IMPACT 2: Inquiry Model for Professional Action and Content-Rich Teaching. A Partnership to Help Reform Middle School Teaching and Learning

**Gordon Aubrecht, Ohio State University—Marion and
Bill Schmitt, Science Center for Inquiry, Fountain Hills, Arizona**

Abstract

        Perhaps no phrase has been more echoed by people who believe that they have a mission in their life to raise, educate, and care for children is that the #1 priority is "doing what is best for the kids." Teachers in the middle schools are normally focused on achieving that goal in each day's classes, but, given numerous assessments of the state of education in America, achievement is in jeopardy. Calls for improvement based upon content-based and inquiry-driven teaching and learning advanced by the National Science Education Standards in 1996 seem to have had little effect for supporting improvement. Change is a monumental task. IMPACT 2 is an example of a project that regional campus science faculty can accomplish that makes possible broader science understanding. The project seeks to benefit students by helping teachers place their ad hoc science pedagogies into a longer-term perspective. For most teachers at any level, teaching is telling, and the day-to-day drumbeat of instruction supports this view and solidifies it. Scientists have long been repelled by this way of presenting science, which is, after all, a way of knowing and not simply offering a set of facts usually assumed by lay persons to be science. For this reason, scientists have embraced inquiry as best for kids' science learning. Inquiry seen broadly (in all its metamorphs) is having students personally investigate the natural world and use reasoning to build knowledge. Our project in Marion City Schools at Grant Middle School involved virtually all its science teachers in a search for inquiry and understanding through use of continuous professional development, reflection, constant dialog with fellow science teachers and the implementation of FOSS curriculum.

Overview

As part of the rustbelt, Marion has few jobs for unskilled labor, many unskilled laborers, and a lack of skilled labor. Many residents are mired in poverty, and about two-thirds of pupils qualify for reduced-cost or free lunches. The proportion of minorities in the schools is small (~5%). [1] Grant Middle School enrolls all sixth, seventh, and eighth-graders in the City Schools (Marion also has a Catholic elementary school that gets some enrollment from some local non-Catholics as well as Catholics). The State of Ohio has achievement tests in reading, writing, science, mathematics, and social studies. Because of the powerful negative environmental factors mentioned above, scores on Ohio achievement and graduation tests (Ohio Achievement Test, OAT, and Ohio Graduation Test, OGT) are extremely low, and the Marion City Schools is under a form of state watch. [1]

As a result of some positive outcomes of a state-funded program for Marion and Newark City Schools teachers (Project IMPACT) run by Andersen, Aubrecht, and Schmitt (AAS) several years ago, administrators from the Marion City Schools contacted us and asked us for help in improving the abysmal OAT science scores at the middle school. (IMPACT stands for *Inquiry Model for Professional Action and Content-rich Teaching*.) The Ohio State University Marion collaborated through AAS with the entire Marion City Schools middle school science faculty to improve science teaching and learning systemically. To meet the challenges of increasing teaching and learning in the schools, AAS and Marion City wrote the grant proposal to the Ohio Department of Education with help from a small Department of Education proposal preparation grant that was given to one group in every regional educational district.

In addition, the Marion City Schools independently decided that the dire situation presented by the poor scores on the science achievement tests warranted buying a kit for teachers to assist them in switching to inquiry. They decided to purchase the Full Option Science System (FOSS). [2] FOSS kits are supposed to be inquiry-based, and there is a good deal of inquiry in them (along with a teacher-centric environment). The team decided that the FOSS curriculum could

be made to work. There are many stories of the great number of FOSS or other kits bought by school districts that just sit on the shelf because teachers have no idea of how or why to utilize them. Some use pieces of FOSS, but the point of FOSS is that it is a *system*. As a system, FOSS builds students' ideas to a view of the state of human understanding. FOSS accomplishes this by taking students through the intermediate steps often left out as teachers rocket through their "required" topics.

IMPACT 2 was funded by a grant through the Ohio Department of Education. It provided resources to teachers at Grant Middle School, the sole middle school in the Marion City Schools and was one of only two proposals that received the further grant. An attraction of the program in the proposal was the commitment of nearly every science teacher in the middle school and of the local teacher union.

IMPACT 2 is a year-long professional development program that provided over 150 hours of support to all science teachers, mostly during normal school days and hours. The organization and operation was:

1. A summer workshop prior to start of school to introduce teachers to inquiry and FOSS (Table 1 provides the schedule to help guide other regional campuses interested in participating in a similar project);
2. Twice per week grade level meetings and 3 day long meetings during the school year;
3. A focus on content and inquiry (i.e., FOSS as appropriate) through much of the year;
4. A gradual shift of emphasis to teacher reflection and interaction through the year;
5. Coaching and professional bonding of the grade-level staff and the entire science faculty through posting on the Ed Gateway listserv throughout the year; and
6. A debriefing and planning for the future at the close of the school year.

Teacher participation and results

There were two parts to project preparation. In the summer

course at Ohio State Marion, teachers participated in a different approach to learning—i.e., that students can learn with "coaching" so that their ideas and thinking processes are valued in ways they cannot be when teachers force them to use one approach about what to learn and how to learn it. The instructional project team (Aubrecht and Schmitt; hereafter AS) met before the grant was officially to begin with the City Schools math coaches, who helped develop the teachers' program. This is shown as the June session in Table 1.

Another major focus of the summer part of the project was to help teachers at each grade level unpack and learn to use the FOSS modules in ways that reflect inquiry learning principles. The second summer part involved working with the math coaches and the science teachers at Grant Middle School.

Teachers did *experience inquiry* from the start of the summer workshop by doing investigations from *Physics by Inquiry*. [3] Some confided later that after the first day, they were nearly ready to drop out. However, the experience was essential for establishing a common understanding of inquiry. This helped them as they unpacked FOSS sections and taught them to each other at grade level and then taught some of the lessons to the other grade levels. The teachers acknowledged as much in later reflections.

There was a great emphasis from the instructional staff on *questioning* as the basis of science and of education. Listening to students' questions and responding to them, waiting when asking questions of students, and not sequentially calling on students until the "right" answer was achieved. All these issues were discussed and modeled extensively.

During the school year AS continued to help teachers focus on these ideas in weekly meetings and through list-serv discussions. As teachers became involved in the implementation of this "new" curriculum the levels of excitement, frustration, apprehension, and hard work increased. Indeed this project required professional effort above and beyond the call of duty by the teachers and instructors alike. Some indication of the results were published in the FOSS Newsletter. [4] The best descriptions of the project challenges and professional growth are given by the teachers themselves in the following selected

quotes from on-line discussions that reflect the pedagogy of the project:

Teacher 1

This year I have started asking more open-ended questions and "playing dumb" when students ask if what they are doing is "right." This is sometimes frustrating for them and for me. I was used to being the more knowledgeable person in the room with the answers, and students accepted that, now that I require students to think for themselves they struggle to persevere and usually end up giving up. At least before once I answered their questions I knew they had heard the correct explanation or vocabulary, even if they chose to not remember it!

Teacher 2

The use of the rangers has been a welcome addition to what I have done in the past with studying motion. As you know, I have a ranger and have made good use of this. Now I have a class set of rangers the students have had a chance to work with them. I hope they found it as beneficial as I did. Once the initial playtime was over the students did a good job of operating the machines. The hardest part of this for me was finding a way to set up the room to accommodate several groups with working machines. Days like this are my favorite because I am free to move around the room and listen to kids talk. I get to hear what they know and what they think they know. The hardest part of this is for me to be quiet and let the groups work through their own thoughts and misconceptions; to let the students teach each other.

I am truly enjoying this method of helping students learn. It has been refreshing for me to get away from the times I would ' lecture' and require students to copy my notes. There are still times that this happens but these moments are few and far between.

This has re-energized me in that each period of each day has the potential to be different. I don't know where students as a group or as individuals are going to lead discussion. I am forced to know my material better and I am forced to admit that I do not know everything.

The style change has affected some students. Predictable, the

really book smart students who can read and remember struggle a bit. They are learning how to think instead of just memorize. The group of students who are more hands on and visual are finding success that they haven't seen in the past.

Teacher 3

In my teaching experience too often we put pressure on ourselves to be perfect in the classroom. The expectations of teachers in today's society are very high. We have so much to accomplish in such a small amount of time, and so often the pressures of teaching the State Indicators, documentation of teaching them, and expecting our students to achieve mastery of the Indicators is an extremely overwhelming feeling. Making mistakes in the classroom is just unacceptable.

Until now. Now with teaching inquiry based and learning to use FOSS in my classroom, I am realizing more and more that mistakes are a part of learning, especially in science. Trial and error is the way much science happens, it just never really happened in my classroom as often as it has this year! I am usually an extremely well organized teacher, thinking through each lesson, setting the expectations for my students and making sure that we reach those expectations.

I have learned so much about myself this year. I have learned that I can go into a lesson having no clue what is going to happen, and amaze myself at how calm I stay when things go wrong. I know that we can re-do anything we do wrong, and sometimes the lessons learned from the re-doing are more valuable than if it had worked perfectly the first time. I am realizing slowly that it is ok to not be perfect, and that every day is a valuable day in my classroom even if we didn't reach the goals I had set. We have accomplished something. Maybe it is a day of just discussing and questioning ourselves, our methods, our results, our data or what went right or wrong in an investigation. Sometimes those are my favorite days of all, the ones we spend discussing and evaluating just exactly what it is we are learning and why it is that we learned it.

Answers to questions used to seem so right and wrong, but

now, sometimes I find myself asking too many questions! I love answering my students' questions with questions. They don't even realize I am doing it most of the time – they just think harder and try to explain it to me in a new and different way. The beauty of inquiry at its best is when my students argue with each other and support their answers. They have learned that if they are going to voice an opinion, they had better be able to back it up, or someone will certainly have a better idea!

I am learning to ask more meaningful questions. The ones that make my students the most excited are the "whys and hows". They love to explain to me what they see; why they think something worked or didn't work. Never before have I had such enthusiasm about answering a question about an investigation. If they disagree with the answer given, they will not rest until they have an opportunity to give their side.

I am encouraging questions from my students. Too often I was too worried about getting things done to meet the indicators that I didn't allow us to get off on discussions to answer student questions - now we are all over the place with discussions and questions, and I am realizing that it is ok. This is how they are making their connections to what we are learning - so I need to let it happen. I love hearing my students ask each other questions – and expect answers.

Teacher 4

I'm much more conscious of my questioning techniques and allowing the student time to think and answer. I find myself 'waiting them out' to see what their thinking is and what thoughts they are using to support their thinking.

Originally, the kids had a hard time with the idea that they did not need to have THE correct answer right away and that they weren't possibly going to find out until they investigated it on their own. Then when it might take an extended period of time to find the 'answer' (if there was one), well this was a whole new approach to them! When we finally do discover an answer to a question that we had wondered about, you'd think they discovered a cure for cancer.

