SECTION B

RESEARCH-BASED STUDENT LEARNING AT THE POST-SECONDARY LEVEL

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ABSTRACT

Research-based student learning is an educationally sound approach to learning adding value to undergraduate courses and enhancing students' long term academic experience. Research-based learning should recognize the student as researcher, begin at the undergraduate level, and be embedded in all discipline courses and across the curriculum. It requires active student engagement, and can be complemented by the use of qualitative methodology in research and critical thinking very early in the education experience. Post-secondary institutions need transformational leaders to meet the challenge of placing research at the center of student learning. To reach student goals, institutions must develop a strategic plan, persistently monitor all facets of research-based student learning and continually cultivate a culture of inquirers within an ever-changing academic environment.

Research-based Student Learning at the Post-secondary Level

Since the 1990s, academics have written about how students learn. As early as 1985, educators began applying Total Quality Management (TQM) principles to academia in an attempt to reexamine and make the overall academic experience more efficient. In the late 1990s, academic discussions concentrated on the need for post-secondary institutions to transition from a teaching-centered to a more learning-centered approach to education. As the shift gradually occurred, institutions saw a need for continuous monitoring of this learning experience in order to assess the process. Many universities now have a Quality Enhancement Plan (QEP) in place. In addition, institutions have implemented Continuous Quality Improvement (CQI) as a method of assessing whether or not efforts to build a new learning environment have been successful while at the same time assuring students' overall academic success. The question is what type of learning is best suited to specific academic programs. For example, project-based and problem-based learning have been used as ways to accomplish learning objectives in certain types of management courses; however, those approaches are not necessarily suited to all programs and courses limiting students' ability to conduct research in other areas. This paper contends that research-based student learning is an educationally sound approach that can add value to any undergraduate course as well as enhance the students' long term academic experience. In addition, it further proposes that the qualitative method is suitable to the time constraints of the research process and coincides with learning critical thinking and analysis very early in the education experience.

Background

The idea of an academic learning community has been around for some time. O'Banion (1997) recommended fostering such a community as early as 1936 when he proposed that

students learned best by working on real problems. He also recommended new concepts of assessment and was an early proponent of embracing Total Quality Management (TQM) in academia. O'Banion had a vision for the future of education in the 21st century. The idea that change needed to take place followed over time. Initially, the proposed changes focused on learning, but the approach to the change and the emphasis was on the teacher side. While teachers were beginning to promote the idea of a new learning community, students knew little about the transformation that needed to take place. For the most part, students continued with a traditional approach to learning. Historically students sat in a classroom and expected the teachers to deliver the intellectual goods. Some students took notes and accumulated facts while others sat in a classroom waiting for the lecture experience to end. That was a reality that academia needed to address. Most learning that took place was passive. Students may not have known better because the lecture format was the traditional approach to learning. Some disciplines dealt with case studies and problem-solving, but not many were concerned with research-based student learning. Instead the focus was on research-based teacher learning. The community of learners that began to emerge initially regarded teachers as researchers who imparted their knowledge learned through personal research to passive students. Over time, that approach to research dominated the classroom. When it became apparent that the research process had to be readdressed by placing the student at the center of learning, it was apparent that across the curriculum there was no standardization of a research process in place to accomplish this. The discussion for learning for the 21st century had to build on that which preceded it. O'Banion's revisit to the idea of a community of learners in the 1990s began the conversation to examine the link between research and learning.

Literature

The literature links both research and teaching, and research and learning. Differentiating among author arguments necessarily assures that the information and recommendations provided herein targets the student experience rather than the teacher experience in research. Brew and Boud (2009) claimed that overall learning is the link between research and teaching. Initially, they stated that the value of research in the learning experience comes from the teacher or instructor side. They further contended that teachers who research have more to add to the student experience than otherwise. Van Heuvelen (1991) developed research-based instructional strategies in physics (p. 891). He suggested that it would be beneficial to integrate certain research strategies into undergraduate introductory courses in physics, especially those centered on problem-solving. These are just two examples of many where the discussion rested on linking teaching and research. Both Brew and Boud and Van Heuvelen proposed attacking the question from the teacher side, with Van Heuvelen recognizing the value of introducing research strategies in the introductory courses. The teacher-centered aspect aside, the linkage under discussion in this paper focuses on research-based student learning, or an examination of research from the other side, the student side, of the equation.

