From Convocation to Capstone: Developing the Student as Scholar

Keynote Address

The Student as Scholar:
Undergraduate Research and Creative Practice

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In recent years, it has become increasingly common for faculty to involve undergraduates in their scholarship or to supervise undergraduates doing original research. For faculty, such efforts unite the dual roles of the faculty under the framework of "teacher as scholar," and, when done well, such activities can contribute to the faculty member's own scholarly pursuits. For students, working directly with professors on research has the potential to be transformative, as they interact with the knowledge, passion, and approach of the faculty to gain a deeper understanding of how to ask – and answer – new questions.

Unfortunately, the undergraduate research experience is often viewed too narrowly as an isolated component of the student's education, or as suitable for only some of the most advanced students. In this paper we argue that undergraduate research should, in fact, be at the center of the undergraduate experience, that undergraduate education should adopt the "Student as Scholar" Model throughout the curriculum, where scholar is conceived in terms of an attitude, an intellectual posture, and a frame of mind derived from the best traditions of an engaged liberal arts education. With this framework, not only each research project, but also each course, is viewed as an integrated, and integrating, part of the student experience.

Developing the Student as Scholar Model requires a fundamental shift in how we structure and imagine the whole undergraduate experience. It requires, as a minimum, the adoption of the Learning Paradigm in everything from the first introductory course through the final capstone experience. It requires a culture of inquiry-based learning infused throughout the entire liberal arts curriculum that starts with the very first day of college and is reinforced in every classroom and program. It transcends the boundaries of the classroom and takes advantage of the vast amounts of raw material now available to undergraduates. And it draws heavily from a developmentally-appropriate perspective of undergraduate education, where students move from a more passive, externally motivated experience to the active, internally-motivated posture of a scholar.

At its core, this is a vision of undergraduate education that offers students sustained and consistent emphasis on their identity as learners and as scholars, gradually blurring the distinction between the two, and it provides opportunities to develop meaningful connections to faculty and other students in campus environments that establish and support vibrant learning communities. The adoption of the Student as Scholar Model is the culmination of fundamental shifts in our underlying educational philosophy, specifically from a *teaching paradigm* that emphasizes telling students what they need to know, to a *learning paradigm* that emphasizes inquiry in shaping how students learn what they need to know, to a *discovery paradigm* that emphasizes inquiry with no boundaries.

In this paper we first examine the shift in educational paradigms and define what it means to be a student as scholar. We emphasize how the changing context of technology and scholarship makes the discovery paradigm *possible now* and increasingly so in the future.

To fully realize these possibilities, however, we need to place the Student as Scholar Model in the context of (1) student development and (2) liberal educational philosophy (Figure 1). An understanding of (especially) traditional college-age students' personal and intellectual development is critical to the successful adoption of the Student as Scholar Model. Thus, we

illustrate how understanding models of student development can be used to purposefully create curricular and co-curricular activities that build student capability progressively throughout the college years. Similarly, we position the Student as Scholar Model in the context of a liberal education, describing how the model creates a natural and highly effective focus for a liberal education framework. We show how the Student as Scholar Model provides an integrating framework for highly effective long-term learning.