I love the looks on their faces when I tell them how much I like

the way they aren't afraid to make a prediction or a good guess as to why something may occur. For most of them, the concern that their theories may not be 'correct' is no longer a hindrance to their thinking. I really do think that many of them now believe that we learn as much or more when things don't work the way we thought they would.

Teacher 5

I noticed while in the classroom with the science teacher, they relied heavily on the textbook and worksheets. There was not a lot, if any, hands on activities. The only hands on activities were the ones the teacher made up or found on the internet. Along with doing their own experiments that were found in books or on the internet, they also used their own money for the experiments. This can become pretty costly.

When the teacher or instructor gets experiments out of a book or off the internet, the experiment is not always explained in a fashion that is easy to follow. There are times the experiments are vague, not in step-by-step order or the teacher isn't sure so the experiment is not done correctly most of the time. Along with possibly not doing the experiment the right way, the teacher doesn't get good feedback from the students. There is not a lot of discussion among the students. Its teacher directed. In the teachers mind, he/she wonders if the questions were geared toward student success. Does the student really understand the concepts trying to be taught?

As I stated before, I've never taught science so using the FOSS Program has eased me into teaching science. For example, the FOSS notebook gives you goals, objectives, step by step, media, and assessments. The teacher manual gives a scientific and historical background of the material being studied. Questions are left open for discussion among students. It's not so teacher directed. The FOSS is hands on. The students take part in the experiments. There is a site on the computer lab and do different activities on the computer. Before FOSS, the students were not given the opportunity to question, explore, and play with concepts on their own. The inquiry based program allows for more student success and less teacher direction. The Special Ed. Students find much more success with all the hands on material that is available. Students who are unable to sit for 30

minutes, this is wonderful. The program allows movement, talking and giving their opinions.

Teacher 6

One thing I have noticed throughout the year is that the students themselves have changed. At first, they wanted me to give them the answers and now some of them would rather figure it out for themselves. Don't get me wrong, I still have students that just want the answers. I am at the point now where I don't know how to deal with the lack of effort. Part of me wants to just give them the answers and the other part says the inquiry is working let them do it. I feel that I have changed my teaching style to inquiry based teaching. I just hope that the students see it that way as well.

There are a couple of items I would include if I were creating indicators and an assessment rubric for inquiry teaching. First of all, I would want the teachers to rate themselves as well as someone else. One thing I have learned being involved in the FOSS program is that student input about their performance is just as important as evaluator input. I would also have a checklist, same as the one above for the evaluator to fill out. I would like to have a rating scale from 1-5, where 5 is always and 1 is never. The criteria for the rating scale should include content and how is it tied in to what is being taught, standards and how they tie in, and tally marks for questions and information. I think the self-assessment would be beneficial because you may think you are asking questions when in fact you are giving more information. This would be easy to see if you had someone keeping track of those types of indicators.

I think inquiry based teaching is beneficial and helpful. I have not seen the test scores for this year's OAT Test but I can almost guarantee that the scores will go up. If you show the content of what you are teaching in several different ways, more students are going to pick things up and understand difficult topics. Some students that you would not expect to understand are the ones that will surprise you the most.

Teacher 7

Originally, the precursor of Xxxx's participation in the FOSS program was my necessity to gain additional contact hours that are needed as a requirement to renew my instructor's license, but from day one I found out that this "Physics 670, "Assessing Inquiring Teaching of Science ", was a course far from just an "Instructor Lecture Class", and some students scribbling some irrelevant notes never to be used, but instead the one of two instructors, Gordon Aubrecht, presented himself and with a statement of "Inquiry Teaching". My first response was to wait for him to fill in all of the blanks to his own statements for all to agree. Instead he stepped back with his long hair and sandals that brought up memories of a young Xxxx that lived in Yellow Springs Ohio, and attended Central State University. During that time, I challenged every norm of expectation in my life, and threw those acts of rebellion I found the freedom to think and act out of the box.

Mr. Aubrecht leaned back with a smile that I knew quite well. He asked the question, "Why", "What", and a response, "I don't quite understand, would you explain, what do you mean by that?"

He actually was engaged in a form of "Modeling", (Something I haven't done for quite some time but do now.) A point that in his own way is encouraging we, the "Instructors" to follow. I grew to look forward to each session and look forward to reunite myself with those reasons I chose to be an instructor 40 plus years ago, from being an "Art Instructor" to that of meeting the needs of "Special Needs Students".

Teacher 8

The next topic area is my favorite topic area: my daily lessons. I have experienced a tremendous transformation this year as my students and I have journeyed through the FOSS Investigations.

Because of Gordon's guidance and support and because of Bill's inspiration and support, I have been able to let my students guide the lessons instead of the curriculum or myself guiding the lessons.

My favorite days are the days when we veer off course from the designed curriculum and we investigate the detour of the day.

A detour might be why something did not work the way we

thought it should work or a student discussing an experience, thought or idea about the initial lesson or the "what ifs….What if we did this Mr. Xxxx?....my response…Well let's "what if" then.

Other detours or extensions include when I create my own lesson or an extension to a FOSS lesson. Two examples stand out for this year. The first example is when I created my own evaluation tool for the terms erosion, deposition and sediment. I had my students write a short paper explaining the three terms. When I graded the papers, I was immediately able to see of the depth of understanding each student possessed in relation to each term. Plus any student that was vague or unsure about a term was given the opportunity to revisit, revise and resubmit their paper.

The second example involves an extension activity in understanding the meaning of the symbols Δx, t, x and d along with how to apply the meanings within a graphing context. After discussing four separate legs of a trip with my students and after realizing that the FOSS Investigation was not providing enough practice for them, I taught and re-taught the symbol meanings until I knew my students understood the concepts.

Then I created two more legs for my students to do and those two legs were my evaluation tool.

Another source of my teaching rejuvenation is the interaction I have had with my peers. In my eight prior years of teaching middle school science, I have never been able to meet with my peers on a regular basis.

This interaction has provided me with support, varying points of view, enlightenment, challenges and many other positive attributes of professional growth. The interactions allow me to see beyond my own teaching and incorporate ideas from other science teachers that have enhanced my lessons throughout the school year.

Teacher 9

This was not a journey through science inquiry but a journey TO science inquiry. Most science teachers think that their classes are inquiry based because they "do labs" and other hands-on learning experiences. The fact is they are asking students to think by taking

notes, giving information, guiding student to the *proper* way of thinking about science. They then give some arbitrary investigation, lab or demonstration that backs up the information that students have been spoon-fed. I never realized this until this summer when I was given the opportunity to learn *true* science inquiry and all it has to offer both the teacher and the students.

"All it has to offer," that quote sounds funny considering my thoughts and feelings toward science inquiry after just the first few days of my introduction to it. We were given a set of questions; a pretest if you will; that made me think about what I knew about science. As I sat in class with tools and equipment that I had no idea how to use, being asked questions that I had no idea how to answer, I kept thinking to myself "will you please just tell me what you want me to do so we can get on with it already!?" We were given a vague idea of the question we were trying to answer; we were given the tools and equipment to manipulate in order to come up with the answer. The trick was that we had to figure out how to use the materials to get to the answer. On top of all of that, once I thought my group was heading in the right direction, we were met by a barrage of questions about what we did what we thought AND our answers needed to be supported with our thoughts. I was in the mindset that I want to be told whether we were right or wrong, but instead we were led around by questioning to learn whether we were right…and if we were wrong, it was back to the drawing board. To a room full of teachers this became increasingly frustrating and irritating. After some time we all relaxed and came to some understanding of the concept, a working definition. We also became aware of the process that we were going through was true science inquiry. We were the students and our professors were modeling a science inquiry classroom.

I would love to say I jumped head first to inquiry, but that would be a lie. Not only was I hesitant, I was also dragging my feet nearly kicking and screaming. I decided baby steps would be best. With the FOSS kit by my side as my tool, I was on my way. I began by asking simple questions like "what are you doing," "why," and "what have you learned." These questions were easy for my students to answer. I have moved on to questions like "why do you think

that is happening," and "explain your reasoning." I have recently started turning my students' questions back on them. When they ask a question, I ask the same question right back. Initially, I was reluctant to use this strategy. I thought that the students would shut down and then begin to stop questioning for fear that they would "get the wrong answer." In reality, while annoyed, they were very responsive. They thought about answers and came up with even more questions from each other. While standing in the back of class, I stopped and really listened to what was going on. They were asking each other questions and answering them; they were discussing the material and learning… without me. I was there to keep order, guide.

These conclusions are supported by the grade-level interviews Aubrecht and Schmitt did with one student from each classroom in February, 2009. We asked students to characterize a good science classroom for a fictional middle school principal, and the students from all grade levels essentially responded with the equivalent of "it should be like our science classroom." Students said that they need lots of hands-on experiences to help them understand what they are learning about. They also thought that the being active learners was important. Working together and being able to ask personal questions was also important. When asked what teachers in that school should *not* do, they responded with several suggestions. Getting away from mostly listening to a teacher or just reading about information in a textbook was not good learning. Another was that teacher ask students questions but not provide answers to students so they could figure things out for themselves. We regard this as a measure of the extent of our teachers' success in their classrooms.

Conclusions

This project could not have evolved as it has without the extensive guidance from the instructors and the commitment to do most of this project during school time. The literature on growth and change in education contains many references to difficulties encountered in this type of effort. Many teachers would not have participated in a meaningful way without this commitment. As it was set up, most teachers actively participated. The use of tools appropriate

for the task (in this case FOSS) were also essential components because in involved teachers in doing their own inquiry to learn the curriculum and there needs to be a vehicle for teachers to implement the practices supported by the project. Major difficulties encountered included getting teachers to be reflective of the process, to see themselves as the professionals they are, and to see the importance of having a responsibility to each other. Also, because of an extensive workload, teachers often seemed to use project time during the school day as "planning time" rather than development time.

The time devoted to this project by teachers and instructional staff (AS) was very large, though for the teachers most of the time was during school hours (except for the summer meetings before and after the school year). Table 2 shows this time commitment. Should any other regional campus attempt such a project, it should be aware of the extraordinary instructor time commitment required for success.

An important aspect of the project is that virtually ALL the science teachers implemented the curriculum and showed significant growth in being able to recognize improved opportunities for student learning. There was a significant change in the classroom. To sustain this change, ongoing support should be provided for several more years so that teachers moving from seeing how inquiry works to discovering why it works.

Evidence of student achievement as a result of IMPACT 2 involved reflections and discussions from teacher and staff classroom observations, from randomly selected student interviews, and discussions with administrators. Additionally, results of student performance on the Ohio Achievement Test in Science increased substantially over the preceding year, though the school failed to attain an acceptable level. Because Grant Middle School is under state watch, the state-mandated Improvement Diagnostic Review of the school curriculum recognized excellence in science learning improvement, the only grant curriculum to be so recognized.