Linking research and learning to students' calls for a clearer understanding of the meaning of research, an identification of the researcher in today's terms, and an understanding of what constitutes learning. Researching is a process of discovery and inquiry about a specific subject (Boyer, n.d.). Learning is a process involving change in knowledge, beliefs, behaviors, or attitudes and is something students themselves do (Ambrose, Bridges, DiPietro, Lovett & Norman, 2010, p. 3). Taken together, this marks a shift in thinking about research-based learning. As mentioned, early writings on this subject focused on the teacher as researcher. The

approach was traditional or lecture-based. Teacher research was thought to enhance the student experience as students engaged in project-based learning. The Higher Education Academy (n. d. a) concurred that research and teaching have been interpreted in traditional ways focused on teacher research; however, it follows that as universities transform so should the focus of research-based learning to concentrating on the student (para. 3).

Brew and Boud (1991) stressed research as the process of learning and learning as a process unto itself (p. 267). Furthermore, research involves communication of ideas just as it encompasses the concept of learning from mistakes. The common thread between research and learning is the process of inquiry which can be done individually or in groups (p. 269). Where Brew and Boud argued from the point of teachers as researchers, their suppositions can be applied to students as researchers. Consequently, where teaching effectiveness has been a goal in the past, achieving student learning objectives could be the goal today. Finally, where teacher research productivity has been the measure with learning outcomes transmitted from teacher to student, the student research process could be the measure of student success and learning the direct outcome (p. 271).

On a different note, Healey (2005) differentiated between research-led, research-oriented and research-based learning all of which help illustrate the link between research and student learning. Research-led means students learn as researchers within a curriculum designed to include inquiry-based activities; research-oriented refers to a process centered on student research; and research-based means the student is the researcher (p. 2-3). These linkages between research and learning emanate from a student-centered vantage point. For the purpose of this paper research-based learning refers to a student learning process accomplished through inquiry and discovery to advance knowledge within a research-based curriculum. This definition focuses

on the student as the researcher (active learning) rather than as an audience (passive learning), and includes a curriculum that is learning-focused and research-process oriented. This approach does not intend in any way to diminish the fact that teacher research can add significant value to the process. Also, not all post-secondary institutions require that teachers engage in research; those institutions that do require teacher research have teachers who tend to focus on their own research rather than on developing the research skill in students. Transitioning to research-based student learning requires that educators think about research learning in a different way.

Brew and Boud (1995) speculated on the idea of infusing the link between learning and research into the design of courses (p. 272). Van Heuvelen (1991) proposed the idea of research-based strategies in undergraduate courses. Generally, these authors concur. The time may be right to revamp undergraduate curricula to include a research-based student component. This could be done even if the research component is relatively elementary as compared to the level of student research at the 400-level or beyond. Healey (2005) also proposed that students gained knowledge from reading and lectures, but learned research and techniques through work-based learning (p. 2). Healey cited the 1999 *Boyer Commission on Educating Undergraduates in the Research University* to support his contention that research-based student learning should be standard and occur in the first year of the college experience (p. 9). Healey added to the comments made by Brew, Boud, and Van Heuvelen that support research-based learning early in students' academic careers.

In addressing student prior knowledge and student motivation, The Eberly Center for Teaching Excellence (n.d.) proposed that for students to achieve learning goals they need to acquire skills, practice skills and then apply skills (para. 5). Considering that these skills can be learned while working within the research process, the center's comment regarding skills

supports the previous authors' who suggested that the research-led student-based experience should occur early in the academic experience, be practiced in more than just one undergraduate course, and be done within a research-directed component of the course in order to actively apply skills.