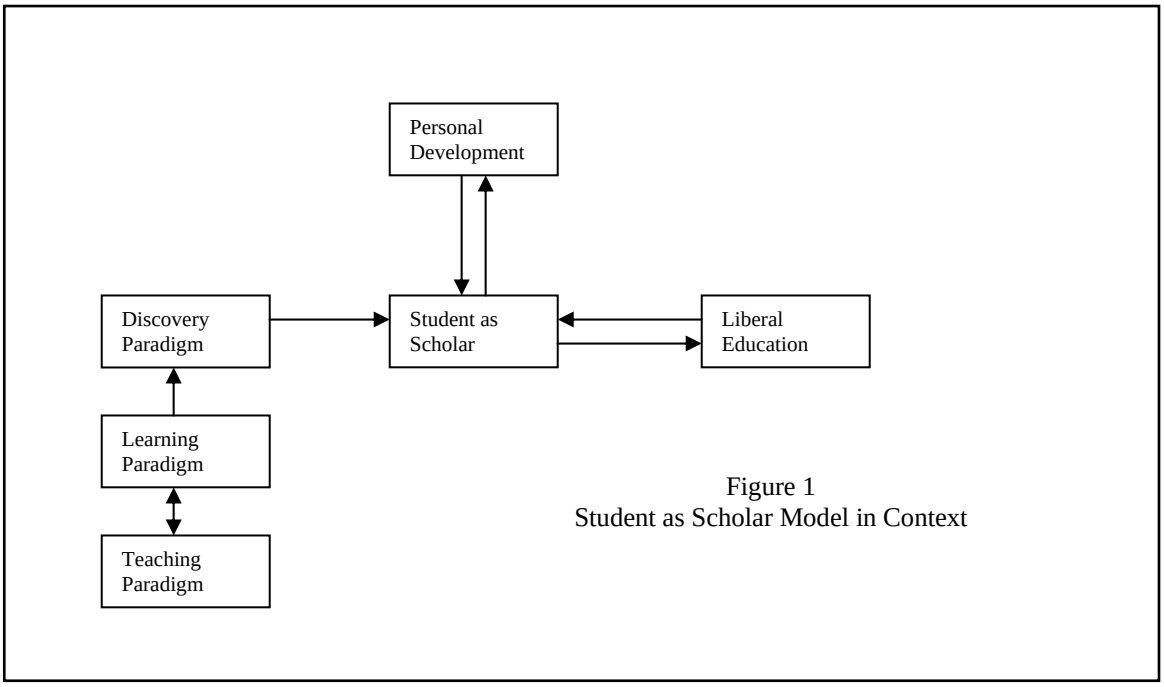

Figure 1
Student as Scholar Model in Context

To demonstrate how these elements come together, we highlight specific examples of the application of the Student as Scholar Model to three stages of student development: foundation courses, intermediate learning, and capstone experiences.

Paradigm Shifts

From Teaching to Learning

During the past decade there has been an astonishing degree of change in our approach to education. Much of this change stems from the seminal work of Barr and Tagg (1995) who brought coherence and energy to the study of collegiate education, launching the Learning Paradigm into the mainstream of higher education. Tagg's (2003) subsequent book, *The Learning Paradigm College*, both solidifies the fundamentals of this approach and provides a wealth of examples of the application of the paradigm from colleges and universities throughout the nation. At a minimum, the Learning Paradigm calls for a more open approach to student learning, with an emphasis on engaging students, adopting multiple learning formats, and assessing outcomes.

Carol Twigg launched a complementary effort through a focus on the use of technology to improve higher education with the founding of the National Center for Academic Transformation

(NCAT), which "provides leadership in using information technology to redesign learning environments to produce better learning outcomes for students at a reduced cost to the institution" (http://www.center.rpi.edu/). The keys to success include the redesign of courses from the ground up, invoking the Learning Paradigm to establish learning outcomes for the course, creating better measures for those outcomes and the costs associated with a course, and using technology strategically to achieve superior learning with reduced costs. NCAT has pushed the use of learning technologies to advance student outcomes, changing how students interact with the material and activities of courses.

The efforts of Tagg and Twigg, among others, have stimulated much deserved attention to the Learning Paradigm which provides for a more engaging and successful educational experience for college and university students. Inspired by their efforts, we believe that the Student as Scholar Model can productively extend these concepts in what might be termed the Discovery Paradigm. Table 1 depicts the distinctions between educational paradigms.

Table 1
Educational Paradigms

Paradigm	*Approach*
Teaching	Telling students what they need to know
Learning	Engaging students in learning how to learn; emphasis on learning what they need to know
Discovery	Encouraging students to seek and discover new knowledge

As we noted at the outset of this paper, "scholar" is conceived principally in terms of an attitude, an intellectual posture, a frame of mind. Many of the attributes of a scholar, as listed in Table 2, are similar to those of a learner, most notably accepting personal responsibility for learning and a focus on inquiry-driven study. Others focus on elements of how to conduct scholarship. Several attributes, however, focus on the core aspects of the "frame of mind" critical to the student as scholar, including internal motivation, a belief in one's capacity to do original research, reliance on personal authority, and the self perception of being a peer in the larger scholarly community. All of these attributes are critical to the success of the Student as Scholar Model, and they provide a frame through which we can establish specific goals for a curriculum or an individual course. In the broadest sense, though, the Student as Scholar Model provides an integrating vision of student success and development that we explore in this paper.

Table 2
Attributes of the Student as Scholar

- Accepts responsibility for learning (active vs. passive) and uses answers as an opportunity to ask more questions
- Integrates learning both within and across disciplines
- Lays out appropriate methodologies for scholarship generating or using original material
- Understands how to work collaboratively, even in a geographically dispersed team
- Is internally motivated, not needing external pressures (like grades!) to initiate work

- Believes he/she is capable of authoring new knowledge
- Judges new information based on personal values and belief system, rather than relying on external authorities
- Sees oneself as a member of a larger community of scholars and looks to peers in order to share viewpoints and contribute to the quality of critical dialogue

The Student as Scholar Model, derived from the Discovery Paradigm, extends the Learning Paradigm in three significant ways. First, it obliterates the boundaries of a traditional course, infusing in students the sense that the course is the platform on which they launch their search for understanding, and that it does not define limits on their learning and discovery. Second, it emphasizes the integration of learning across the curricular and co-curricular environments. Third, it instills in the student the belief that she or he can be the author of new knowledge. These qualities provide the opportunity for higher education to unite its core missions in what Hodge (2006) has termed the "fusion of learning." They give additional impetus to the best aspects of a liberal education and provide a framework by which we might more deliberatively link curricular progression with student intellectual development.

