means to engage in doctoral inquiry.

References

Moore, M.G., & Kearsley, G. (2012). *Distance education: A systems view of online learning* (3rd Ed.). Belmont, CA: Wadsworth.

Winkle-Wagner, R., Johnson, S., Morelon-Quainoo, C., & Santiague, L. (2010). A sense of belonging: Socialization factors that influence the transitions of students of color into advanced-degree programs. In S. Gardner & P. Mendoza (Eds.), *On becoming a scholar: Socialization and development in doctoral education* (pp. 179-199). Sterling, VA: Stylus.

Evolving into Scholars

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The doctoral process is one that evolves. Learners grow and develop both personally and professionally as a result of their educational journey. While most come to the process with a multitude of life experiences, they continue to define and redefine themselves. Doctoral learners hone their skills as researchers, critical thinkers, and writers. They develop the art of balancing their personal life, their professional life, and their commitment to their educational pursuits. Personal challenges can arise when learners find themselves in new educational environments where there is no diversity of gender, race, religion, or sexual orientation. This may cause some to become isolated, while others may use this as an opportunity to become more familiar with individuals whose ideas and values differ from their own. The more that learners avail themselves of varied experiences and opportunities during the doctoral journey, the more valuable will be their evolution process.

Several issues related to social identity have been discussed. However, the issue of the doctoral learner's age has not yet been examined. Age can be a key element in how learners are accepted by faculty and by peers within the doctoral community. Learners wonder why those who are more senior are pursuing their degree when they are close to the end of their career. Common questions such as "Why are you here?" or "What are you going to do with your degree when you are finished?" can be found offensive to active learners who want to further develop as lifelong learners. Those who are committed learn to adjust to the questions, comments, and raised eyebrows with humor and determination, and stake their claims as valuable members of the doctoral learning community. Learners at the other end of the spectrum, the "Doogie Houser" protégées, can certainly be presented with challenges of their own. Because of their age, they are deficient in both life and professional experiences. Who will value their opinions? Who will take them seriously in the learning community? Like the senior students and those in between, young learners must approach the doctoral process with positive determination.

> The more that learners avail themselves of varied experiences and opportunities during the doctoral journey, the more valuable will be their evolution process.

Participation in a grounded doctoral cohort offers participants weekly opportunities to engage in rich discussions with peers from varied personal and professional backgrounds. During these discussions, there are opportunities to synthesize literature and research, and to share opinions and resources Camaraderie develops and learners are provided with opportunities to coach each other and celebrate victories through the peaks and valleys of the doctoral journey. These interpersonal relationships add great value to the learning community.

Participating in all classes, as a group, allows learners to build on past learning experiences, thus strengthening the outcomes of future learning.

Reference

Gardner, S. K. (2010). Doctoral student development. In S. Gardner & P. Mendoza (Eds.), *On becoming a scholar: Socialization and development in doctoral education* (pp. 203-221). Sterling, VA: Stylus.

Adult Learners Pursuing Doctoral Education

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Doctoral Learner, Organizational Leadership
Grand Canyon University

Becoming a doctoral learner is a process. As adult learners, doctoral students have a unique variety of beliefs, experiences, and circumstances that influence their learning styles and readiness to become doctoral learners. Unlike other forms of learning, doctoral learning requires a high degree of self-directed and interdependent learning, as well as the ability to engage in detached reflection, critical thinking, and innovative thought. Faculty and administrators can support adult learners by providing instruction, guidance, and infrastructure appropriate to the learner's stage of development in the process of becoming a doctoral learner. Kasworm and Bowles (2010) present three components of adult learning—self-directed and critically reflective thinking, identity formation through transformational learning, and participation in communities of practice—as they relate to the process of becoming a doctoral learner. Based on these perspectives, strategies and recommendations to support doctoral learners are provided for faculty members, university administrators, and external agencies.