The Foundation for Critical Thinking (Paul & Elder, 2008) confirms the need to include critical thinking as part of the students' learning process. It identifies critical thinking as "self directed, self-disciplined, self-monitored, and self-corrective thinking" (p. 2). Higher level thinking requires both intellectual skills and traits. Some of these skills include reading and reflection, data inquiry, data analysis and communication. Intellectual traits include: intellectual autonomy, integrity, humility, empathy, courage, perseverance, fair-mindedness, and confidence in reasoning (p. 13). Mastery in thinking is achieved when "good habits of thought are becoming second nature" (p. 20). The Foundation's explanation of critical thinking accentuates the need for institutions to provide a path for students to master the associated skills and traits. Learning research requires exposure to the research process over time; critical thinking requires practice over time. In addition, learning through research is a self-directed process and critical thinking is a self-driven process. Research-based student learning is the ongoing process that allows students to develop critical thinking. Linking research-based student learning and critical thinking early in the education experience can provide the foundation upon which to build a culture of inquirers. To accomplish this linkage, post-secondary institutions must review how they revamp curriculum design and learning objectives.

Research reveals that some universities realized a need to plan curriculum, link the plan to their vision, and periodically review their programs. The University of Houston (n.d.) developed its Quality Enhancement Plan (QEP) around the idea of linking research with the

university's mission and by promoting discovery-based learning at the undergraduate level as well (p. 1). The University of Houston's approach is transformational in that it takes elements of its QEP, such as a research supportive curriculum, and matches these elements with core competencies like critical thinking (p. 3). As a result, it appears that the post-secondary education experience could benefit from some element of research-led, inquiry-based learning very early in the college experience and in most courses, if not all.

The literature is replete with commentary on research-based learning for teachers as presented by Brew and Boud (1995) and notes a shift in emphasis to research-based learning for students as proposed by Van Heuvelen (1991). Defining research as it relates to education was a task taken on by some of the literature. Other literature stressed that students need to take an active part in their learning experience, and pointed out that the research process is an avenue that can promote that experience (Higher Education Academy, n.d.; Healey, 2005). Glesne (2011) was persuasive in arguing for the use of a qualitative method for research early in the student's academic career maintaining that this method might be more conducive to the process of research-based student learning. The review also showed that many universities like the University of Houston have begun to develop Quality Enhancement Plans as a way to map out how the institution will achieve its goals. With a clear definition of research, an understanding of how students learn through active participation, and plotting the delivery of quality education, universities are better positioned to provide students an opportunity to learn research through most courses beginning very early in their undergraduate work. Not to be overlooked, the literature also addresses theory, models and method as each relates to research-based student learning. By no means, however, is the literature presented here exhaustive.

Theory, Models, and Methods

Theory

Mitchell and Jolley (2004) explored the value of theory in research and noted that some disciplines focused on theory while others centered on common sense (p. 1). Selecting appropriate theories can provide the proper framework for research. Theories tend to be both internally consistent and consistent with existing facts; they can make predictions that run counter to current thought and even may suggest new controversial ways of looking at the subject matter (p. 2). Theories can also coordinate with other experts' efforts, are often broad in scope, testable, and explain the facts with just a few ideas (p. 3). Carnegie Mellon's Eberly Center for Teaching Excellence (n.d.) provided an effective theory or principle of learning that complements this study (para. 1-7). The Center's learning principle stated that learning is affected by the following: students' prior knowledge; how students organize knowledge; motivation, mastery, and application of core skills; goal directed practice with feedback; interaction with all aspects of the course; and, the need to monitor and adjust their approaches to learning to become self-directed learners (para. 1-7). These aspects of the principle of learning can provide the theoretical foundation for discussion of research-based student learning. With a theory for research-based student learning identified, the next step was to identify a model to use in applying the theory.

Models

Models are useful tools in developing processes. The Higher Education Academy (n.d. a) in the United Kingdom published an article on student learning that presented a useful model that goes along with the research-based student learning theory. The article began with a discussion of two known types of learning: deep and surface. Deep learning requires student

engagement where surface learning is somewhat passive and cursory. The article extended this thinking and proposed a heuristic (exploratory or investigative) model that "includes deep, surface and strategic approaches to learning" (p. 1). This model allows students to take a situation or event, discover information, and learn in the process. The strategic component of the heuristic model considers students' desire to achieve a positive outcome from their work (p. 2). Students take different approaches to learning but can be directed by instructors toward engaged or active learning. If used to achieve learning this strategy can influence how and if students achieve learning outcomes. In the surface approach it becomes clear that some students prefer certain ways to learn and some work to satisfy external course requirements, among other variables. The Higher Education Academy (n.d. a) proposes that the deep approach is more rewarding to students, that students should be actively engaged, should seek to learn through personal exploration, and ultimately "become involved in creating knowledge and understanding through discussion" (p. 8). The heuristic model works for research-based student learning in that it takes into account all types of learning (both deep and surface), involves the instructor in the process (facilitating the improvement of student learning skills), and rewards student achievement (a useful strategy).