Technology as the Enabler of the Student as Scholar

Significantly, the adoption of the Discovery Paradigm and the Student as Scholar Model as a framework for education is possible now, in ways that were nearly impossible before, because the nature of scholarship has changed so dramatically in the past few years. Quite simply, the ability of students to access, process, and explore the raw material of scholarship has taken a quantum leap forward, primarily because of enormous changes in technology.

The most obvious technological changes revolve around the development of the internet and the concomitant increases in the amount of raw material readily available to students. Whether it is the Human Genome or images of rare documents, digital output from the Sloan Digital Sky project or galleries of art, vast sets of demographic data or collections of historic maps, students today can readily access materials that in years past were available only to the most advanced scholars who had privileged physical access to those materials. For students of only a generation or two ago, learning occurred by reading summaries or conclusions that others put forward and had at best very limited access to the raw material underpinning journal articles and books. Thus the possibilities of encouraging original student research were highly constrained, and student involvement in original research, especially research authored by themselves, was the exception.

Figure 2 displays the connection between technology change and the evolution of educational paradigms. With the availability of information limited and heavily filtered, the Teaching Paradigm provided a reasonable approach to education. With increases in information availability, and improvements in the tools to examine that information, the Learning Paradigm, with its emphasis on inquiry-based education (even if constrained by prepared sets of data) became both more plausible and more effective. The explosion of technical capability in the past decade has dramatically changed the foundations for learning, with exponential increases in access to significant raw material for research purposes. Thus it is possible, really for the first time, for the motivated student to feel excited by a question posed in a class, generating new questions and seeking answers that realistically might also turn out to be new. Perhaps most

important is that the student *believes* that this outcome is a possibility. This is the frame of mind we seek to achieve in the student as scholar model.

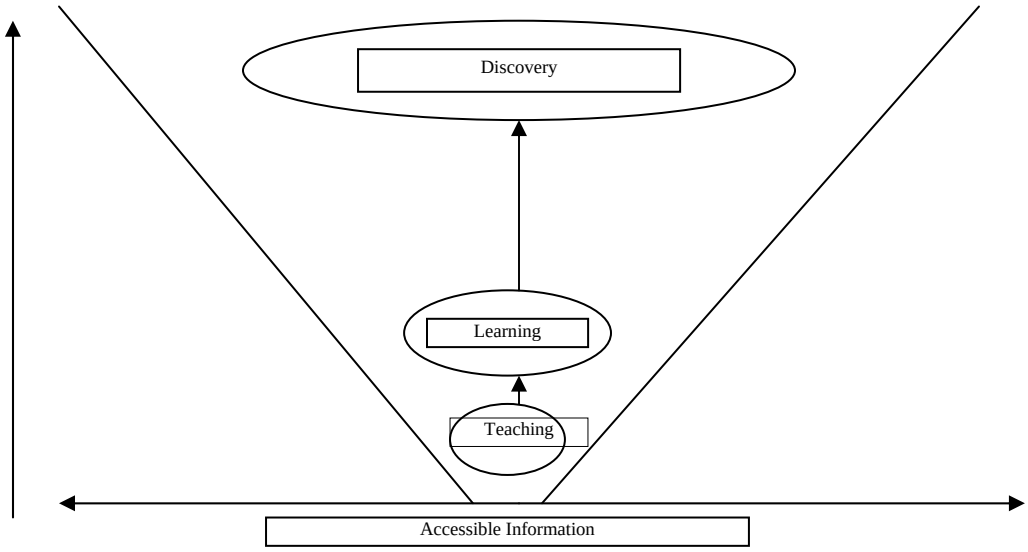

Figure 2
Technology and the Evolution of Educational Paradigms

Technological change has also dramatically altered the availability of research equipment. It is now common for sophisticated equipment, such as a DNA synthesizer, to be available in advanced undergraduate courses, and it is not unusual for undergraduates to have access to high-end MNR's as part of a research team. Through the use of this sophisticated equipment in controlled environments, the students gain the knowledge of how to use cutting edge devices, but even more importantly, how to imagine questions that require their use. We do not mean to over-emphasize the experience of students in the sciences in this regard, but the changes in what is now possible for science students to undertake is simply breath-taking. Again, we stress the critical importance of technology as *enabling* a sophisticated and successful adaptation of the Discovery Paradigm and the Student as Scholar Model by making it possible for students to create new knowledge.

The successful adaptation of this approach to education, however, also requires that we understand how students develop intellectually and motivationally and that we shape the broad elements of the learning context through a liberal education. We turn next to exploring how this understanding and context interact to create a deliberative approach to growing the student as scholar, to developing both the skills and the attitude to learning that will create outstanding learning outcomes that will continue to grow over a student's lifetime.