Acknowledgment

Table 1 Planned schedules for the summer sessions prior to the 2008-2009 school year

	23-Jun	24-Jun	25-Jun	26-Jun
AM	*Physics by Inquiry* (PbI) Properties of Matter 1 & 2	Sun shadow experiment; observe moon	More FOSS module preparations	Measurements; work on FOSS
lunch	more PbI; analysis	Questioning	FOSS	FOSS
PM	What are the essentials of what works?	Involvement of teachers; how does it get to be effective and effectual?	Questioning techniques. What works in the math classroom?	Synthesis
	Examples from own teaching, coaching.	FOSS kits		

	4-Aug	5-Aug	6-Aug	7-Aug
AM	Introduction to inquiry	groups get oriented	practice presenting to one another	two presentations (6th, 7th)
lunch	discussions	discussions	discussions	discussions
PM	Introduction to inquiry; week 1 assignments	practice presenting to one another	work on pre-post assignment for each module	presentation (8th); assignment for week 2

	11-Aug	12-Aug	13-Aug	14-Aug
AM	prepare practice run-through at grade levels	practice presenting to one another	two presentations (6th, 7th)	summative experiences; what works, what's useful?
lunch	discussions	discussions	discussions	
PM	practice presenting to one another	work on pre-post assignment for each module	presentation (8th); assessments	Questioning; how do we encourage questions that lead students somewhere?

Table 2 Teacher and instructor time commitment (each teacher spent about 232 hours)

	Aubrecht time	Schmitt time	Institute time per teacher	Meeting time per teacher	Teacher (av.) observation times	List serv time per teacher
Summer 08	216	216	64			8
Autumn 08	221	230		32	4	16
Winter 09	163	190		32	2	16
Spring 09	151	160		18	1	10
Summer 09	110	124	29.5			
Totals	861	920	93.5	82	7	50

References

1. Marion City Schools supplied the demographic information
    presented here.
2. FOSS was developed by U.C. Berkeley faculty working with the
    Lawrence Hall of Science and is distributed by Delta Scientific.
3. McDermott, L. C. *Physics by Inquiry*, V. 1 (New York: J. Wiley &
    Sons, 1995).
4. Aubrecht, G. and Schmitt, B., "Systemic Reform of Science
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Biographical Information

   Gordon J. Aubrecht, II is professor of physics at OSU Marion.
He graduated from Rutgers University summa cum laude and earned
his graduate degree at Princeton University. His original research
interest was theoretical particle physics, but he is currently studying
how students understand atoms, nuclei, and the interaction of light
and matter as well as how useful and effective physics by inquiry is.
He was awarded the Distinguished Service Citation of the American
Association of Physics Teachers in 1994, was elected a Fellow of
the American Physical Society in 2000, and was presented with the
John B. Hart Award for distinguished service from the Southern Ohio
Section of the American Association of Physics Teachers in 2002.
He received the AURCO Distinguished Service Award in 2004.
Also in 2004, Aubrecht received the Howard Maxwell Award for
Distinguished Service from the Ohio Section of the American Physical
Society and the Louis Nemzer Award from the Ohio State Chapter of
the American Association of University Professors for his defense of
academic freedom. He is a past president of AURCO.

Experiential Learning in a 2-Year Business Program: Case Study of a Team-Based Project

Susan A. Baim
Miami University—Middletown

Abstract

This paper explores the concept of experiential learning as applied in a 2-year business program. Often cited as a preferred learning style for Gen Y students, experiential learning can help engage students more fully and facilitate greater retention of key course concepts. Application of basic principles is illustrated using a consumer research-oriented project from an introductory marketing class. A description of the team-based project is presented, along with a discussion of how results are evaluated.

Introduction

Taking an experiential approach to learning has been shown to be of particularly high value when developing course materials for the "Generation Y" learners that comprise a large percentage of today's student population (Sojka and Fish 2008, p. 25-26; Elam and Spotts 2004, p. 51-52). Gen Y learners demonstrate shorter attention spans and a stronger desire for incorporating personalized experiences into their learning plans as compared to the learning characteristics of their predecessors. This translates into a preference for high-involvement learning as opposed to traditional lecture-based materials (Sojka and Fish 2008, p. 26). As one example, the authors suggest the use of brief role plays on well-defined marketing topics like sales presentations as an effective process for transferring knowledge on important marketing concepts that seems to work well with Gen Y learners.

Experiential assignments are known to increase students' confidence in their own understanding of complex concepts while also increasing the students' actual, measurable competence in these same topic areas (Pollack and Lilly 2008). The authors determined that students readily accept self-directed experiential assignments in

a consumer behavior course, but that for optimum effectiveness, the assignments also need to demonstrate strong, relevant linkages to real-world business situations (p. 65). For those projects that meet the criteria, students not only demonstrate a higher level of competence, but also perceive themselves to be more prepared to handle similar situations, should they occur in an on-the-job setting, or even in a job interview (p. 56).

Experiential project ideas described in the literature run full-spectrum from individual student research opportunities to large-scale projects that can involve a whole class. Many projects carry the specific goal of increasing students' workplace skills so that they are better prepared for career positions after college (Fish 2007, p. 59; Rundle-Thiele and Kuhn 2008, p. 33). Others focus more attention on building collaborative learning styles among students with the implication that such approaches resonate well with on-the-job problem solving (Munoz and Huser 2008, p. 214-215; Pun, Yam and Sun 2003, p. 340-342). Many of the most interesting projects, regardless of the specific marketing topic to be covered, include an element of competition – such as between multiple teams within a given class, or even between multiple sections of the same class.

The Use of Interactive/Experiential Projects in Marketing Courses

The advantage of including interactive/experiential projects in marketing courses is well documented in the literature. Projects that allow students to leave a traditional classroom lecture setting and learn directly by working and/or studying in the "real world" add value for a broad cross section of learners. One particularly good example of an innovative project is "The Get Marketer Challenge," developed by Rundle-Thiele and Kuhn (2008). As applied in an introductory marketing class, this project exposes undergraduates to various marketing roles, specific tasks that allow them to put theory into practice, and an element of teamwork (p. 33-34). The marketing situation analysis project described by Munoz and Huser (2008) also stresses elements of teamwork and the importance of addressing fundamental marketing processes within the project. Drawing on the dual concepts of experiential learning and collaborative learning,

Munoz and Huser note that students are required to create new ideas from their own experiences and to do so within a team-based environment, reflective of what they will encounter in the workplace (p. 215).

Development of innovative experiential projects such as the examples provided here is not limited exclusively to instructors who are teaching traditional classroom lecture-based courses. Wood, Solomon and Allan (2008) assert that experiential projects can play an equally important role in defining an appropriate curriculum for a fully online marketing course as well (p. 47-48). The authors caution, however that instructors must be cognizant of differences in learning styles that may be present across a class roster, with some students being fully comfortable with computer-aided instructional materials and others strongly preferring a direct, hands-on approach with full involvement of the instructor (p. 49-50).

Critical Learning Approaches Can Complement Experiential Learning in Marketing

The philosophy of using a more critical approach to teaching undergraduate marketing courses is often complementary to the use of experiential projects. In a recent publication, Tregear, Kuznesof and Brennan (2007) note that critical approaches may be based on one or more of three guiding principles. First, the authors observe that critical approaches help students to develop their thinking, reasoning and analytical skills though adopting a questioning and skeptical attitude toward the material under study. Second, the authors observe that critical approaches enable students to recognize and appreciate multiple levels of ambiguities or multiple perspectives that could influence their decision making processes. Third, the authors observe that critical approaches often are based on the use of experiential assignments and problem solving exercises – particularly those that require students to reflect on what they are learning – as a means of encouraging greater self-awareness (p. 412-413). In research designed to investigate students' perceptions regarding critical teaching approaches in marketing, Tregear, Kuznesof and Brennan found that critical assignments were viewed as more intellectually challenging

and more work overall for students, but also were recognized as valuable preparation for the higher-level thinking students believed that they would encounter in the workplace (p. 415-417, 422).

Evaluated within the context of an introductory undergraduate course in marketing, approaches such as the use of experiential projects and/or the design of projects requiring expanded critical thinking serve to increase students' ability to synergize a greater level of comprehension from what they are learning and to apply it more readily in novel situations. Related to the concepts of metacognition and transfer, this ability is a desired key outcome in marketing education (Ramocki 2007). In the author's words, "…metacognition involves thinking about our thinking. It is the inner voice monitoring all of our thoughts from a macro, or bird's eye perspective" (p. 12). Additionally, transfer is "…an application of a learned concept to some situation where it might be required or useful" (p. 12). Both concepts are highly germane to the process of preparing new marketers for the opportunities that they will encounter throughout their careers.

A Practical Application in an Introductory Marketing Course

A fundamental learning from any introductory marketing course is the ability to recognize consumers' needs and wants. For the instructor, the goal is to get students to step outside of themselves and focus on exactly what the consumer is saying – a process that benefits greatly from application of both experiential learning and critical thinking. Students must not only be shown how to capture consumers' needs and wants that are readily apparent, but also need to learn to draw more information out of consumers in cases where stated preferences are incomplete or unclear. Gaps must then be filled in without adding the students' own personal biases. A good first step is to briefly cover, within the classroom, topics ranging from how marketers talk with consumers of various demographic and other characteristics that allow marketers to define segments of consumers that they seek to pursue. Once a foundation is laid, a good second step is to engage students in a round-table discussion on how well they believe they can listen to what consumers need and want – without interjecting their own preferences and biases into the conversation. A

critical third step is then to engage students in a rigorous, but also very intriguing "hands-on" project to cement their classroom learnings.

Stylin' Wrappers: The Custom Gift Box Design Project
        The project described here serves to expose students to consumers' needs and wants in an on campus setting. It is particularly useful in situations where an introductory or "ice breaker" project is desired to heighten students' awareness of how complex it can be to understand what consumers believe – and what they are saying versus not saying about those beliefs. Using a team-based approach, students interview a selected consumer on campus with the goal of understanding what that consumer enjoys in terms of work, hobbies or other interests. Each team then creates and builds a small gift box for their chosen consumer that accurately reflects what team members have learned about that consumer's needs and wants. Feedback from the consumer determines how well each team has "hit the mark." Brief team presentations and discussions back in the classroom help students summarize and capture their learnings.
        The idea of creating a "custom" gift box is loosely based on the Japanese concept of creativity and quality in package design (Dubey, 2008; Shahmanesh-Banks 2003). Japanese firms, faced with a strong eco-friendly mandate to reduce disposable and excessive packaging, have turned to developing particularly creative and well-designed containers for high-value products. These containers appeal to the consumer, who often elects to keep the package and put it to a supplemental use after the original product has been consumed (Shahmanesh-Banks 2003, p. 35). A brief discussion with students regarding the ideas of "value-added" packaging and reducing waste through sustainable use helps provide a foundation for why one might want to create a "custom" gift box for a consumer. Although not mandatory, the author has also found it beneficial to invite a guest speaker from the packaging or consumer products industries to share some "real world" packaging experiences with the students before they begin their projects.
        The premise of the "Stylin' Wrappers" project is as follows. Small student teams (3-4 students each) all work for the

fictitious Stylin' Wrappers Company, a firm that custom designs and manufactures small gift boxes. The target market for the firm is consumers who would like to purchase a small, customized gift box for personal use or to use as a gift for someone else. In all cases, the gift box must meet the consumer's needs and wants. The gift box must also be functional in that it must protect the contents placed within under reasonable conditions of abuse. Each student team identifies and works with a single consumer (referred to from this point on as the "client") in order to achieve these goals. Project evaluation is based multiple criteria as will be discussed below.