Methods

Stony Brook University's President Boyer (n.d.) proposed that inquiry-based or discovery-based learning should be the standard for learning and insisted that there needs to be a change in the way instructors use undergraduate methods to accommodate research-based student learning (p. 1). The university uses a model that moves the student body from that of a culture of receivers (traditional approach to learning) to that of a culture of inquirers (transformational approach to learning). Not only does the university propose involving the

undergraduate in the research process but it insinuates that "every course in an undergraduate curriculum should provide an opportunity for a student to succeed through discovery-based methods" (p. 5). The university's ideal educational learning model is collaborative, done through discovery and communication, and across the curriculum (p. 4). Research-based learning could place the student at the center of the model. With a few sound models from which to draw, the focus now turns to research methodology.

Students can select from three methods to do their research: quantitative, qualitative, qualitative/quantitative mixed. Within each of the methods are further options to consider. This paper argues for undergraduate qualitative research. As previously mentioned, Van Heuvelen (1991), a physicist, suggested that instructors encourage students to think in terms of representing their research as a physical process that leads to quantitative and qualitative understanding (p. 892). His observations noted a resistance on the part of students to do qualitative representations as they tried to solve problems. He concurred that students do not have a clear understanding of qualitative concepts, may have little, if any, opportunity to develop the special techniques needed for that method, and that in his discipline students are exposed to the lecture format which at best may ensure that knowledge is imparted (p. 893). Where Van Heuvelen (1991) was concerned with remedying the passive nature of instruction in science, instructors today should be just as concerned about passive delivery in their respective disciplines. Glesne (2011) offered another take on the value of qualitative research. She recommended that research should be analyzed and not reduced to numbers or a norm; it should be written up as a descriptive narrative which amounts to a qualitative approach. One of Glesne's recommendations was to do research within an interpretative qualitative tradition which means that a student acts on audio and visual sense experiences and then interprets someone else's

perspective of the world around them (p. 24). Although interpretative inquiry required the researcher's perspective as a means to learn about others as well as various researched events. Glesne (2011) offered a process for students wishing to conduct qualitative research that includes reading, reflecting and doing (p. xvi). McKeachie (2002) claimed that to promote critical thinking through active learning, instructors need to incorporate activities that engage students in active thinking, reflection and tasks (p. 208). Both agree on reflecting and doing. The difference between Glesne's reading and McKeachie's active thinking could be thought of as two parts of one action (reading).

Anderson, et al. (2001) revisited Bloom's taxonomy and presented a new basis for curriculum development and accountability. They also thought of their work as a way to update available knowledge on learning by devising categories of cognitive processes that include remembering, understanding, applying, analyzing, evaluating and creating, all of which are useful for classroom instruction (p. 31). The value of their contribution lies in designing curricula to address research-based student learning. The framework these authors presented is appropriate to achieving instructional objectives and is conducive to learning within shorter periods of time. Generally Glesne, Van Heuvelen, McKeachie, & Anderson, et al. agreed that curricula could be updated based on categories of the learning processes and they call for a qualitative approach to research using interpretative inquiry. The literature reviewed highlights useful theory, models and methods compatible with research-based student learning.

Research-Based Learning

The Social Sciences come closest to incorporating inquiry or discovery-based research and promoting research-based student learning. For example, the discipline of history requires a study of the profession, or historiography, at the early undergraduate level. The author has first-

hand experience with the learning process involved with producing a valid history research product. Within the History program, Historiography had to be the first history course that a student took; it included a foray into an explanation of research and exposure to experts in the field over time. At the end of this 100-level course, the student ostensibly had a foundation in history that should prove valuable later in the academic experience. As the student progressed through the degree program, a research paper was required in every course, and in these history courses most papers required students use the qualitative method and primary sources. Over time the student gained an understanding of the validity of primary sources which became part of the cumulative learning process. As the level of education increased, the expectation for a more substantial research product increased. The concluding document for the undergraduate degree in history was a 400-level research paper. The learning in these classes, however, took place within a classroom lecture or traditional format.