Building a Bridge to an Internal Foundation: Using Developmental Theory to Shape the Curriculum

A primary requirement and goal of the Student as Scholar Model is to integrate personal development with student learning in one seamless educational experience through immersion in

scholarship. From a developmental perspective, learning involves actively making sense of one's experiences (Baxter Magolda & King, 1996). This sense-making and knowledge construction helps students formulate their current sense of self and personal identity. Since learning is a "comprehensive, holistic, transformative activity that integrates academic learning and student development" (ACPA & NASPA, 2004, p. 2), developing scholars requires educating the whole student, while educating the whole student can better develop the scholar. Students have the potential to author their educational experience and become lifelong learners, but they need the support of faculty, administrators, student affairs professionals, and fellow peers to experience education as a transformative process as viewed through the lens of their development as scholars.

Robert Kegan (1994) describes composing one's reality, or self-authorship, as "internally coordinating beliefs, values, and interpersonal loyalties rather than depending on external values, beliefs, and interpersonal loyalties" (as cited in Baxter Magolda & King, 2004). Magolda and King (2004) advocate for self-authorship as a central goal of higher education. They explain how possessing an internal foundation "yields the capacity to actively listen to multiple perspectives, critically interpret those perspectives in light of relevant evidence and the internal foundation, and make judgments accordingly" (2004, p. xxii).

Kegan (1994) describes how individuals move through different orders of self consciousness as they develop an internal foundation to construct their reality and make meaning of the world. The five orders of consciousness are "principles of mental organization that affect thinking, feeling and relating to self and others" (Love and Guthrie, 1999, p. 67). In his framework, individuals move from the first to the fifth order of consciousness over their lifetime, with college students typically progressing from the second order of consciousness to the fourth order within the prototypical time frame of the traditional higher education experience (Love & Guthrie, 1999). In the third order of consciousness, students can see things from multiple perspectives; however, they have a strong reliance on external authorities for their values, acceptance, and sense of identity. In the fourth order of consciousness, students develop a reliance on their own authority. *The Student as Scholar Model focuses on students progressing from their reliance on external authority in the third order to an internal foundation in the fourth order of consciousness*. The Teaching Paradigm, in which students passively receive knowledge, upholds students' development in the third order of consciousness. The Learning Paradigm supports students in their developmental crossroad between the third and fourth order, and the Discovery Paradigm challenges students to author knowledge and utilize their developing internal foundation in the fourth order.

The challenge for higher education, Kegan (1994) explains, is to build an evolutionary bridge, that "fosters developmental transformation, or the process by which the whole ("how I am") gradually becomes a part ("how I was") of a new whole ("how I am now") (p. 43). The construction of this bridge requires contributions from all parts of higher education. Professors can provide support during this developmental transformation through "sympathetic coaching." Sympathetic coaches provide acknowledgment to the current developmental level of students, while providing challenges to the next higher order (Kegan, 1994). Peers are also an integral part of bridge building and can facilitate movement between orders, thus creating a community of students as scholars. In Project DEEP (Documenting Effective Educational Practice)

researchers explain, “Teaching, assisting, and evaluating peers places students at the center of their learning experiences. They learn to work as colleagues with faculty mentors and realize they are able to help others learn” (Kuh et al., 2005, p. 195).

Kegan (1994) urges educators to “fashion a bridge that is more respectfully anchored on both sides of the chasm, instead of assuming that such bridge already exists and wondering why the other has not long ago walked over it” (p. 332). We need to remember the level of support students need while they are “in over their heads” (Kegan, 1994); which is coupled with challenging and transformative educational experiences. Baxter Magolda and King (2004) created the Learning Partnerships Model as a guide to promote self-authorship in higher education and to build a bridge anchored on both sides of developmental challenge and support. The model provides educators with the opportunity to “reexamine their assumptions about their knowledge of teaching and administration (the cognitive domain), about themselves as educators (the intrapersonal domain), and about the nature and quality of their interactions with others (the interpersonal domain) (Baxter Magolda & King, 2004, p. 306).

In order to aid in students’ development as scholars, we must examine our current educational practices and assumptions about learning. In the Student as Scholar Model, educators must let go of their power of authority in traditional educational practices and *empower students to see themselves as authorities and creators of knowledge* as well. Rather than depending on the educator’s internal foundation to guide the educational curriculum inside and outside of the classroom, we should consciously support students’ developing internal foundations congruently within the liberal arts curriculum and through undergraduate research. Faculty, administrators and student affairs professionals can collaborate to build a developmental bridge for their students in order to develop self-authorship capabilities as scholars.