Project Instructions

Students are provided with a set of instructions that outline what is expected in each critical step of the project. Time is provided in class for teams to form and to discuss individuals on campus who they will consider asking to participate as clients. Teams of 3-4 students are suggested; larger teams typically find it difficult to match schedules and get the work done. Once a team has formed, members need to learn as much as possible about the selected client, using consumer understanding skills learned in class, so that the gift box may be designed appropriately. Teams are encouraged to interview the client at a mutually convenient time and advised that multiple meetings may be needed in order to fully grasp the client's needs and wants.

Student teams have a period of three weeks to design and construct a small gift box for the client. In terms of design, both the exterior and the interior of the gift box are important and must be created from scratch – pre-made boxes are not acceptable. In terms of function, each gift box must be strong enough to tolerate having a marketing text dropped on it from one foot above the package without damaging the delicate contents inside (one Ruffles® potato chip is used to simulate "delicate" contents). Teams may consult with other individuals as necessary during the design and construction phases of the project (fathers, friends and roommates tend to be very popular consulting resources), but must account for the cost of consulting services within the project budget. Teams are encouraged to share

a preliminary design or "prototype" with the client and to request feedback.

A budget of no more than $5.00 per gift box is stipulated. Small quantities of materials may be purchased, but most teams successfully employ scrap items found at home. To ensure a common ground regarding the prices of "construction raw materials," teams are given a price list of 30-40 items and instructed to calculate the costs of their boxes. Examples of the materials used are provided in Table 1. The prices of items not included in the table are agreed upon with the instructor.

After all feedback has been obtained from the client, each team gives the completed gift box to the business department faculty secretaries, who act as independent judges of the quality of execution, in terms of the elegance of design and care in construction. The faculty secretaries also act as quality control evaluators by performing the "book drop" test on each gift box. Gift boxes that fail to protect the contents of the box, i.e., allow the Ruffles® potato chip to break, are disqualified and the team will need to start again from scratch. In essence, the faculty secretaries are acting as "top management" of the Stylin' Wrappers Company by determining whether or not the company would be proud to call the completed gift box a product worthy of the name Stylin' Wrappers.

Table 1		
Representative Costs of Gift Box Construction Raw Materials		
Item	Amount	Price
Use of a Consultant	Per Hour	$0.10
Cardboard	1 square foot	$0.25
Tape, Heavy-Duty Packing or Duct	6 inches	$0.10
Construction Paper, Heavy	Per 8.5 x 11 sheet	$0.05
Tissue Paper, any color	Per 8.5 x 11 sheet	$0.02
Packing Peanuts	Handful	$0.20
Fancy Bow, any size/color	1	$0.10
Glue	1 Tbs.	$0.05
Pressed Wood	1 square foot	$0.50
Spray Paint or use of Marking Pens	Per Side of Box	$0.15
Copyright fees for artwork or pictures	1 Fee per Project	$0.25

At the conclusion of the project, each team delivers a short PowerPoint presentation to the class as a whole. The team presentation materials should include an introduction of all team members, with their roles and responsibilities, drawings or pictures of the gift box design, and a short explanation of the process that the team used to work with the client. The team should also explain how members balanced style and function – in other words, how the team satisfied both the company's top managers (breakage resistance and overall quality) and the client (consumer-based needs and wants). A brief written report is also required, summarizing key learnings from completing the project.

Project Evaluation Criteria

By completing the Stylin' Wrappers project, students should meet three specific learning goals. First, students should demonstrate an increased awareness of the importance of listening critically to what consumers (the clients) are saying about their needs and wants. Second, students should demonstrate the ability to translate what they are hearing into a design and/or finished product (gift box) that captures and exemplifies the key elements of what they have learned from their clients. Third, students should demonstrate an increased ability to think and work collaboratively in a project team setting. The first two learning goals are of the highest importance when teaching classes of young, enthusiastic Gen Y learners who often focus a large portion of their energies on their own personal experiences while learning and may not, initially, listen acutely to what their clients have to say.

As described, the Stylin' Wrappers project accounts for 10% of the grade in an introductory marketing class. On a 250-point scale, student teams receive up to 100 points for the design and execution of the gift box and up to 120 points for the quality and completeness of the in-class presentation and written report at the end of the project. The use of formal grading rubrics with specified numbers of points for consumer insights, quality of design, strength, cost, thoroughness of the in-class presentation, etc., are employed, providing students, up-front, with a breakdown of exactly how they will be evaluated. The

last 30 points are based on confidential ratings of each team member's performance by his/her peers on a given team. Project points are compiled and awarded by the instructor, based on conversations with the clients and the faculty secretaries, and on an evaluation of the presentations and written reports at the end of the project. All members of a given team receive the same grade. Small amounts of extra credit are awarded to 1ˢᵗ, 2ⁿᵈ, and 3ʳᵈ place teams, based on the faculty secretaries' assessments of gift box quality.

Student Feedback

The Stylin' Wrappers project requires students to think outside of the box, to interact with their peers in a team-based setting, and to accomplish something that is outside the norm of typical lecture-based classroom activities. A brief quantitative survey, completed at the end of the project, helps to ensure that the project is delivering good value for the time spent. Using a 5-point Likert scale in each case (Bond and Fink 2001; Cummins 2003; Kelsey and Bond 2001), students are asked to rate the project by indicating their agreement/disagreement with six brief statements. Statements and results generated are provided in Table 2.

Table 2					
Student Feedback: Summary of Responses to Six Questions Regarding the Stylin' Wrappers Project (n = 110)					
	Percentage				
Statement	Strongly Agree	Agree	Neither Agree Nor Disagree	Disagree	Strongly Disagree
Completing this project helped me understand how to listen to consumers.	74.2	10.5	8.4	6.9	0.0
Completing this project helped me develop stronger teamwork skills.	40.1	14.4	15.4	12.7	17.4

The grading criteria for this project were fair to my team's efforts.	22.4	64.8	6.3	5.0	1.5
This project required way too much time to complete.	11.0	15.7	26.6	19.1	27.6
I can see how this project fits with the rest of the materials we are studying in class.	33.4	49.2	2.5	8.9	6.0
This project should stay on the Introduction to Marketing syllabus.	51.9	38.7	5.1	1.4	2.9
Note: n=110 represents the pooled responses from four sections of the Introduction to Marketing course.					

From the tabulated data, it may be seen that the project is highly popular with the introductory-level marketing students with 84.7% indicating that they either "strongly agree" or "agree" that the project helped them understand how to listen to consumers. A total of 90.6% of students either "strongly agree" or "agree" that the project should remain as part of the scheduled activities for the course. Some students (about a quarter of those completing the survey) were concerned about the amount of time required to complete the project. Grading was judged to be fair to the project teams by a very large margin, with 87.2% of students indicating that the either "strongly agree" or "agree" with the statement furnished in the survey.

Discussion
        The Stylin' Wrappers project has been used approximately six times in introductory marketing classes taught by the author. The

project is very popular with students, many of whom have heard of the project from friends in previous classes. These incoming students frequently enter the class on the first day with a client "pre-arranged" for the project. Similarly, faculty and staff also appear to enjoy the project, with many acting as "repeat clients."

For most students, completing the project significantly supplements the understanding of how to listen to the consumer that they develop through the traditional classroom lectures and discussions. Invariably, students cite an increase in their ability to listen to consumers with an open mind – and to record what consumers are telling them – as a key outcome, thus meeting the first learning goal. This is not surprising, considering the immediate feedback that the teams receive from their clients on the gift box prototypes and final designs. Team members frequently observe that their initial impressions of their client's needs and wants are incorrect. Sharing prototypes of the gift box reveals gaps in understanding and allows students to recognize situations in which their own personal biases and/or not fully listening to their client have inappropriately influenced their design. Students achieving this level of awareness have clearly met the second learning goal. Peer-level evaluations of team members are invariably taken very seriously by each team, with a good range in the scores generated across any given team. Qualitative comments on team interactions accompanying the formal evaluations strongly support the successful completion of the third learning goal.

The Stylin' Wrappers project serves as a rich source of material for post-project discussions, not only on meeting consumers' needs and wants, but also on topics including building effective work teams, balancing multiple project priorities (design, function, and cost), and meeting deadlines. It is highly rewarding to see students thoroughly involved in their learning. For example, discussions during the end-of-project presentations are wonderfully robust. Students in the "audience" eagerly question the presenters regarding the decisions that they made throughout the project. Questions abound, such as, "How did you find *that* out about your client?," "What other options did you consider in designing your box?," or "Can we hear more about how you got your client to open up so much?" All are indicative of

the active, involved learning that takes place with the gift box design project.

Students demonstrate a lot of creativity in their gift box designs, which range from rudimentary to highly artistic. There is rarely a functional failure in any final design. Students take great care to pretest their designs before adding finishing touches, and actually tend to over-engineer their gift boxes in terms of strength. With that detail out of the way, the creative designs reflect how well each team has understood its client's needs and wants.

Figures 1 through 4 illustrate examples of the gift boxes that were designed and constructed by student teams over the past several semesters in an introductory marketing course. For example, Figure 1 illustrates a gift box that was designed for a faculty member who loves to bake as a hobby. The student team learned that this client wanted a way to store recipe cards that were frequently in use. The team designed a gift box in the shape of a kitchen stove, complete with a fold-down door where recipes could be inserted. The client was thrilled with the novelty of the design and the quality of execution.

Figure 1: Gift Box Designed for an Avid Baker

Figure 2 illustrates a gift box design, in the shape of a somewhat "ghoulish" old-style coffin, that initially drew gasps from the audience since it was created for an older faculty member nearing retirement. As the student team explained, however, they learned from their client something that no one else had ever heard – his main hobby was studying the culture and history of New Orleans, including that city's famous above-ground cemeteries. Taken in context, the gift box more than met the client's expectations and he now uses it to hold his keys and other small items on his desk.