Today, most doctoral students are not solely engaged in the pursuit of education. They are working adults, busy running meetings, raising families, and taking care of their older parents. They are diverse in gender, ethnicity, culture, nationality, and socioeconomic status. Given this broad spectrum of learners, it is imperative that universities be prepared to support the changing needs of doctoral learners. The opposite is also true; prospective students must understand the responsibilities and be willing to make the changes necessary to become doctoral learners. During the formative stages of doctoral education, it is incumbent upon students to identify their personal needs and interests, and seek resources to support discovery and self-determination. University faculty and administrators can assist by providing clear expectations, an environment of trust and respect, and flexibility in program design. As students progress, they must form their identities as doctoral learners through critical reflection and engagement. Faculty and administrators can assist by facilitating awareness of distorted and limiting views, providing opportunities for service-learning and participatory action research, and offering interdisciplinary doctoral degrees. Finally, doctoral students should immerse themselves in their area of interest by participating in communities of practice. University faculty and administrators can assist by facilitating communities of practice through writing groups, research laboratories, and action research groups.

> **Conference-style residencies provide opportunities for online learners to meet and learn from each other, faculty members, and university administrators. Web-based networks...create space for doctoral students, faculty, and administrators to communicate and engage in virtual communities of practice.**

Becoming a doctoral learner is challenging in any setting, but perhaps most difficult in the online academic environment. Universities offering online programs have developed innovative methods of supporting students in their journey to become doctoral learners. Web-based discussion forums facilitate course specific discussion. Conference-style residencies provide opportunities for online learners to meet and learn from each other, faculty members, and university administrators. Web-based networks, such as Grand Canyon University's DC Network, create space for doctoral students, faculty, and administrators to communicate and engage in virtual communities of practice. Hybrid cohort models have also been developed, merging campus-based night classes with online methodologies, offering perhaps the best of both worlds. Virtual technologies such as Skype may also add to a university's ability to connect with students in a more personal manner. Regardless of the setting, however, the critical issue is the student's ability to develop self-directed learning skills;, engage in detached reflection and critical thinking, and participate in communities of practice. Despite the strategies discussed, many students continue to lack these abilities. Future research might seek to identify additional methodologies for helping doctoral students to understand, embrace, and develop the skills necessary to fulfill their roles and responsibilities as doctoral learners. Further, in their selection process, universities might consider prospective students' aptitudes related to self-direction, ideological rigidity, and collaboration.

Reference

Kasworm, C., & Bowles, T. (2010). Doctoral students as adult learners. In S. Gardner & P. Mendoza (Eds.), *On becoming a scholar: Socialization and development in doctoral education* (pp. 223-241). Sterling, VA: Stylus.

Book Review: *Quick Hits for Teaching with Technology: Successful Strategies by Award-Winning Teachers*

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Technology: It is a word that inspires and excites many educators. It can also strike fear in the hearts of even the most forward-thinking teachers who embrace technological tools to advance effective teaching practices. Questions about how much technology should be included in any given lesson, or what kind of technology might enhance the learning of students, are valid and extremely important aspects to the use of technology in the regular or virtual classroom. *Quick Hits for Teaching with Technology: Successful Strategies by Award-Winning Teachers*, edited by Robin K.

> **The information provided within the essays is diverse and easily adaptable to the…needs of the educator looking for…innovative ways to enhance student learning.…**

Morgan and Kimberly T. Olivares and published by Indiana University's Faculty Colloquium on Excellence in Teaching (FACET), contains essays describing practical, tried-and-true uses of technology in the classroom. The collection of essays is designed to be a quick guide for educators, assisting them to effectively use the many great tools available (some for a small fee, others at no charge) to promote student engagement in the classroom, provide access to a multitude of learning styles, enhance the evaluation of both student learning and teacher effectiveness, and finally, make teaching and learning more effective.

The collection is organized into sections based on the above-mentioned principles: promoting engagement, providing access, enhancing evaluation, and becoming more efficient. Each section includes selected essays whose authors explain in detail why they chose to use technology, what technology was incorporated, how it was incorporated, what results came from the use of technology, and how to adapt what they used to different types of classrooms as well as different disciplines. My only suggestion for a more user-friendly format would have been to organize the essays according to the discipline each was originally created for. This would have made it easier for the researching educator to find possible technological uses that could be adapted to his or her specific needs.