Liberal Education and the Student as Scholar

In recent years there has been a resurgence of interest in liberal education, including the launch of Liberal Education and America’s Promise (LEAP) by the Association of American Colleges and Universities (AAC&U). LEAP argues convincingly of the relevance of liberal education to modern society, a position that we most emphatically embrace. Whether a student majors in a liberal arts discipline or not, the skills, perspectives, and self-identity that come from a liberal education are foundational to all advanced education.

LEAP (AAC&U, 2007) identifies several aims that

> collectively include both the most venerable goals of liberal arts education – critical inquiry and reasoning; written and oral communication; ethical judgment; civic responsibility – and goals that prepare students for the realities of the contemporary world – scientific and technological literacy; quantitative analysis; information literacy; cross-cultural and global learning; collaborative problem-solving and experience; and integrative learning.

We build on LEAP by arguing that the Student as Scholar Model both draws on and adds to the impact of a liberal education on durable and long-term student learning. By combining key

aspects of the Learning Paradigm - e.g. establishing goals, assessing outcomes, and making learning an active process - and the philosophical foundations of a liberal education through the mental frame of the student as scholar, we can create an extraordinary student experience with superior learning outcomes.

Table 3
Student as Scholar in the Context of Liberal Arts Education

Liberal Education Goal	Student as Scholar Logic
Critical inquiry and reasoning	Evaluate validity of evidence; construct and test hypotheses; seek to understand the perspective of stakeholders
Written and oral communication	Effectively communicate research results; use writing and presentation to interrogate understanding; communicate clearly with respondents during face-to-face research
Ethical judgment	Exercise responsible scholarship; personal responsibility for results
Civic responsibility	Understanding one's self as the agent of action; analyzing personal biases as it impacts research and relationships
Scientific and technological literacy	Develop ability to ask meaningful questions and conduct appropriate research
Quantitative analysis	Explore relationships with statistics using standard packages
Information literacy	Determine how to find relevant information, filtering out unwanted material; ability to sort, analyze and describe relevant data
Cross-cultural and global learning	Creative thinking inspired by alternative points of view
Collaborative problem solving	Learn to work in teams; develop sense of peer contributions
Integrative learning	Ability to look beyond the obvious boundaries of a problem; think creatively and expansively

Table 3 showcases linkages between a liberal education and the Student as Scholar Model. Without going into detailed elaborations, this table is intended to show the remarkable complementarities between a liberal education and the Student as Scholar Model. Almost everyone leads a discussion of a liberal education with a focus on critical thinking and reasoning. It is difficult to imagine skills more central to the Student as Scholar Model, with its emphasis on developing the capacity to pose and pursue important questions. Similarly, the vastly increased access to raw material brought about by technology improvements, brings opportunity and

challenge that fit beautifully within a liberal education framework. Developing skills to find, critically evaluate, analyze, and synthesize information are foundational to a liberal education and the Student as Scholar Model.

But perhaps most interesting of all, is the need to understand the role of personal development. In the previous section we described the centrality of agency to personal and intellectual growth. Ultimately, the capacity to undertake original research rests not only on the skills achieved, but also, and most emphatically, on the extent to which a student understands his or her own capacity to author original material. Here, again, the linkages between the Student as Scholar Model and a liberal education are exceptionally strong. One of the most enduring goals of a liberal education is to create "the educated person." The Student as Scholar Model provides an organizing framework precisely for this important goal.

One Miami University senior reflecting on his experiences, noted the importance of developing as that "educated person" from the beginning of one's college career. He referenced his first year, English Core course, saying, "It taught me the importance of independent thought, but also the importance of emotion, its expression, and its power play in acquiring and actively utilizing knowledge. Without this course, it would have taken me until my junior year, during which I took a comparable course, for me to develop a sense of cognitive and emotional agency." These types of transformative experiences should not only occur in one course in a student's academic career, but throughout the curriculum.

Creating the Student as Scholar Experience

As we argued earlier, to be truly successful, the Student as Scholar Model should apply to the entire curriculum and take into account the development of students. To illustrate how this might be accomplished, we offer a few examples from three different points on the "developmental bridge." Foundational courses anchor one end of the bridge. At the beginning level, students have a limited vision of themselves as legitimate authors of new knowledge and rely on external authority for discipline and guidance. As students move to the middle of the bridge, they are involved in courses that include projects that are more open-ended, often involve collaborative work, and draw on multiple skills and points of view. Less external authority is needed, although some structure remains valuable to student success. At the far end of the bridge, advanced students have the opportunity to create their own research questions and develop their own methodology, knowing that they have the chance to provide original contributions. They understand that motivation and authority come from within. Kegan (1994) reminds educators about the importance of creating a bridge that is "more respectfully anchored on both sides of the chasm, instead of assuming that such bridge already exists" (p. 332). Thus all courses or experiences are equally important to students' development as scholars, regardless of their advanced status.