Figure 2: Gift Box Designed for a Professor with a Hobby of Studying Old New Orleans Cemeteries

Figure 3 illustrates the gift box that scored the highest number of points across all offerings of the project. Known as the "Care-E-Poo," this gift box received rave reviews from the client, other students, the faculty secretary evaluators and the instructor. The team involved chose a staff member who loves to walk her dog, but hates to carry the obligatory little "baggies" of dog waste for disposal. A supply of plastic baggies, plus baggies of waste as necessary, are easily concealed and easy to carry. The client was absolutely thrilled with the end design and keeps it hanging next to her dog's leash for walks. With suitable changes to increase durability, everyone agreed that this gift box might be a new marketable product for pet owners.

The creation and presentation of the "Care-E-Poo" gift box provided an excellent opportunity to transition the classroom

discussion to the higher-level topic of "delighting" the consumer (Evans and Burns 2007, p. 1625-1627). When the consumer receives extra value that is beyond expectations, that consumer may move beyond the state of being totally satisfied and become a staunch and loyal supporter of the company's offerings. A direct quote from the client about the "Care-E-Poo" was, "I will never go on a dog walk without it!" Students seeing the genuine positive feedback that the "Care-E-Poo" gift box received were able to quickly bridge the gap between meeting the consumer's needs and wants and truly "delighting" the consumer.

Figure 3: Gift Box Designed for a Staff Member Who Loves to Walk Her Dog
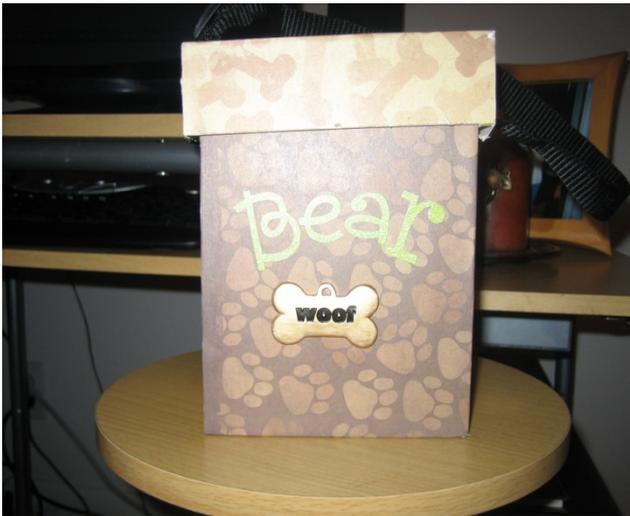
With every interactive student project, there is variability in terms of the effort that the teams expend to complete the work. Figure 4 illustrates a gift box designed by a student team that did not spend enough time developing an understanding of the client's needs and wants. The team selected a history professor as the client and communicated with him only enough to secure his permission to participate. The team completed no personal interviews with the client

and designed a gift box based on "what they thought that the client would like." The resulting gift box, a "general store" type country market, complete with a Confederate flag painted on the interior floor, did not appeal to the client at all. In fact, it was somewhat confusing to him since his main interest and hobby is the collection of early 20th-century advertising posters.

Figure 4: Example of a Gift Box that Did Not Meet the Client's Expectations

The "general store" gift box, however, provided for some of the richest and most eye-opening discussions in class. The student team members readily admitted that there really was no substitute for getting to know the client well. Their results were especially disconcerting since they had worked hard to construct the box, itself. (The "general store" box, purely from a quality point of view, was actually a very sound design.) The main take-away for the class from this discussion was exactly what this project was intended to show: *without understanding the consumer's needs and wants, even the best-executed product design may totally miss the mark.*

Summary

At the end of the in-class presentations, it is useful to discuss what students may want to do with their project materials and also to summarize main learnings. The actual gift boxes become the property of the clients, as a "thank you" for their participation. Students are strongly encouraged to keep copies of gift box photos, PowerPoint presentations and final written reports for inclusion in a portfolio of their completed work (see, for example, Klenowski, Askew and Carnell, 2006). Work portfolios, particularly those that show creativity, innovation, teamwork and other highly valued business skills, can help students secure internships and career positions by providing important points of differentiation for them versus other interviewees.

Student comments provide the most succinct assessment of the primary consumer learnings from the Stylin' Wrappers project. Frequently cited statements include:
- Build a strong relationship with the client;
- Don't project your own preferences onto the client;
- Be creative and ask for client feedback on prototypes to create a better product;
- Start early and allow plenty of time.

Potential future applications of the Stylin' Wrappers project are many and varied. Instructors could easily adapt the project to follow a specialized theme, such as creating birthday or holiday boxes, boxes advertising favorite sports teams, or even boxes created exclusively from recyclable/biodegradable materials in the spirit of the move toward a "green" environment. Application to advanced marketing courses, including higher-level marketing research, customer service, and/or new product development offerings would also afford novel learning opportunities for undergraduate marketing students.

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Biographical Information

      Susan A. Baim is an Associate Professor of Business Technology on the Miami University Middletown Campus. After completing her undergraduate work at Washington State University, she earned her MBA in Marketing from the University of St. Thomas (Minneapolis/St. Paul) and her PhD in Organization and Management from Capella University (Minneapolis). Dr. Baim's research interests include advanced customer satisfaction studies, particularly those appropriate for assessing satisfaction with governmental services, experiential learning techniques at the undergraduate level, and distance-learning administrative strategies. She may be contacted at Miami University Middletown, Johnston Hall 212, 4200 E. University Blvd., Middletown, OH 45042 or through e-mail at baimsa@muohio.edu

Seeing Theory in Practice: An Analysis of Criminal Justice Students Participation in a Police Training Scenario

Dennis W. Bulen
Wright State University—Lake

Abstract

This project sought to explore the disjunction in expectations and experiences of four criminal justice students who participated in a police training scenario. The training scenario was a simulated campus shooting. The students participated in the scenario by role-playing victims and by role-playing the perpetrators. The expectations and experiences studied were the student's perceptions of the police officer personality in a high risk confrontation, the student's perceptions of their own physical reaction to being involved in a shooting situation, and the student's perceptions of the theory of police confrontation and the reality of police confrontation. Data were collected from the students using individual interviews, observations, and group discussion. The results suggest the students underestimated the level of intensity of the police personality when officers are involved in a shooting situation, the students underestimated their own physical reactions to being involved in a shooting situation, and the students indicated the involvement in the scenario greatly helped to bridge the gap between the theory learned in the classroom and the reality of being involved in a shooting situation.

Introduction

On May 8, 2009, Wright State University-Lake Campus (WSU-L) and the criminal justice program hosted a multi-agency training scenario for public safety personnel. The practitioners included 120 police officers, sheriff's deputies, and state troopers. Fire personnel and emergency medical personnel were provided by local fire departments. The Homeland Security Administration and the American Red Cross provided support for the participants and the victims. WSU-L campus students and faculty acted as victims.

The criminal justice students (students) played two roles in the scenario. First the students role-played fatal victims. The purpose for this was to allow the students to observe the entry and clearing tactics the police officers and the Special Weapons and Tactics Unit (SWAT) teams used in responding to the threat. Second, the students role-played active shooters. Each student assumed the role of a shooter. Their role was to engage the responding police officers with a firearm.

An individual's perceptions and expectations are influenced by a wide array of stimuli. The students identified the stimuli that influenced their perceptions and expectations of a police response as coming from classroom instruction, text books, television and movies, and other limited contact with law enforcement. This project explored the disjuncture between the student's expectations prior to their participation in the scenario and their experiences of having participated in the scenario.

Data was collected by interviewing each student, observing each student as they were participating in the scenario, and interviewing the students as a group. Interview feedback was noted at the time of the interviews and composed at a later time. Visual observations were noted at the time of observation and composed at a later time.

Purpose

The purpose of the scenario was to provide the criminal justice students an opportunity to participate in a police training scenario, to experience the events as if they were a police officer, and understand the difference between the theory of the experience and the reality of the experience. Each participating student had taken a class in police operations the previous quarter. The police operations class had an instructional unit that covered the police response to a hostile shooting situation. The instructional units included police response tactics to a hostile encounter, physiological responses that as officer may experience during a hostile encounter, and the psychological responses that an officer may experience during a hostile encounter.

The scenario also provided the university, the criminal justice department, and the criminal justice students an opportunity to

develop a working relationship with local law enforcement, state law enforcement, emergency medical departments, and disaster services. These relationships will help to facilitate employment opportunities for the criminal justice students upon their graduation.

Literature Review

Learning is defined a relatively permanent change in behavior, knowledge, capability, or attitude that is acquired through experience and cannot be attributed to illness, injury or maturation (Wood et al, 2006). Cognition has been defined as the "class of variables related to the quantity and type of knowledge and the relationships among knowledge elements." (Kraiger et al, 1993 p. 313). Cognition refers to the collective sub-processes involved in thinking. These processes include acquiring, storing, retrieving, and using information (Matlin, 1989). Learning style (Claxton, Murrell, & Fife, 2000) is the combination of characteristics and tendencies that result in learning. Learning is a cyclic process. Kolb (1983) identified four phases in the learning cycle students should go through to benefit from experiential learning. The first phase is concrete experience where the students have a tangible involvement in a situation at some level. The students are involved in an event that occupies some of their time and energy. The second phase is reflective observation where the student takes time to reflect on the tangible involvement. The student may replay the event mentally, the student may talk about the event with others, or the student may compare the event with peers who have experienced the same type of circumstance. The third phase is abstract conceptualization where the student forms generalizations based upon the tangible involvement. The student will make assumptions on how or why the event occurred or what effect the event may have on them in the future. The fourth phase is active experimentation, in which the student tests the information received during the tangible involvement. This learning cycle occurs in all aspects of learning. Students who have the opportunity to learn using a variety of instructional methods will experience an increased learning and understanding. Students who are presented information in a classroom setting then have an opportunity to put the information into practice will have a greater

understanding of information than those students who receive the information only in the classroom. Scenario-based training is an example of this type of learning environment. Participants experience a series of events at preplanned points in the scenario called learning points (Whitcomb, 1999). Reaction patterns are how a participant responds to a particular stimulus. These responses include thoughts, feelings, and actions (Sweitzer & King, 2003). The participant experiences, assimilates, and processes the stimuli and learning occurs.

The effective use of scenario-based training has been successfully used in the training of police officers, airline pilots, emergency medical personnel, and the military. Moats et al (2008) suggest that a cutting edge method for avoiding and managing a crisis is scenario-based training. The Federal Emergency Management Agency (FEMA) has identified two main benefits of scenario-based training. This type of training enables the participants to practice their roles and gain experience in those roles and improves the organization's system for managing emergencies (FEMA, 2003). Scenario-based training provides a framework for individuals and groups to prepare and respond to a possible future event (Kirkley & Kirlkey, 2005; Smith, 2004; Stroschneider & Gerdes, 2004). The scenario and the participant decisions are developed to stimulate specific learning outcomes. "Scenario-based training is an amalgamation of knowledge and skills-based training. It incorporates psychomotor coordination and reinforces a survival mind-set in the student" (Lynch, 2005).