The information provided within these essays is diverse and easily adaptable to the special needs of the educator looking for exciting and innovative ways to enhance student learning as well as teacher efficacy. The two chapters I found to be potentially helpful and exciting for my own future classroom include the section on promoting engagement and the one on providing access. The introduction to the first section explains that "To learn means to construct meaning rather than memorize facts. Student-instructor, student-student, and student-content interactions, facilitated by the use of technology, drive the effort" (Novak, 2012, p. 2). Critical thinking skills are necessary for our students to become successful, responsible, and productive members of society. Long gone are the days when students could memorize facts and do well outside of school. Given the incredible speed of advances in technology, students must be able to learn and adapt. The students of today have also grown up in the technology age: At no time have they been without the entertainment and easy access to information provided by technology. Specific tools mentioned in the book include: using E-Rewards relating to the material being learned in class to gift students for doing well (Casey-Doecke, 2012, p. 8); having students research YouTube videos relating to classroom concepts for validity and accuracy (Owens, 2012, p. 9); providing an online forum

for debating specific topics (Dixson, 2012, p. 12); online tools for creating visual maps of concepts; supplementing classroom lectures using podcasts (Fernandez & Urtel, 2012, p. 37); and taking virtual field trips to enhance classroom content. These are just a few of the techniques discussed in the book. Such a plethora of technological teaching tools to enhance classroom activities can be overwhelming for the individual educator trying to decide which tools would best suit his or her needs. I found myself thinking about using so many tips provided by the essays that I became a little flustered and started to worry that I was trying to do too much. The book addresses this problem as well, by providing a chapter that "offers ideas and suggestions about how to be sure we are using technology in ways that maximize opportunities to learn but minimize extra work for students and faculty" (Dixson, 2012, p. 87). We must be careful to find a balance between the amount of technology we use in the classroom and the length of time involved in creating and implementing such programs. Educators need to be conscientious in choosing technology that enhances, rather than detracts from, the learning environment and the efficient use of class time.

Quick Hits for Teaching with Technology is a wonderful resource for educators of all academic levels and disciplines. The tips provided in these essays are tried-and-true methods for incorporating technology into today's classroom. There are so many tools available to educators today that can make the use of technology both easy and relevant for everyone involved in the educational process. I am going to end this review here, so that I can do more research on creating online debating forums, or maybe look into creating wikis; or maybe I will just go and take a virtual field trip for fun.

References

Casey-Doecke, J. (2012). Using E-rewards to promote engagement and re-engagement in the online classroom. In R. K. Morgan, & K. T. Olivares, (Eds.) *Quick hits for teaching with technology: Successful strategies by award-winning teachers*, (p. 8). Bloomington: Indiana University Press.

Dixson, M. D. (2012). Using team-based learning to engage students in online courses. In R. K. Morgan & K. T. Olivares (Eds.), *Quick hits for teaching with technology: Successful strategies by award-winning teachers*, (pp. 12-13). Bloomington: Indiana University Press.

Morgan, R. K., & Olivares, K. F., (Eds.). (2012). *Quick hits for teaching with technology: Successful strategies by award-winning teachers.* Bloomington: Indiana University Press.

Novak, G. (2012). Technology transforming learning. In R. K. Morgan & K. T. Olivares, (Eds.), *Quick hits for teaching with technology: Successful strategies by award-winning teachers* (pp. 1-3). Bloomington: Indiana University Press.

Owens, J. K. (2012). YouTube reviews. In R. K. Morgan & K. T. Olivares (Eds.), *Quick hits for teaching with technology: Successful strategies by award-winning teachers* (pp. 9-10). Bloomington: Indiana University Press.

Urtel, M., & Fernandez, E. (2012). To podcast or not to podcast. In R. K. Morgan & K. T. Olivares (Eds.), *Quick hits for teaching with technology: Successful strategies by award-winning teachers* (pp. 37-38). Bloomington: Indiana Universtiy Press.

Stephanie Healy is a recent graduate of Park University. She graduated summa cum laude with both a Bachelor of Arts in English Literature and a Bachelor of Science in Secondary Education. Stephanie is a member of Sigma Tau Delta and has recently been hired to teach English at the same high school she graduated from 20 years ago. Her experiences include working as a detention facility officer and as an instructional assistant in special education which led to her returning to school to become a certified teacher.

Call for Proposals
Volume 8
Special Edition: Student Perspectives on SoTL

InSight: A Journal of Scholarly Teaching is a scholarly journal published by the Center for Excellence in Teaching and Learning (CETL) at Park University. The 2013 volume of *InSight* features a special edition highlighting learners' perspectives of SoTL work. This refereed special edition will highlight collaborative reflections in which a student and a faculty member provide their perspectives on a targeted chapter of the text, *The Scholarship of Teaching and Learning Reconsidered: Institutional Integration and Impact* by Hutchings, Huber and Ciccone.