Foundation Courses: Stepping out onto the Bridge

Educators can fail to provide support "by neglecting to build a bridge out of and beyond the old world and by expecting individuals to take up immediate residence in the new world" (Love & Guthrie, 1999, p. 75). The foundation course thus begins with meeting students at their current

level of development, which can be dualistic, consequence-driven thinking, and reliant on parents and professors as the creators and disseminators of knowledge.

Biology 180, at the University of Washington, is the first course in a three-quarter sequence of introductory courses for students intending to major in Biology or related fields in the life sciences. The course is five credits and enrolls roughly 345 students per quarter. Unfortunately, too many students fail the course.

To increase student achievement and reduce the failure rate, Biology 180 faculty proposed to test several new types of active-learning strategies: 1) daily, in-class, multiple-choice questions that were either graded via a radio frequency student-response system ("clickers"), or un-graded via cards held aloft by students; and 2) weekly, peer-graded, written practice exams that were either done in groups of four or individually online.

In spring 2005, faculty evaluated student performance on identical midterm and final exam questions, based on their risk score**,** and on their participation in one of the four course designs implemented. The course designs include the use of clickers coupled with a four-person exam study group, clickers coupled with students completing practice exams online, four-person exam study groups, and finally practice exams online.

The results provided convincing evidence that on average, students did better in the newly revised course (regardless of which design was implemented) than students had done in previous quarters. The faculty saw a drop in the failure rate and improved exam scores across the board. Additionally, when analyzing only the high-risk student population, they found strong evidence that these students performed better with the clickers and online group educational strategies, especially when these counted towards their grades.

Biology 180 provides an excellent example of how transforming an introductory class to make it inquiry-driven, student-centered, and active can improve the experience, especially with an understanding of student development. At this level, significant external discipline provides a strong boost to student learning. To help students have successful experiences at the "beginning of the bridge," they not only need strong foundation courses, but informed and committed professors teaching those courses as well. These students are becoming active participants in their learning and are looking to the professor for guidance. Initial educational experiences set the foundation for students to be scholars. This is illustrated in the revised Biology Course, as it launches the Student as Scholar Model through a course format that shapes how students learn by recognizing their need for assistance in accepting responsibility for their own learning.

Intermediate Learning: Crossing the Bridge

Once incoming students have completed their foundation courses, they will find themselves in the middle of the "bridge." At this point in their undergraduate careers, students are engaging in intermediate-level experiences – experiences which take them "beyond the book" and challenge them to continue their development as scholars. These students are active participants in their learning. They find themselves involved in opportunities which demonstrate how to work collaboratively with others. Doing this enables students to feel a part of a larger community of scholars – one where they can look to their peers for help and support. They are more

intrinsically motivated since they understand that they are capable of being authors of their own knowledge. Through these intermediate experiences, students begin to develop the capacities necessary to judge new information based on their own personal values; they spend less time looking to external authorities for the answer. These intermediate opportunities show students how to develop scholarly work by using original material. They also prepare students in understanding how they can integrate their learning within and across disciplines.

The Student as Scholar Model challenges both the professor and students to take learning to a new level. Tim Greenlee, a marketing professor at Miami University, does this successfully with his 300-level course by running an inverted classroom. By viewing his course as a discovery experience for his students, Greenlee empowers them to use technology, inquiry, and collaboration to develop as scholars.

In the inverted classroom, activities that traditionally take place inside the classroom, such as the course lecture, happen outside the classroom, via technology. Activities that traditionally take place outside the classroom, such as group projects, happen inside the classroom, allowing for more one-on-one interaction with the professor. In this marketing course, students watch the video-based lectures (which are posted online) before each class. With his previous in-class, "by-the-book," lecture style, Greenlee felt that there was limited interaction between both the students and himself and the students with each other. Viewing the lectures before class allows the students to devote their time in class to collaborating on group projects. The outcomes of this kind of experience are increased critical thinking, communication, problem-solving, and responsibility, all of which align with the outcomes of a liberal education as well as the student as scholar model.

Group collaboration increased when Greenlee began giving his own quizzes – opportunities as he calls them – that are designed only to benefit the students. Students work in groups throughout the semester and each group member's opportunity score is averaged together for a team score. This friendly competition between the teams has fostered camaraderie within each group. This camaraderie, in effect, creates a richer research experience for these students. One of the main attributes of a scholar is taking ownership of one's learning, and as the students work in their groups on self-selected research projects, they are doing just that. They are intrinsically motivated to successfully do the research for their in-class projects.

Although these students are at a point where they are capable of directing a majority of their own learning, they are still looking for guidance along the way. So, Greenlee provides the teams with a daily agenda, which keeps the students on track. His role has become that of facilitator, rather than solely that of lecturer.

This intermediate course focuses on the *process* of learning and of researching. The students are learning how to integrate what they know not only with other marketing courses, but also with other curricular and co-curricular endeavors. The liberal arts education goals of critical inquiry, communication, ethical judgment, problem-solving, and integrative learning have proven to be outcomes of an inverted classroom such as this one. It is in this developmentally appropriate environment that students learn to proudly wear the "hat of a scholar."