Because creating a research paper was the focus of the senior research course, during the first three or four weeks of the ten week term the research process was discussed, paper expectations reviewed, research conducted and data accumulated by the student as the research learning process continued. Around midway in the course, content shifted from that of learning about and doing active research to that of compiling and creating a product. A passing grade on the student research paper was required for graduation. The research process required for this final course had merit. On a positive note, students had been exposed to learning how to research, were actively engaged in the process, and the repetition of the research process assured some level of retention in both information and the research process itself. Unfortunately, the teaching style in the classroom which relates to how students learned foundational knowledge was traditional and passive, and evident throughout most of the undergraduate learning

experience. This disparity between active research and passive learning can promote anxiety among students. This example can serve as support for the supposition that the research process should begin early, evolve over time, and lead to students' ability to turn out a viable product; but it also highlights the need to have active learning in a transformational environment as part of the research process.

Another example associated with the same academic experience involved group collaboration in a lower level American History course. The assignment was a group task in research. The instructor provided the overarching research topic which was a specific historical event, in this case the Cuban Missile Crisis. Each student had to write on a subtopic of the main topic: for example, the diplomatic relationship between Khrushchev and Kennedy, the U-2 spy plane incident, or the Bay of Pigs fiasco. The class continued working on individual subtopics as the learning process of compiling information progressed. At the end of the term, students presented abstracts of their individual subtopic papers and did so on in order of occurrence. Ultimately, the presentations illuminated the overarching topic for the group much more so than had students done a paper on separate topics of their own choosing. The presentations also served as a springboard to further discussion at the time of presentation because each student had a vested interest in the conversation. This group assignment example illustrates the value of group (student-centered) learning within a research-based course. The shortcoming in the experience was that the informational part of the class was done in the traditional lecture format.

These examples show that research-based student-centered courses could provide the opportunity for students to learn foundational material. Because delivery of the material in a traditional lecture format tends to facilitate passive learning, it follows that transformational changes in, for example, classroom delivery are needed to complement the experience and

encourage active student involvement. Some institutions have successfully adopted transformational practices that demonstrate the success of research-based student learning early on and across the curriculum and serve as best practices.

Best Practices

Having provided some background on the subject, identified the problem that persists, and discussed the level of transformation that needs to occur across the academic community, the next phase of this study provides evidence of transformational changes in process at some universities. Griffith University is one example of best practices. The Griffith Institute for Higher Education Good Practice Guide (Green, n.d.) showed that Griffith University set out to create a research-intensive university. It intended to "make positive moves to help students build strong intellectual and practical connections between research frontiers and the students' own learning" (para.1). Part of the university's effort included developing student skills in conducting and evaluating research. It further offered its students opportunities for learning approaches such as inquiry-based research and experimental methods that are linked to active learning and positive student outcomes (para.1). The university's overall strategy aimed to link teaching and researching; however, one goal required that research outcomes inform the curriculum, and that the learning process included using the tools of research. One strategy was to place the latest research within its historical context in classroom teaching, also referred to as contextualizing. The intent was to either reinforce or discredit theories of the past with current debates (para. 4). This strategy directly relates to the example of the course in historiography within the history program provided in this paper. Through discovery, the current thinkers can debate past experts in the field, an endeavor that can produce new insights. Another strategy was to design learning activities around contemporary research issues (para.5). The Griffith University guide also

proposed teaching research methods, techniques, and skills explicitly within programs (para. 6). This aligns with one of Griffith's strategies, that is to be exposed to researchers' practices and values through discussion of the process, and by providing a structured learning experience that helps students learn to analyze and draw conclusions. Although the guide is directed at linking teaching and research, embedded within are strategies that target student learning supporting the current discussion.