Scenario

The scenario was a simulated campus shooting. The scenario attempted to replicate a situation similar to the mass shootings at Columbine High School and Virginia Tech. Participating police personnel and emergency medical personnel staged in the parking lot of the campus. Response teams were formed. A simulated 911 call was made to the county sheriff's mobile communication center advising that shots were being heard in Dwyer Hall on the WSU-L campus. The dispatcher dispatched available units to the university. The response teams entered the building and neutralized the threats.

SWAT teams then entered the building and conducted a sweep for additional threats. The emergency medical personnel entered the building and removed the victims.

The student's initially role-played victims. The students were 'made-up' to simulate fatal injuries. The students were placed in various positions as if fatally wounded while attempting to escape the threat. Students were used as victims to allow them to experience the response tactics of the law enforcement personnel. Due to the sensitive nature of the law enforcement tactics, observers were prohibited from watching the tactics as they were employed.

The students later role-played as active shooters. The students were paired and each student in the pair was issued a handgun with simulated ammunition. The pairs were given instructions to verbally confront the officer teams. Immediately after the verbal confrontation, the pairs split and ran in different directions. The purpose of the split and to run was to force the responding officers to decide which shooter to pursue and to give chase. The students were further instructed that at some point in the scenario, they were to turn and face the officers and open fire. The responding officers then returned fire to neutralize the threat. Each student participated in a total of three exercises role-playing a shooter.

The students who role-played the shooters and the responding law enforcement personnel were armed with nine millimeter semi-automatic weapons that had been modified to shoot simulated ammunition.   The simulated ammunition rounds were paint pellets set in a nine millimeter cartridge. These rounds sounded like live ammunition. When the projectile struck the target, the paint was transferred to the target to indicate a hit.

Students

The scenario was presented to students in the criminal justice classes offered during the fall 2008 and winter 2009 quarters. Volunteers were sought and selected for the role-playing by the researcher. The primary criteria were the student's desire to enter the criminal justice field and the student's availability on the day of the exercise. Four students met the criteria. These students role-played as

victims and role-played as shooters.

The students were all male from 19 to 38 years of age. One student was married with eight children and the other three were unmarried. None of the students have any practical police experience. All of the students are attending the Ohio Peace Officer Basic Training Program (police academy) with career goals of working for a county sheriff or a municipal police department. All of the students are enrolled in an Associates of Technical Studies Program. Three of the student's areas of academic concentration are Law Enforcement and one student's area of academic concentration is Political Science.

Findings

The students had an opportunity to interact with the law enforcement officers for approximately one hour prior to the beginning of the exercise. The students commented that the officers were laughing, making jokes, and cutting up prior to the beginning of the exercise. The officers seemed like any other members of a group going about their day.

The students' first contact with the officers in the scenario was as role-played victims. The students all commented on the professionalism of the officers. The students stated the officers all seemed to know what they were doing. They all worked well together even though they were not all from the same department.

Student 1 commented that once the exercise began, the officer's personas changed. He commented that the demeanor became very serious. Student 1 described the officers as much focused, very professional, and had a no "BS" attitude. When student 1 was role-playing the shooter, he knew the officers were going to "kill" him had this been an actual shooting situation and that was their job. Student 1 commented that when the debriefing had concluded, the officers went back to laughing and cutting up, just like nothing happened.

Student 2 commented that once the officers determined he was a fatal victim (the injuries were identified using body tags), the officers ignored him completely. He stated he felt like he did not matter to them. Student 2 talked with an officer after the exercise and asked the officer about the attitude toward fatal victims. Student 2 said the

officer told him they cannot do anything about the dead, but they can do something about the living. Their job is to save the lives of the living. Student 2 commented that during his role-play as a shooter, they felt physically afraid of the officers. He stated he had no doubt the officers would shoot him without hesitation. Student 2 explained that the shooting encounter seemed to be moving in slow motion. He felt like he could not move or react to the situation. He described the voices of the officers as being similar to what you hear on television during a slow motion presentation. He said it felt very strange to feel like everything was in slow motion, but knowing it was happening in real time. Student 1 indicated that he did not have time to think about what he wanted to do during the exercise. He stated that his mind went blank when he tried to think about what he wanted to do. His perception was that the police officers did not have to think about what they were going to do, they just reacted. Student 1 stated that he was amazed at how fast the officers reacted to his threat.

 The student's second contact with the officers was as role-played shooters.

 Each student pair was debriefed following each role-play. The researcher was an instructor and an observer during this training and conducted the debriefing. The students who role-played active shooters demonstrated similar reactions to their participation. All of the students demonstrated classic fight or flight responses. A fight or flight response is the body's "primitive, automatic, inborn response that prepares the body to 'fight' or 'flee' from perceived attack, harm or threat to our survival" (Neimark, ND, p. 1). Each student was perspiring profusely, their faces were very flushed, their breathing was very rapid and shallow, their eyes were widened with pupils dilated, each suffered varying degrees of audio breakdown, they experienced tunnel vision, and each demonstrated a loss of fine motor skills.

 Audio breakdown is the loss of normal hearing. This is the body's protective measure against loud noises (Neimark, ND). Student 3 experienced the most severe case of audio breakdown. This occurred during the student's first role-play. The student's breakdown began during the instructional period just prior to his first role-play. The researcher was giving the student pair their instructions. The student

was demonstrating characteristics that led the researcher to believe the student did not understand the instructions. The researcher gave the student his instructions and received no confirmation of understanding. The researcher gave the student his instructions a second time with no confirmation of understanding. The researcher removed the student's protective face shield. The student's eyes were extremely dilated and the eyes were unable to fix on the researchers face. The researcher spoke to the student with no response. The student was perspiring profusely. The student's arms and legs were moving as if preparing to run. The researcher tapped the student on the forehead three times. The student's eyes blinked, the student focused on the researcher, and the student's body relaxed. The researcher asked the student if the student could hear the researcher. The student affirmed his ability to hear the researcher. The researcher gave the student his instructions and the student affirmed his understanding.

All of the students demonstrated a loss of fine motor skills immediately following their role-play. This loss was demonstrated by their difficulty in loading the magazine for the weapon. The students were dropping the rounds, student 4 dropped his weapon while attempting to remove the magazine, students dropped the magazines, and students had difficulty loosening and tightening the straps on the protective face shield.

Student 4 explained that he had a hard time pointing the weapon at the officers and shooting at them. He stated that he hesitated with the first shot in each of the scenarios in which he participated. He stated the officers did not hesitate at all. He stated when he pointed the weapon at the officers, they fired at him and continued to fire until he raised his hands or the monitor stopped the exercise.

Each student was asked several questions during the debriefing. None of the students knew how many rounds they fired. None of the students knew how many times they were hit by returned fire. Only student 1 was able to relate back to the researcher the verbal instructions the researcher had given during the exercise. Student 2 and student 3 did not hear that instructions were being given. Student 4 heard the researcher's voice, but could not relay what was said.

Student 2 and student 3 stated all they could hear was their own breathing and their own heartbeat. They said it felt like their hearts were beating in their ears.

All of the students indicated the scenarios did not go as they had expected. They indicated this was nothing like they had seen on television or in the movies. All of the students had difficulty firing at the officers, which none of the students expected.   The fight or flight response was discussed in class. The students understood the response from an academic perspective, but none of the students had ever experienced the response to the extent they had experienced it during the exercises.   The students were unprepared for the physiological and psychological changes they experienced.

The students volunteered to participate thinking the experience would be fun. The students were glad that they participated, but they did not experience the fun as they had anticipated. The student's expectations were directed by what they had learned in their criminal justice classes. All of the students indicated what they had learned in class did not prepare them for the reality of the exercise. All four students had intended to attend the Ohio Peace Officer Basic Police Training (police academy). All four students applied, were accepted and are currently attending the academy. Their participation in this exercise did not dissuade them from participating in the academy and pursuing a criminal justice career.

Summary

The students who participated in this research experienced learning on two levels. The first level of learning was in the classroom where they learned of the body's physiological and psychological response to a threat and the tactics for police response to a threat of this nature. The second level of learning was during the exercise where they experienced the physiological and psychological responses to a threat, they observed the change in personality of the officers, and experienced their own responses to the threat.   The students had a better understanding of the material presented in the classroom by participating in the exercise and experiencing the changes.

The students were exposed to the personality of the police

officers. They would see the officers laughing, cutting up and having a good time. Then the officers transitioned to their working personality of no nonsense. When the exercise was concluded, the students saw the officers, again laughing and having a good time. That transition and the speed of the transition was a new experience for the students. The students experienced their own personality transformation during the exercise. They experienced the fight or flight response. The students came to understand the speed with which the body makes those transitions.

The students indicated their participation in the exercise was very positive. None of the students had any second thoughts about attending the police academy based on their experience in this exercise. All four students indicated their desire to attend the police academy was strengthened by their participation.

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Biographical Information

      Dennis W. Bulen is an Assistant Professor of Criminal Justice at the Wright State University-Lake campus. He earned his B.S. from Eastern Kentucky University, his M.C.J. from the University of Alabama, and his PhD from the University of Louisville. He is a retired police chief, a police academy instructor and commander. His research interests include recruitment, hiring, training, and small department management issues.

Contact Information

Dennis W. Bulen
Assistant Professor of Criminal Justice
Wright State University-Lake Campus
7600 Lake Campus Drive
Celina, OH 45822
dennis.bulen@wright.edu
(419) 586-0371

Faculty-Librarian Collaboration: The Blackboard Embedded Librarian

John J. Burke, Beth E. Tumbleson, and Sarah M. Frye
Miami University—Middletown

Beginnings and Marketing

A trio of librarians at the Gardner-Harvey Library, Miami University Middletown launched a pilot program, Blackboard Embedded Librarian, in 2008-2009. The purpose of the pilot was to address students' course-related research needs in online space familiar to students. Students routinely work in the university course management system that faculty use to post required readings, assignments, and on-going discussions. When librarians are able to provide instant access to library materials and services within this electronic environment familiar to students and faculty, students' information literacy skills are developed and research outcomes improve.

Nationally, library services are being delivered to off-campus individuals, whether they are distance education users, commuters, or traditional students who work from home rather than in the library. In 2009 the Miami University Regional Campus System expanded from two campuses built in the 1960s to three; however, the newest West Chester Voice of America Learning Center is without an on-site library. The regional campuses were also charged by Miami University to innovate in distance education as part of a consultant's report. Another impetus to embed librarians in the campus course management system was the fall 2008 launch of the Online Nursing Program. Using technology to deliver library resources and services to non-traditional students, who are busy studying, working, and parenting, makes sense. Finally, the faltering economy motivated librarians who teach to search for ways to work more efficiently and cost-effectively as instructors of information literacy.