For this special edition, interested faculty/student writing teams should submit a brief (150-word or less) proposal highlighting their thoughts/interests/ideas in relation to one of the following chapters:
1. Why the Scholarship of Teaching and Learning Matters Today
2. Teachers and Learning
3. The Scholarship of Teaching and Learning, Professional Growth, and Faculty Development
4. The Scholarship of Teaching and Learning Meets Assessment
5. Valuing – and Evaluating – Teaching
6. Getting There: Leadership for the Future

Proposals will be evaluated and authors notified of their acceptance for the target chapter prior to submission of complete manuscript. Complete manuscripts should follow the general submission requirements.

Each faculty/student author pair should focus on the same chapter but provide independent reflections highlighting the meaning/significance/value of the chapter in relation to their own work and intellectual growth. Faculty should work with their undergraduate or graduate student to ensure that the co-authored manuscript is of high quality, relevant, and reflective.

Submission Requirements
- *STYLE* - All manuscripts must be formatted in APA style.
- *LENGTH* - Manuscripts should be no more than 10 pages (not including abstract, references or appendices).
- *ABSTRACT* - Each manuscript must be summarized in an abstract of 50 to 100 words.
- *AUTHOR* - Each author should provide his/her full name, title and departmental affiliation, campus address, telephone number, and email address. Each author must also include a brief biography (no more than 100 words per author).
- *FORMAT* - All manuscripts must be submitted via email as attachments in Microsoft Word or Rich Text Format.
- *DEADLINE* - All submissions must be received by **4:00pm on March 1, 2013 (CST)** to be considered for inclusion in Volume 8.

Review Procedures
Submissions will be subject to a double blind peer-review. A manuscript is evaluated based on relevance, originality, generalizability, clarity, significance and the extent to which the subject matter contributes to an integrated understanding of scholarship of teaching and learning. Review process will require approximately 8 weeks. Referees' feedback and editorial comments will be provided to the author when revisions are requested. The publication will be distributed both in print and online fall 2013.

Copyright

Manuscript submissions are accepted with the assumption that they neither have been nor will be published elsewhere. Authors and CETL will hold joint copyright to all published manuscripts.

Contact

All inquiries should be directed to: cetl@park.edu. For more information, visit the *InSight* website at www.insightjournal.net.

Call for Papers

Volume 9: *Scholarly Teaching and Learning*

InSight: A Journal of Scholarly Teaching welcomes original manuscripts with a focus on the scholarship of teaching and learning (SoTL) from scholars across the disciplines. We seek articles that address the following: methods and practices of scholarly teaching; critical analyses of the scholarship of teaching and learning; theoretical and empirically-based research articles with practical application possibility; case studies; scholarly analyses and reflective accounts of teaching and learning; teaching narratives that promote conversations about SoTL's value as a tool for advancing student learning.

Articles should present practical and informed applications of teaching, and should address specific issues relating to real classroom experience. Theoretical issues should be rooted in practice. Articles that include student voices and responses are especially welcomed.

Suggested topics include the following:

- Challenges/Responses to the SoTL paradigm
- Practical methods of developing institutional and discipline-specific definitions of SoTL
- Status reports of SoTL's role in a particular discipline
- Essays that offer guidance to faculty new to SoTL, or which outline strategies for support of new faculty
- Examples of SoTL projects at the course or discipline-level
- Intersections of SoTL and service-learning, eLearning, learning communities, and other learning initiatives
- Future directions in SoTL
- Cross-disciplinary and cross-institutional collaborations for promoting SoTL
- Innovative critiques that include specific suggestions for implementation of institutional initiatives for SoTL practices.