The University of Warwick in the United Kingdom (Wright, 2006) addressed the problem of undergraduates who found research a difficult undertaking or difficult to access (para. 3). The university focused on developing research-based learning strategies that could provide the foundation for teaching at all levels. Besides incorporating student learning outcomes into the curriculum, the university's practice links outcomes, process, tools and context, all of which are necessary to develop a research culture. The result was "increased opportunities for undergraduates to be involved in the Scholarship of Engagement and in the Undergraduate Research Scholarship Scheme" (para. 4). When it comes to research-based learning, the University of Warwick's proposed idea of developing a research culture early in the education experience is in support of this study.

In tackling the concept of research-based learning, Maastricht University's Science College (Maastricht, n.d.) in the Netherlands concluded that research-based learning goes beyond problem-based learning where a student learns what is already known (p. 1). The college proposed that students are capable of learning through their own discovery and by seeking new knowledge. As students research, they are exposed to the literature in their field relevant to the topic and ultimately gain practical skills. Although this university proposes research at the 300-

level, taking other best practices into account, it is conceivable that this same thinking can be applied at the 100-200 level as well.

Fister (2001) of Lake Forest College shifted the conversation on learning from information literacy to "the process of turning information into knowledge" (p. 1). She proposed some assumptions about research for consideration such as independent inquiry as part of the undergraduate level. The results of her rethinking about the process proposed are as follows: (a) research should be part of the undergraduate experience and include knowledge creation; (b) research is better served placed within the curriculum framework, and although it can respond to the directive of writing across the curriculum, it "needs to be addressed in terms of distinct research traditions" (p. 1); (c) research, although recognized as a complex process, should go beyond just finding information to include evaluation; (d) inquiry-based learning should be developed throughout a student's education; and (e) while students must learn to read critically and reason analytically, they should do so using both traditional (library) and non-traditional (electronic) materials. Fister also looked beyond students writing traditional research papers because some of these papers are often viewed as a report on a topic that has been done and is not thought of as original work. Rather than viewing the process as linear (choose a topic, gather information, read, write), students need to be aware that there is a great deal of reading to be done prior to engaging in the process of writing the paper. This helps students learn how to critique facts and sort out only those that are relevant and generally to think critically. The need for continuous research reading suggests that research-based learning is circular or on-going rather than linear, at least within a course.

Fister (2001) also noted that for those students not writing academic discourse, the research process can still apply. She provided an example of an assignment in a communications

studies class where research and application of theory were required, but the end result was a portfolio of different forms of writing, none particularly scholarly (p. 3). Another example concerning a biology classroom assignment focused on sequencing of learning. Biology students had assignments that introduced them to the field and how the particular field defined research, taught them how to write a proposal, and then how to frame the proposal in such a way that it complemented research in the field. The likelihood of student success in an advanced biology class was enhanced because there was a highly sequenced major in place. Students learned about the literature in the field along the way, and by the time they had to write in an advanced class, they had already been exposed to foundational field information that complemented their doing actual research (p. 4).

Another example Fister (2001) presented had to do with art history and focused on research as a communal effort with students working on the same issues. As students met in the early part of the semester, they came together to share their sources and ideas. This process encouraged students to speak out about a new idea assuming there was sound reasoning and evidence behind it. Gaining a sense of ownership, especially with first year students, is difficult at best. Often some students are concerned with doing minimal work to get by. Fister provided an example of an English instructor who (p. 5) provided an assignment that called for open-ended research whereby students went to the library reference desk, "next experienced blind panic"(p. 5) and then finally became obsessed with finding an answer. In going through this assignment process, students learned the ways to research. "The moral of this story is to give your students – even first year students – a challenge" (p. 5).

Fister's (2001) initial assumptions included five positive aspects related to the process of doing research. They are: (a) that doing research plays an important role in undergraduate

education; (b) research needs to be incorporated into disciplinary frameworks; (c) research is a complex process requiring boundary setting and timely feedback; (d) learning research skills is a process that happens over time; and (e) the skills students need include critical thinking, analytical reasoning, and persuasive communication. Fister's assumptions and recommendations included the idea of a new frontier in education whereby a transition was occurring in how students learn. Fister saw, as did others, the transformation in education in the early phases of a change from a traditional teaching community to a transformational community of learners, a new frontier (p. 5). Fister's assumptions serve as a guide for those universities that have totally embraced the educationally sound idea of research-based student learning.