Academic librarians always ask: "What's the best way to provide information literacy?" The Blackboard embedded librarian

program seems to be a winning solution. Through faculty-librarian collaboration, course-related research is made manageable for students. A Blackboard embedded librarian better understands the faculty's research assignments and students' needs in terms of library materials. Then course-specific library resources and services can be provided within Blackboard which students associate with learning and assignments. Within Blackboard, students may easily access links to library resources and research help such as full-text subject databases, electronic collections of reference works, and timely research consultations via IM, email, or in-person.

In marketing the pilot, the librarians anticipated faculty concerns. When instructors teach online or in a facility without a physical library, how do students receive research assistance? Information specialists bridge the worlds of technology, changing academic collections of print and electronic resources, and regularly work with students, whether one on one or in the classroom. The librarians initiated a partnership with faculty by inviting them to collaborate within a Blackboard course to strengthen student academic achievement. Via various communication channels: email, library blog, newsletters, and personal invitations, the librarians explained the role of the Blackboard embedded librarian, the library materials and services that could be added to their courses, and the particulars of the working relationship. They emphasized the flexibility and course-customization possible, in contrast to the general library Website, and the personal interaction with students through prompt replies to email queries or "Discussion Board" questions. Happily, 10 instructors teaching 19 sections agreed to participate in the pilot program. These faculty taught off-campus, online, and traditional courses; across the disciplines: English, Communication, Religion, Computer Science, Nursing; and lower and upper division courses.

Once participating faculty were matched to an embedded librarian, driven largely by the librarian's interest, expertise, and personal connections, faculty were surveyed online to determine information literacy needs and expectations. Instructors were asked if they wanted an embedded librarian only at the start of course, for several weeks during the research component of the course, or

throughout the semester. Research assignments were requested so the embedded librarian might create custom content, better comprehend prior pitfalls, and suggest information literacy skills and strategies to emphasize as well as resources, and tools that might be incorporated in the Blackboard course. The librarians built a model Blackboard organization to showcase their "research wares." Then the faculty member enrolled the embedded librarian either as an "instructor" or "course builder" which excludes access to the grade book and course statistics.

Implementation

The initial step in implementing the Embedded Librarian Program was to meet face-to-face with faculty to discuss possible content to be added by the embedded librarian within an individual course's Blackboard site. Librarians scheduled individual meetings with participating faculty members during January, prior to the start of the spring semester. These meetings provided a valuable opportunity for librarians to build relationships with participating faculty from various departments. These meetings also allowed librarians to gain understanding of faculty members' overall comfort level with technology and their preferred style of organization within Blackboard. During meetings, librarians demonstrated a model for embedded librarian content within Blackboard, helping faculty better visualize the role of the service in their course site.

In most faculty-librarian partnerships, librarians were added as course builders within the courses that they worked with and subsequently added an "Embedded Librarian" button placed among the various course buttons established by the faculty member. Within the "Embedded Librarian" button, librarians created separate folders to share information and library resources relevant to the course [see Figure 1 & Figure 2 below]. Some librarians chose to organize content based on resource type creating separate folders for books, articles, websites, digital media, citations, etc.   Other librarians organized content in a manner that was specific to assignments throughout the semester. In an Introduction to Communication course, for example, the embedded content was separated into folders titled "Recommended

Resources for the Informative Speech," "Recommended Resources for the Persuasive Speech," and so on. The initial set-up of the "Embedded Librarian" content required approximately 1-2 hours per course. Librarians were able to migrate content between similar courses, which significantly reduced set-up time. For example: After adding content to a course, adding content to additional sections of the same course could, in some cases, take a matter of minutes. Adding additional content throughout the semester varied, depending on the complexity of the material added. Instructors and/or librarians emailed students throughout the semester when new content was added within the "Embedded Librarian" button.

In addition to allowing librarians to place content within Blackboard, most instructors invited the embedded librarian to visit their class. In some cases, instructors preferred that librarians visit for a brief – 15 to 20 minute – introduction session to explain the purpose of the embedded content and invite students to seek research assistance as necessary. Other instructors reserved a full class session in their syllabus for library instruction, enabling the librarian to introduce the content within the "Embedded Librarian" button and also deliver a formal instruction of research concepts. These introduction and instruction sessions provided a valuable opportunity for students to connect a face with the embedded librarian and think about initiating a working relationship with the embedded librarian. In many cases, these sessions initiated greater demand for the embedded librarian's services as students appeared more comfortable approaching the librarians after the classroom visits, particularly when they knew that the librarian had an understanding of the course syllabus and course assignments.

Requests for research assistance tended to occur several weeks after the introduction of the embedded librarian, corresponding closely with due dates for course assignments. Fortunately, having access to courses' Blackboard sites, librarians were generally able to anticipate periods of more frequent requests and thus provide point-of-need instruction and/or content within the "Embedded Librarian" button. Due dates for most research assignments fell primarily towards the middle and the end of the semester, however, which impacted librarians' workload throughout the Embedded Librarian Program; the set-up phase and the midterm period required a greater time commitment than other phases of the program. Students communicated their need for research assistance in a variety of ways: Students in online courses almost exclusively corresponded with their embedded librarian via email. Students in traditional courses who met their embedded librarian early in the semester also emailed requests for assistance. More commonly, though, these students visited the librarian in the library. Although embedded librarians established and communicated office hours to students, most students visited without first scheduling a time to meet causing the embedded librarians' workload to be somewhat unpredictable.

The implementation stage lasted essentially the entire semester with the early tasks of meeting with the course instructor, deciding on appropriate content to add, and posting content; it carried well throughout the semester with the flexible, but on-going tasks such as establishing communication with students and modifying content as necessary.

Assessing the Embedded Librarian Experience

As the semester drew to a close, students and faculty who participated in the program assessed the pilot program. The assessment was in the form of two web-based surveys, developed using Prezza Checkbox. The first was a web-based survey for students in the courses that had an embedded librarian. The second was a web-based survey for the faculty who taught the courses.

The student survey asked students to respond anonymously to ten questions aimed at evaluating their experience with the program

and suggesting areas for improvement. A link to the survey was emailed out to every student enrolled in an embedded librarian course. 17 of the 272 students responded for a 6.25% response rate. The general reaction of respondents to the program was positive, with 64% of students agreeing or strongly agreeing with the statement that it was helpful to have a Blackboard embedded librarian in their courses. Students tended toward exploring resources on the embedded librarian pages of the course Blackboard site on their own (82% visited these pages) rather than interacting directly with the librarian (only 12% had done so). 64% of respondents found librarian suggested resources and strategies for research useful and an identical percentage used new databases or websites provided by the librarian in their papers or projects during the semester. A strong desire to have an embedded librarian present in future courses was expressed by 70% of respondents.

         Of the nine participating faculty members, four responded to an anonymous web-based survey at the end of the semester. Unlike the student survey, this survey included seven questions and focused its attentions on faculty members' perspectives on their students' use of the embedded program. Respondents thought that the program benefitted students most in terms of their "adopting more sophisticated search methods" (100% of respondents chose this option) and "better understanding access to course-specific electronic resources available" through the library (75%). Only 50% respondents agreed that students were "choosing topics that are more narrowed and manageable," "using better academic sources in research," or "citing sources in APA or MLA format more accurately." In terms of the aspects of the course, 100% of respondents agreed that the "introduction of new resources for research" and the "reinforcement of instructor's expectations for student research" were positively affected by the embedded librarian. Only 25% agreed that the librarian aided in refreshing students on various points of the research process and impacting the design of research assignments. 100% of respondents had a favorable impression of their collaboration with an embedded librarian and 100% would collaborate again in the future.

Lessons Learned So Far

Following the semester, the group of embedded librarians met to reflect on their experiences and discuss the survey results. The following list of lessons learned was developed from the librarians' individual observations of the process, their conversations with students and faculty, and their analysis of the survey results. It was also quite helpful at this point in time that the embedded librarians presented a summary of their embedded activities to a group of faculty members at a Center for Teaching and Learning luncheon. They received great feedback from participating faculty as well as questions from potential users of the service.

1. Contact from students via email, IM, and in-person increased during the embedded semester. The topics of the reference interactions made it clear that the increase was due to the students served by embedded librarians. This gave the embedded librarians confidence that they were connecting with students and that they were seeking their help – just as intended through the pilot.

2. It was crucial for the embedded librarians to use the enhanced knowledge they gained about each of the courses in the program to their advantage. Unlike most of the typical one-shot instruction sessions the librarians conducted, these courses gave them access to course syllabi through the course management system. They could focus their attention on different steps in the research process at just the right moment for students, using the learning opportunities created by individual assignments. If students were asked to use only scholarly materials for a short paper, the librarian could post or email information on finding scholarly articles. Likewise, if the instructor communicated to students on the Blackboard discussion board that they needed to work on their bibliographies following the grading of paper #1, the librarian could post information on citations prior to students submitting paper #2. While the librarian had some success in connecting with students and seizing these learning opportunities, they can improve this focus with better planning based on the flow of the course.

3. Similarly, the placement of embedded librarian information within the course site impacted how readily it was used by students. A question about the placement of librarian materials and links on the student survey showed that 70% of student survey respondents suggested that they be placed next to an instructor-posted assignment in the Blackboard classroom, while 41% thought the resources should be placed on a separate embedded librarian page. We used both strategies during the semester, but this result encouraged the librarians to link more materials within instructor created assignment pages. Another mode of communication used by the librarians to suggest library resources and research techniques was to email them to all registered members of the class. This can be a powerful way to reach students in a timely manner, giving librarians an additional method to connect with students (they normally would not have access to student email addresses for a given class). They certainly do not want to overuse this ability, but despite fears that students do not read email, 80% of respondents to the student survey chose email as their preferred method for contacting librarians embedded in a course.

4. There is great potential for combining methods of interacting with students for library instruction. The embedded librarian approach revealed great possibilities of extending librarians' contact with students throughout the semester. Librarians' reflections on experiences in the 15 classes led them to desire this type of contact for all of the courses they work with. They also thought that it made sense for a librarian to meet face to face with each of the embedded classes at least once if they possibly could. In about half of the classes the librarians did have at least a brief session with the class, and that seemed to make students more comfortable in following up with them online or in person at the library when compared with classes that did not have a face to face meeting. The librarians are now imagining a way to meet with each embedded class for at least fifteen minutes near the start of the semester, and then again briefly if needed later in the semester. They would like to try this approach of multiple meetings with the classes they only see face to face as well.

5. The idea of embedding librarians in courses was intriguing to many groups on campus. It served the librarians well in marketing the program (both for the spring and beyond). An "embedded advisor" was added to Blackboard classrooms for courses in a new bachelor's completion program on campus to assist students with their understanding of program requirements. It also led a faculty member who taught a web-based course to plan to have an "embedded technologist" checking in with her nursing course to assist students with Blackboard-related issues. There are many potential applications of the concept in student support of web-based or course management system-reliant courses.