Intermediate learning experiences can also happen outside of the classroom. Every year one hundred Miami University students are selected to be a part of a unique and rewarding research experience. The Undergraduate Summer Scholars Program (USS) "enables Miami undergraduates to do ten weeks of research or other creative activities in the summer under the supervision of faculty" (http://www.units.muohio.edu/oars/undergrad_research/). Students are awarded a stipend of $2,600 to put towards their chosen research topic, as well as funding for supplies and travel, twelve hours of academic credit, and a faculty allowance. This kind of support demonstrates the university's dedication to undergraduate research and developing students as scholars.

The Undergraduate Summer Scholars Program focuses on student-faculty collaboration. Miami University faculty members serve as mentors to the student conducting research. This benefits both the student and faculty member, as it "links [both] scholarship and teaching [and] provides an educational opportunity shown to increase student intellectual maturity" (http://www.units.muohio.edu/oars/undergrad_research/); intellectual maturity is what enables students to embrace the identity of a scholar. These students are learning to take ownership of a research project that they are working on with a faculty member, preparing them – as they continue to cross the bridge – to be able to take full responsibility for their own project.

Reaching the end of the Bridge: The Capstone Experience

Along the developmental bridge of the Student as Scholar Model, the capstone experience provides the highest level of freedom and challenge to students. Within the capstone experience, which classically integrates liberal learning with specialized knowledge, students have guidance to frame their inquiry; however, they call upon their personal belief system and values to make decisions and conduct inquiry. Students extend their learning in a particular area of focus, critique existing knowledge, discover new information, and apply learning across disciplines, an experience that Project DEEP (Documenting Effective Educational Practice) (2005, p. 188) found "contribute(s) to the high levels of academic challenge." If properly prepared, students are now at the far end of the developmental bridge, at the fourth order of consciousness, and they no longer need as much outside support as described in the foundation and intermediate examples.

At Miami University, "each Capstone emphasizes sharing of ideas, synthesis, and critical, informed reflection as significant precursors to action, and each includes student initiative in defining and investigating problems or projects" (http://www.units.muohio.edu/led/Capstone). The core of the capstone experience is evaluating information according to one's own values and belief system, asking intriguing questions, and authoring knowledge to those questions. Miami's statement about capstones reminds students about the importance of critical reflection before action. Students with an understanding of their internal foundation also utilize a self-awareness that helps them to be self-evaluating, set limits, and maintain boundaries. The statement also reminds students about the importance of sharing ideas, which can mean contributing to scholarship in the discipline, giving back to the community, or sharing with other students as scholars.

In Miami University's capstone titled *Ethnographic Field Research*, students complete an ethnographic research project of their choosing. They collect, record, and analyze the data, and present a picture of the culture in a final paper. Another capstone experience at Miami

University, titled *Systems Design and Implementation* calls for students to perform a major open-ended design project in collaborative teams. Students create a working software product using their varied experience and skills, and consider difficult factors, like ethical and security concerns. As an ethnographic researcher or member of a systems design team, students need to have an understanding of themselves and the confidence to work independently of faculty member and classroom instruction.

Portland State University offers an excellent example of a capstone experience that anchors the far side of the developmental bridge, by situating the senior capstone within the community. These experiences "provide an opportunity for students to apply the expertise they have learned in their major to real issues and problems in the community" (www.aacu.org/issues/curriculum/capstone.cfm). Students are not only integrating experiences in the curricular and co-curricular, and from their liberal arts education and major specialization, but are also developing into engaged citizens. The capstone *Portland 2003: Oregon Community Visions* is an example of this community-based learning.

Students in this capstone work with the Mayor's office, City of Portland staff, and members of the larger community to initiate the implementation of the vision for the city of Portland. The coursework includes research, attending community meetings, drafting ideas and plans, and working with community organizations. The city of Portland and the university validate the students' intellect, capabilities, and identities by including them in the vision process. The student research in the capstone seeks to understand the perspectives of those in the community to insure a broad public involvement in the vision process and the implementation. The students in the capstone work collaboratively with community members and each other to dialogue about implementing the city vision. The capstone fosters a community of scholars to engage with course materials and original research, which the students are capable of producing. At the end of the course, students analyze their community research results and present a report to the vision committee, Mayor, and City Council.