Submission Requirements

- *STYLE* - All manuscripts must be formatted in APA style.
- *LENGTH* - Manuscripts should be no more than 12-15 pages (including abstract, references or appendices). Authors are encouraged to include appendices that promote application and integration of materials (i.e., assignments, rubrics, examples, etc.).
- *ABSTRACT* - Each manuscript must be summarized in an abstract of 50 to 100 words.
- *AUTHOR* - Each author should provide his/her full name, title and departmental affiliation, campus address, telephone number, and email address. Each author must also include a brief biography (no more than 100 words per author).
- *FORMAT* - All manuscripts must be submitted via email as attachments in Microsoft Word or Rich Text Format. Do not include personal identifiers within the manuscript. Include contact information only on a separate cover sheet. Each manuscript will be assigned a unique identifier for blind review processes. Send submissions to cetl@park.edu.
- *DEADLINE* - All submissions must be received by **4:00pm on March 1, 2014 (CST)** to be considered for inclusion in Volume 8.

Review Procedures

All submissions are initially screened by the editor for suitability to the journal. Relevant manuscripts are then sent to appropriate reviewers and undergo a rigorous blind peer review. Manuscripts are evaluated for relevance, practical utility, originality, clarity, significance and the extent to which the submission contributes

to the goals of the journal and the ongoing development of the scholarship of teaching and learning.

The review process for publication takes about three months. Authors are provided feedback from the editor and from reviewers.

The CETL office retains the final authority to accept or reject all submitted manuscripts. The final publication will be distributed both in print and online fall 2013.

Copyright

Manuscript submissions are accepted with the assumption that they neither have been nor will be published elsewhere. Authors and CETL will hold joint copyright to all published manuscripts.

Contact

Please address your inquiries to: cetl@park.edu. For more information, visit the CETL website at www.park.edu/cetl.

QUICK TIPS: PREPARING MANUSCRIPTS FOR *INSIGHT*

The following "Quick Tips" provide suggestions and guidance for preparing manuscripts for potential publication in *InSight: A Journal of Scholarly Teaching*. *InSight* is a peer-reviewed publication highlighting the scholarly contributions of postsecondary faculty. As is the nature of refereed journals, acceptance and publication of original manuscripts is a competitive process. The goal of the following information is to assist faculty in preparing manuscripts in a manner that maximizes the chances of publication.

Preparing the Manuscript

The organization and style your manuscript will be largely dictated by the type of submission (e.g., theoretical, empirical, critical reflection, case study, classroom innovation, etc.). Thus, while guidelines will follow to assist you in preparing your manuscript, the key to successful submission is clear, effective communication that highlights the significance and implications of your work to post-secondary teaching and learning in relation to the target topic. To prepare and effectively communicate your scholarly work, the American Psychological Association (2010) provides the following general guidelines:

- Present the problem, question or issue early in the manuscript.
- Show how the issue is grounded, shaped, and directed by theory.
- Connect the issue to previous work in a literature review that is pertinent and informative but not exhaustive.
- State explicitly the hypotheses under investigation or the target of the theoretical review.
- Keep the conclusions within the boundaries of the findings and/or scope of the theory.
- Demonstrate how the study or scholarly approach has helped to address the original issue.
- Identify and discuss what theoretical or practical implications can be drawn from this work.

There is no mandatory format for *InSight* articles; rather authors should organize and present information in a manner that promotes communication and understanding of key points. As you write your manuscript, keep the following points in mind:

- Title - Generally speaking, titles should not exceed 15 words and should provide a clear introduction to your article. While it is okay to incorporate "catchy" titles to pique interest, be sure that your title effectively captures the point of your manuscript.

- Abstract - Do not underestimate the importance of your abstract. While the abstract is simply a short summary (50-100 words) of your work, it is often the only aspect of your article that individuals read. The abstract provides the basis from which individuals will decide whether or not to read your article, so be certain that your abstract is "accurate, self-contained, nonevaluative, coherent, and readable" (Calfee & Valencia, 2001).

- Body - Within the body of a manuscript, information should be organized and sub-headed in a structure that facilitates understanding of key issues. There is not a mandatory format for *InSight* articles; rather authors should use

professional guidelines within their discipline to present information in a manner that is easily communicated to readers. For example:

- *Empirical investigations* should be organized according to the traditional format that includes introduction (purpose, literature review, hypothesis), method (participants, materials, procedures), results, and discussion (implications). The following links provide general examples of this type of article:
  - o http://www.thejeo.com/MandernachFinal.pdf
  - o http://www.athleticInSight.com/Vol7Iss4/Selfesteem.htm
- *Theoretical articles and literature reviews* should include an introduction (purpose), subheadings for the relevant perspectives and themes, and a detailed section(s) on conclusions (applications, recommendations, implications, etc.). The following links provide general examples of this type of article:
  - o http://www.westga.edu/%7Edistance/ojdla/winter84/royal84.htm
  - o http://www.westga.edu/%7Edistance/ojdla/winter84/mclean84.htm
- *Classroom innovation and critical reflections* should be organized via an introduction (purpose, problem, or challenge), relevant background literature, project description, evaluation of effectiveness (may include student feedback, self-reflections, peer-insights, etc.), and conclusions (applications, implications, recommendations, etc.). If describing classroom-based work, please include copies of relevant assignments, handouts, rubrics, etc. as appendices. The following link provides a general example of a critical reflections article:
  - o http://www.compositionstudies.tcu.edu/coursedesigns/online/33-2/ritter.htmlv

The limited length of *InSight* articles (manuscript should be no more than 10 pages, not including abstract, references or appendices) requires authors to focus on the most significant, relevant factors and implications.

- References - Select your references carefully to ensure that your citations include the most current and relevant sources. As you select your references, give preference to published sources that have proven pertinent and valuable to the relevant investigations. The goal is not to incorporate ALL relevant references, but rather to include the most important ones.

- Tables, Figures, Appendices & Graphics - Authors are encouraged to include supporting documents to illustrate the findings, relevance or utilization of materials. Particularly relevant are documents that promote easy, efficient integration of suggestions, findings or techniques into the classroom (such as rubrics, assignments, etc.). Supplemental information should enhance, rather than duplicate, information in the text.

The importance of clear, effective communication cannot be highlighted enough. Many manuscripts with relevant, original, applicable ideas will be rejected because authors do not communicate the information in a manner that facilitates easy understanding and application of key points. The value of a manuscript is lost if readers are unable to overcome written communication barriers that prevent use of the knowledge. With this in mind, authors are strongly advised to seek informal feedback from peers and colleagues on manuscripts prior to submission to *InSight*. Requesting informal reviews from relevant professionals can highlight and correct many concerns prior to formal submission, thus improving chances of publication.

References

American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

Calfee, R. & Valencia, R. (2001). *APA Guide to preparing manuscripts for journal publication*. Washington, DC: APA

QUICK TIPS: SUBMISSION GUIDELINES FOR *INSIGHT*

The following "Quick Tips" provide suggestions and guidance for submitting manuscripts to *InSight: A Journal of Scholarly Teaching*. *InSight* is a peer-reviewed publication highlighting the scholarly contributions of postsecondary faculty. The following information provides an overview of the purpose; scope and functioning of InSight so that faculty may better understand the *InSight* publication process.

Scope & Focus

InSight features theoretical and empirically-based research articles, critical reflection pieces, case studies, and classroom innovations relevant to teaching, learning and assessment. While there are a broad range of acceptable topics, all manuscripts should be supported with theoretical justification, evidence, and/or research (all methods and approaches relevant to qualitative and quantitative research are welcome); all manuscripts should be appropriately grounded in a review of existing literature.

Audience

InSight emphasizes the enhancement of post-secondary education through the professional exchange of scholarly approaches and perspectives applicable to the enrichment of teaching and learning. Relevant to this mission, manuscripts should be geared toward post-secondary faculty and administrators; included in this audience are full-time and adjunct faculty; face-to-face, hybrid and online faculty; tenure and non-tenure track instructors; trainers in corporate, military, and professional fields; adult educators; researchers; and other specialists in education, training, and communications. Recognizing the cross-disciplinary readership of *InSight*, manuscripts should present material generalizable enough to have relevance to post-secondary instructors from a range of disciplines.

Review Process

All submissions are evaluated by a double-blind, peer-review process. The masked nature of the reviews helps ensure impartial evaluation, feedback and decisions concerning your manuscript.

This review process utilized by *InSight* mandates that you should keep the following points in mind when preparing your manuscript:
- Your name and other identifying information should only appear on the title page; the remainder of the manuscript should be written in a more generalized fashion that does not directly divulge authorship.
- All information needs to be explained and supported to the extent that an individual not familiar with a particular institution's mission, vision or structure can still clearly understand the relevance, significance and implications of the article.