Most of the best practices in education link the idea of teacher-focused or student-focused learning through research. Most all practices stress the need for new ways to infuse research into the learning process and present strategies with which that can be accomplished. Some focus on upper level research whereas some point out the benefit of research at the lower level as a point to begin learning the process. Best practices are available. Institutional leadership should explore these practices and see if any would complement the institution's mission and reinforce the strength of its strategic goals.

Recommendations

To achieve a research-based student learning environment, or a culture of inquirers, within a post-secondary environment, institutional leadership first must provide guidance on the definition of research and identify the researcher as the student. As noted in some of the examples provided, some institutions require research-based teacher learning whereby instructors continually research as a way of enhancing their skills. Teachers then impart their information to students who will learn from them. This approach encourages passive learning among students.

Some institutions do not require that teachers do research and make the case for promoting research-based student learning. Many other examples provided uphold the idea that the research process needs to promote active learning and be aimed at the student researcher. Institutional leadership would benefit from a definition of research as 'a discovery-oriented process conducted by the student'. Until there is clear guidance on the definition of research and on identifying the researcher as the student, institutions may continue to have a different idea of what constitutes research as it relates to students.

A second recommendation suggests looking differently at project-based, problem-based, and research-based learning. An understanding is required that each approach may be better suited to certain disciplines at different times since each type of learning has a different end-product in mind. Project-based learning considers what is known. Learning through projects is a good technique for certain courses but only if the project requires researching new information prior to executing the project. Problem-based learning seeks a solution for what is known. Learning by solving problems has value if it requires a search for new information to solve a problem. Research-based learning seeks discovery of new ways to look at that which is known and requires discovery of new information. All of these approaches to learning are different from each other. Project-based and problem-based approaches could be considered research-based if discovery of new knowledge or inquiry into existing theories is part of the process so that the final 400-level product represents the culmination of students' work. However, if the long term goal of student research is that students build a knowledge base, gain skills for learning such as critical thinking and communication, and then produce a research product that represents a culmination of all of these building blocks, then research-based student learning seems a more suitable approach to accomplishing that goal.

A third recommendation is that qualitative or interpretative inquiry may be a better approach at the undergraduate level. If research becomes part of all courses and occurs in some courses early in the education experience, consideration must be given to the time it will take to do any worthwhile research over the course of a semester. The qualitative method is suited for research as early as in the 100-level in the academic experience and in semesters as short as nine weeks (versus the standard fifteen weeks). This is the value of using the qualitative or interpretative inquiry approach to research. Another consideration could be using a mix of qualitative and quantitative methods in research in a 400-level product that represents a culmination of the academic experience. It may be that exposing students to both methods could broaden their perspective on research as they move through the curriculum and explore various topics. Generally, if doing research begins at the lower level the research may be easier to accomplish using the qualitative method.

A fourth recommendation is that post-secondary institutions consider developing an on-going research-based learning process across the curriculum, have that process be part of all core courses, and begin at the 100-level of the learning process. However, at present, many examples are available from which to choose for some say at the 300-level, some say 200 and a few say when students begin their studies. It would be beneficial if all educational institutions reached a consensus as to when this process should begin. Perhaps that could be the next phase of institutional inquiry on the subject of research-based student learning. Rather than look at research papers as reports on what is known, institutions can promote a curriculum that is more proactive and views research papers as products of discovering knowledge and evaluating results over time. Student engagement in research over time and in all core courses is optimum. It

allows for a gradual accumulation of knowledge and associative skills like critical thinking and practice.

A fifth recommendation is that research-based student learning could be built into a sequence of courses required in a program. This recommendation is the result of the review of best practices. Ideally the sequencing could be interdisciplinary, but at the least should be within a specific discipline. An institution could spread out the process by setting up research criteria and related skill sets at each level of learning within the curriculum. For example, at the 100-level, students learn the definition of research and are exposed to experts in the field as part of the learning outcomes in each course. At the 200-level, students learn the various theories in the field, are introduced to all types of methods available, and must incorporate one of the methods in an end product for the course. At the 300-level, emphasis in courses could focus on primary, secondary, and tertiary sources, how they fit into research and how to locate them. By the time students reach the 400-level, they are ready to pull together knowledge, subject experts' opinions, research events or current issues in the field, determine a method of research and proceed to create a research product.