A capstone experience is a point of intersection for students' liberal arts education, major focus, undergraduate research, and the co-curricular. The student as scholar framework progresses the intersection of learning and scholarship found in the capstone, and calls for ongoing critique, discovery, and application throughout the curriculum. A capstone-like course does not need to remain in a classroom or at the end of a student's time in college. The Urban Leadership Internship Program (ULIP) at Miami University is an example of a unique immersion experience that combines professional practice and service in an urban setting (Egart & Healy, 2004). Situated in the Learning Partnerships Model (Baxter Magolda & King, 2004), students in ULIP have the freedom to create their own internship and pursue intriguing research or projects that align with their passions. Like scholars, the interns work both collaboratively with co-workers and independently to create knowledge, actively contribute to the organization and community, and integrate learning across multiple sectors of their lives. This unique immersion program causes dissonance in students, and continues the never-ending process of developing an internal foundation, or personal belief system. Like this program, educators can challenge and support students to integrate learning from their liberal arts education and major, and take advantage of the growing opportunities within scholarship.

Conclusion

The Student as Scholar Model provides an especially effective framework for undergraduate education. It places scholarship at the center of the undergraduate experience, shaping the curriculum from the very first class through the capstone experience. It directly addresses the need to incorporate models of student development. It focuses on creating the bridge, starting from a perspective in which external authorities prominently prevail, to a level where students are internally motivated, believe that they are capable of producing original knowledge, and see themselves as peers in the world of scholarship. Similarly, the Student as Scholar Model draws from and adds to our understanding of how a liberal education shapes how students understand the world and position themselves in that world.

The adoption of the Student as Scholar Model has the potential to dramatically improve the impact of American colleges and universities. First and foremost, it can provide better educated undergraduates, students who have the skills needed to deal with a fluid world. They will not only be better educated, they will also have the confidence, as well as the ability, to perform at a much higher level immediately at graduation, thus positioning them to be life-long learners.

Second, by merging developmental understanding with a liberal education in the context of the Discovery Paradigm, the Student as Scholar Model provides a framework that colleges and universities can use to set goals across the entire curriculum, *with a better understanding of what is necessary to achieve those goals.* As Bok (2006) and others have argued, we can create a much more effective educational system by being more purposeful in setting and pursuing our basic goals.

Third, the Student as Scholar Model offers a powerful path to reducing the boundaries that separate the core higher education missions of teaching, research, and service. The "fusion of learning" brought about by the Student as Scholar Model not only reduces the boundaries, it in fact actively reaches across those boundaries to draw energy for building the attitudes and competencies required to be a successful scholar. We view the integration of these functions as one of the most exciting potential outcomes of the approach.

Having said this, the adoption of a Student as Scholar Model poses many significant challenges, challenges that we expect to wrestle with during this conference. The most direct challenge is to construct a curriculum that embraces the Student as Scholar Model. At both Miami University (Top 25 Initiative) and the University of Washington (Foundations Initiative), efforts are underway to adopt the Learning Paradigm in the largest first year and lower division courses. Although the initiatives are generating many exciting approaches to creating inquiry-driven, student-centered, and active education, implementing these ideas is challenging and demands a great deal of the supporting context. Changing one course in isolation is difficult; trying to get all of the relevant moving parts synchronized is daunting at the beginning of this process. Everything from student services to libraries affects the success of the initiatives. Thus it is critical to view these changes as truly foundational, broad-based, and transformative.

One of the key contextual variables contributing to the success of the student scholar approach is developing a deeper understanding of student development in the faculty. Most faculty have

little training in pedagogy, let alone student development theory. And yet, the successful adoption of the Student as Scholar Model requires a deep understanding of the bridge needed to move students from the third order of consciousness to fourth order of Kegan's (1994) evolutionary bridge. How do we build that expertise? Additionally, moving to the Learning Paradigm and then to the Discovery Paradigm requires faculty to take on a different and new role in the classroom. Instead of holding the power, they are now empowering the students to take control of their education and author knowledge as well. It requires difficult self-assessment in how faculty view themselves and their relationships with students. How can we better encourage faculty to reexamine their roles and relationships?

At a practical level, the successful bridge also requires a better melding of the curricular and the co-curricular. Students learn, learn how to learn, and develop the confidence to learn and discover on their own through the full range of college activities. How, then, do we more purposively develop and link co-curricular activities to the ultimate goal of the student as scholar?

Similarly, as we work hard to spread an appreciation of the power of a liberal education to the broader public, we need to see the Student as Scholar Model as providing a motivating clarity to those values of a liberal education that we hold most dear. The Student as Scholar Model provides a sharper image of what it means to be "an educated person." While it may not provide all of the breadth that many would associate with this label, we believe that it energizes and coalesces many of the most essential elements of a liberal education.

This is an exciting time in higher education. We have unprecedented opportunities to engage our students in their learning in new ways. We know more about how students develop, what enduring skills are most critical, what motivates students, and how to provide students with virtually unlimited access to original raw material that they can explore with "attitude." It is this attitude, this frame of mind, that fundamentally changes how students can think about their education. We believe that this attitude can lead to deeper, increasingly motivated, and more enduring learning not only during the years of formal study, but also throughout a lifetime of informal and formal learning in an ever-changing world.

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