Focus of the Review
Prior to dissemination to the reviewers, the *InSight* Managing Editor will conduct a preliminary appraisal for content, substance, and appropriateness to the journal. If the manuscript is clearly inappropriate, the author will be informed and the manuscript returned. Appropriate manuscripts will be electronically sent to two reviewers for blind evaluation. Although there is an attempt to match manuscripts and reviewers according to content, interests, and topical relevance, the broad focus

of the journal dictates that papers be written for applicability to a wide audience. As such, reviewers may not be content experts in a relevant, matching academic discipline.

The manuscript will be reviewed and evaluated according to the following dimensions:

- <u>Relevance</u> - The most important feature of your manuscript is its relevance; the decision to accept or reject a manuscript is typically based on the substantive core of the paper. As such, manuscripts should introduce the substance of the theoretical or research question as quickly as possible and follow the main theme throughout the article in a coherent and explicit manner.
- <u>Significance</u> - Related to relevance, significance refers to the value of your manuscript for substantially impacting the enhancement of post-secondary education relevant to the target topic. Significant manuscripts will clearly highlight the value, importance and worth of a relevant topic within a meaningful context.
- <u>Practical Utility</u> - As highlighted previously, the goal of *InSight* is to enhance teaching and learning through the exchange of scholarly ideas. With this purpose in mind, all manuscripts should emphasize the practical value, relevance or applicability of information. Manuscripts should go beyond the simple reporting of information to provide InSight into the implications of findings and the application of information into meaningful contexts.
- <u>Originality</u> - The most effective articles are those that inspire other faculty through innovative practices, approaches and techniques or via the thoughtful self-reflection of the purpose, value and function of educational strategies. Thus, manuscripts that highlight original approaches or perspectives will be given priority. Per the nature of published work, all contributions must be the original work of the author or provide explicit credit for citations.
- <u>Scholarship of Teaching</u> - Contributions to the enrichment of teaching and learning should be grounded in relevant theoretical concepts and empirical evidence. As such, articles should be free from flaws in research substance/methodology and theoretical interpretation. All conclusions and recommendations must be substantiated with theoretical or empirical support; personal classroom experiences and critical reflections should be framed within a structure of existing literature.
- <u>Generalizability</u> - The broad goals and varied audience of *InSight* mandate that manuscripts be written for consumption across a range of disciplines that allows generalizability of findings and implications. Thus, while classroom techniques may be developed, tested and reported for a specific discipline or student population, the manuscript should go on to highlight the implications for other populations.
- <u>Clarity</u> - All manuscripts must be written in a clear, professional manner free from grammatical flaws and errors in writing style. The purpose of the manuscript should be clearly defined, relevant and supported by the evidence provided. All manuscripts should be structured in a manner that promotes a clear, cohesive understanding of the information presented. Be sure that your manuscript is free from organizational, stylistic or "sloppiness" barriers that would prevent effective communication of your work.

Review Outcomes

Based upon the feedback and recommendations of the two anonymous reviewers, the Editor will make a final publication decision. Decisions fall into the following categories:

- <u>Reject</u> - Rejected manuscripts will not be published and authors will not have the opportunity to resubmit a revised version of the manuscript to *InSight*. All rejections will be handled in a courteous manner that includes specific reasons for rejection.
- <u>Revise and Resubmit</u> – A manuscript receiving a revise-and-resubmit recommendation shows potential for publication, but needs significant attention and revisions. Those electing to resubmit will be subjected to a novel round of blind review.
- <u>Accept Pending Revisions</u> - A manuscript accepted-pending-revisions meets all the major requirements for publication but may need improvements in substantive, mechanical or methodological issues. Once these issues are adjusted for, the manuscript will receive a "quick review" by the Editor prior to publication. Very rarely is an article accepted with no changes required; as such, most manuscripts are accepted in this category.
- <u>Accept</u> - Accepted manuscripts will be published "as-is" with no further modifications required.

Reference

American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

Calfee, R. & Valencia, R. (2001). *APA guide to preparing manuscripts for journal publication*. Washington, DC: APA.

"In problem-posing education, men develop their power to perceive critically the way they exist in the world with which and in which they find themselves; they come to see the world not as a static reality, but as a reality in process, in transformation."
~Paulo Freire, *The "Banking" Concept of Education*