A sixth recommendation is that all post-secondary institutions have a viable Quality Enhancement Plan (QEP) that targets research-based student learning strategies, especially those with feedback mechanisms. The plan should lay out how and when an institution might reach its goals. Once the plan is in play, however, the institution should implement another plan, Continuous Quality Improvement (CQI). This second phase of planning provides a means of assessing if learning goals are being met. This should be done on a continual basis and take into consideration the possibility for a reprioritization of goals if need be. The planning stage (QEP) maps out the process and is a starting point. The constant monitoring or review of the plan (CQI)

shows what works and what does not work as the university continues to strive towards accomplishing its goals in an ever-changing environment.

Conclusion

Research-based student learning is an educationally sound approach that can add value to any undergraduate course and enhance the student's long term academic experience. The heuristic model proposed by the Higher Education Academy that is based on exploration or investigation best complements the principle of research learning for students. The literature illustrates that institutions continue to review the concept of the learning-centered community within today's education environment. It highlights research-based learning as a topic of concern in academia, and conversation centers on infusing a curriculum with research as a necessary part of the learning process. The associated method advanced is the qualitative method. Some literature suggests using a qualitative or inquiry-based method when doing research, especially in the early stages of post-secondary education; however, students can benefit from knowing that there is more than one method available to them for research. Learning the qualitative method of research early is one way to get students interested in research but is also a means of exposing them to associative skills such as critical thinking and analysis.

The author's own experience with research-based student learning comes from application through courses taught. For example, in a History of Aviation course the author provides guidelines that help students pace their work. The process includes selecting a topic, developing a viable thesis statement, gathering primary and secondary sources and the actual writing of the paper. The learning process begins on the first night of class as students actively engage in the process and continues throughout the course. First they look over the textbook for general areas that interest them. Once a general subject is found, students have to search libraries

and on-line for journal articles or books for information that relates to the topic, read anything current on the topic, and then begin to think critically about what it is they want to prove about the topic. From there they can narrow down what they have read to selecting specific relevant sources. Students use a qualitative approach to the paper which is conducive to the time constraint of the semester and the shortness of the paper in this 100-level course. No statistical research is required. With a viable subject, thesis statement, reliable sources, and the qualitative method to prove the thesis, students are equipped to begin the writing process. The resulting research paper, or learning outcome, is research that examines an aviation-related subject historically. This same process can be applied to any course, except perhaps math, whether aviation-related or general education. Additionally, exposure to the research process early in an academic career helps students learn how to research. Besides the individual research for the paper, the active learning component takes place within the in-class environment where current events are analyzed and discussed, articles read are critiqued, and questions are asked and answered.

Research-based student learning has promise because it requires active student engagement in the research process. Some universities require research-based teacher learning and although they may benefit from this approach to research, most post-secondary institutions do not require research as part of a faculty contract. Aside from the idea that faculty research has value, the problem with research-based teacher learning is that students learn how to do research but do so within a passive environment. With a clear definition of research provided to the institution, student learning as the stated goal, an understanding of the value of student learning through active participation, and the use of an inquiry-based or a qualitative interpretative approach as a worthwhile alternative for research, students will be equipped for success. If

research-based student learning is included very early on in the educational experience, students will have an opportunity to learn research through most courses and, as a result, be prepared to succeed in a 400- level research assignment. A follow-up study could include a student survey that queries critical thinking and research skills and brings the student voice into the conversation.

Today, post-secondary institutional leadership faces the daunting task of moving beyond traditional ways in the classroom that promote passive learning. Institutional leadership must reevaluate the traditional approach to idea exchange as well as develop an understanding of what constitutes a community of learners in light of the state of education today. Taking into consideration the changes in technology and how students learn, leadership could benefit by taking a more transformational approach to student learning. Furthermore, leadership could promote research-based student learning which encourages active learning with engagement as a priority. Ultimately, the challenges for post-secondary institutions are to develop and have in place an effective plan, to continually monitor and review all facets of research-based student learning, and to foster a culture of inquirers within an ever-changing academic environment.

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