6. The impact of embedded operations on a librarian's workload is not insubstantial. During the program, each librarian was embedded in five separate courses. While the group created some materials that can serve as templates for future courses, and have a better sense of the flow of the work, they do hope to expand their interactions with classes and individual students. It remains to be seen how many more courses can be added without additional librarians on staff. The most time-consuming activities were to monitor activities in the individual classrooms and add new content. The librarians may need to retool how much content is needed and to check in more quickly with classes using email.

Future Directions

With a successful pilot program behind them, the librarians are currently working on the following efforts to improve and expand the embedded librarian program. They are fine-tuning methods of working with embedded classes (some examples of this are in the previous section). They hope to recruit a larger group of faculty to participate in the program in the fall semester of 2010. An eventual development will be to attempt to jointly develop research assignments with faculty members to increase students' information literacy skills. The librarians also hope to continue finding forums to discuss teaching methods with faculty members to expand each other's skills and to integrate methods better with faculty who are teaching in the embedded courses.

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Biographical Information

John J. Burke is the Director of the Gardner-Harvey Library at Miami University Middletown. He earned an M.S.L.S. from the University of Tennessee at Knoxville and a B.A. in history from Michigan State University. He has served as a technology innovator and educator in his library career, which includes more than ten years of service in regional campus libraries. He is a past president of the Academic Library Association of Ohio. John is the author of *Neal-Schuman Library Technology Companion: a Guide for Library Staff* (Neal-Schuman Publishers published a third edition of the work in 2009) and two other books.

Beth E. Tumbleson, Assistant Director, Gardner-Harvey Library, Miami University Middletown, earned her M.S. in Library Science from Simmons School of Library Science and M.A. in Church History from Trinity Evangelical Divinity School. She has worked as an academic, school, and corporate librarian. She convenes the Technology Interest Group of Southwest Ohio and Neighboring

Libraries, participated in Five Weeks to a Social Library in 2007 and has published a lesson in *The Library Instruction Cookbook,* ACRL, 2009 and a book review in *Collection Management,* 2008.   She co-presented at LITA National Forum 2008 on "Library 2.0 PDQ: Meeting the Challenges of the Rapid Growth of Distance Learning and Off-Site Courses at a University Regional Campus" and at the Association of University Regional Campuses of Ohio 2009 on "Faculty-Librarian Collaboration".

Sarah M. Frye graduated from Indiana University's School of Library and Information Science in May 2007. After finishing her degree, she filled an interim position as Information Literacy Librarian at Wartburg College in Waverly, Iowa. Sarah began her current position as Public Services Librarian at Miami University's Middletown campus in July 2008. She is actively involved in information literacy initiatives at Miami's Middletown campus; she has taught a two-credit course titled *Effective Use of Libraries* which is an elective in the campus' Bachelor of Integrated Studies degree program. She has also participated as co-coordinator in an Information Literacy Forum which is aimed at engaging Miami faculty and staff in discussions about information literacy. Other projects include implementing a Research Consultation service and serving as a Blackboard Embedded Librarian in the Library's Spring 2009 pilot program.

Genetics Education in the Laboratory: Addressing Students' Misconceptions through Instruction and Activities

Mary Ellen DeHoff
University of Cincinnati—Clermont

Abstract

Students at multiple academic levels experience difficulties in understanding genetics concepts. The present research assessed misconceptions related to genetics among undergraduate non-science majors, as well as the effectiveness of different genetics lab activities. Participants included students (n=42) enrolled in three sections of a General Biology II Laboratory. Students were surveyed at the beginning of the class to assess their incoming genetics literacy. They then received instruction focused on addressing misconceptions revealed by the survey. Following instruction, students participated in different lab activities designed to reinforce genetics concepts: coin tosses, virtual (online) fruit fly crosses, genetic jigsaw puzzles and baking cookies. Students' attitudes toward and perceived effectiveness of the various lab exercises were evaluated using lab notebook reflections. Among students' misconceptions revealed by the survey were a compartmentalized and incomplete understanding of terminology; inaccurate size sequence of structures such as genes, DNA and chromosomes; and a misunderstanding of DNA's function in cells and the effects of mutations. Notebook reflections indicated that students found the virtual fruit fly crosses, genetic jigsaw puzzles, and cookie activity effective in reinforcing various genetics concepts.

Introduction

Genetics is one field of biology that is ripe with exciting advances, social and individual relevance, and opportunities to engage students in lively discussion. However, students at multiple academic levels experience common difficulties in learning genetics, which have been well-documented in the literature. For example, Knippels et al (2005) sought to define problems in genetics education among Dutch

biology teachers at the secondary level. Problems in both teaching and learning genetics were related to abundant terminology and the lack of consistency in relating this terminology to different structural levels (e.g. molecules, cells, populations); the abstract nature of genetics when not related to everyday experiences; and the lack of connection between reproduction and meiosis and genetics concepts. Lewis et al (2000, 2000a, and 200b) investigated the understanding of genetics concepts among students age 14-16, nearing the end of a national science curriculum in the UK. Students showed misconceptions in the size sequence of structures such as genes, chromosomes, and the nucleus; in understanding genetic terms; in defining the genetic code; in the relationship of DNA to proteins; in differences between somatic cells and gametes; and in chromosomal content within the cell, among others. Marbach-Ad and Stavy (2000) examined students' abilities to connect genetic events at the level of the organism with events occurring at the 'micro' (cellular and molecular) level. They found that 9th graders were relatively unable to explain events in the organism using knowledge of events at the micro level; 12th graders were more able to use *terminology* applicable to the micro level in explaining events, but they had little understanding of what the terms actually meant; pre-service teachers at the college/university level were more able to make these connections. In another study by Marbach-Ad (2001) using students at the same academic levels, many students failed to see the interrelatedness of DNA, genes, and chromosomes, keeping these concepts compartmentalized. Their responses also focused on either functional or structural properties of these concepts but not both.

The above studies strongly suggest that college educators cannot assume that incoming students who have taken biology and/or genetics courses have an accurate understanding of even the most basic genetics concepts. Their misconceptions must be ascertained and addressed in instruction. In 2002, Hott et al published genetics content recommendations for college-level introductory biology courses for non-science majors. The article reported six recommended content areas as outlined by a subcommittee of the Information & Education Committee of the American Society of Human Genetics.

Three of these content areas described by Hott are typically taught in the General Biology II Laboratory at our College: 1) the nature of the genetic material, 2) transmission and 3) gene expression. Hott based his content recommendations on descriptive survey data from instructors of introductory biology courses for non-science majors. These data included the time spent on each content area as well as its importance and emphasis in the classroom. In his summary Hott states,

> These descriptive data do not, however, indicate whether students actually learn the concepts we have identified as central to an understanding of genetics, nor do they address the factors that influence student learning. These questions require additional investigations to assess variables such as pedagogical style, the background of the instructor, [and] *the nature of laboratory experiences…*" (p.1035; italics added).

The biology laboratory offers an opportunity for genetics education through activities that can address student difficulties, reinforce correct genetics concepts and make the learning of these concepts fun for students. The purpose of the present research was to improve pedagogy in an undergraduate General Biology II Laboratory course. To do this, I first ascertained students' incoming knowledge and perceptions regarding genetics. I then evaluated their reports of the effectiveness of various lab activities designed to reinforce genetics concepts. The traditional lab activities associated with this course include coin tosses and fruit fly crosses. In this study, coin tosses were used and the fruit fly lab substituted with an online version. Two new activities were introduced: a genetics jigsaw puzzle activity entitled "Finding a Gene on the Chromosome Map" and another involving baking cookies, entitled "Food for Thought: the Cookie Analogy." Teaching strategies employed to address student misconceptions regarding genetics are also discussed.

METHODS

Genetics Survey

The present study took place in three sections of a non-science majors' General Biology II Laboratory in which genetics concepts are taught. Although student misconceptions regarding genetics have been well documented in the literature, I wanted to know what *my* students' misconceptions were. As stated by Bowling et al (2008), "To improve the learning of genetics, there is a need to first assess students' understanding of genetics concepts and their level of genetics literacy…" (p. 15). On the first day of class, students (n=42) were administered a survey for the purpose of assessing their level of genetics literacy. Survey questions were open-ended so that students would not be 'led' in their answers but could express their own thoughts using their own words. Questions are found in Table 1. Students were also not required to put their names on the survey, so that they would be more inclined to answer honestly and openly. Content was similar to that used in previous studies to evaluate genetics literacy among students (Knippels, 2005; Lewis et al, 2000; Marbach-Ad, 2001). The survey also collected the following data related to student profiles: program/major, academic year (e.g., freshman), prior biology courses completed, including the year of completion and grade received.

Students' answers to genetics-related questions were evaluated for their quality and level of understanding, rather than being scored according to 'right' and 'wrong' answers. To simplify analysis, when appropriate, responses were grouped into categories and the number and percentage of responses in each category calculated. If a response(s) suited more than one category, it was placed in a category of "both." Responses that did not fall under a certain category (or which were the only type of answer given) were listed as "other." Prevalent misconceptions revealed by the survey were addressed in genetics instruction (see Discussion).

Laboratory Activities

All students received the same instruction in genetics concepts

by the author. Instruction occurred across three laboratory units in each section (each unit lasting for two hours) and was followed by varying activities to reinforce instruction at the time most appropriate to the activity. Students were assigned to different laboratory activities according to their section and performed coin tosses as well as a virtual fruit fly crossing (Group A) or a genetics jigsaw puzzle activity and an analogy involving baking cookies (Group B). Group A consisted of 10 students, and Group B consisted of 32 students. The variation in sample size reflects the enrollment patterns in the Summer versus Autumn quarters (Group A included one Summer section; Group B, one section in both Summer and Autumn). As the data collected were qualitative in nature rather than quantitative, the difference in sample size was not seen as a serious limitation. Also, coin tosses and actual fruit fly crosses have been the standard lab activities performed at our institution for years. However, due to the smaller sample size in Group A, and the modification of the fruit fly lab to be an online experience, results regarding these labs may be considered suggestive rather than conclusive. Lab activities are described below.

Coin Tosses

Coin tosses were performed according to a protocol written by Janet Stein Carter at UC Clermont College (http://biology.clc.uc.edu/courses/bio115/carter.htm). According to the protocol, the objectives of this activity are "to explore probability as it applies to genetics" and "to learn how to make and use Punnett squares." Students performed section IV.A.2. of the protocol. Working in pairs, they tossed coins to represent different scenarios related to meiosis and both mono- and dihybrid crosses. Students were additionally asked to record the ratios, proportions, and probabilities related to the outcome of each toss. This extra task was meant to reinforce math concepts related to genetics (students at our institution are often found to be deficient in math skills). The time-on-task entailed approximately one hour. Punnett squares were introduced to the students utilizing their coin toss data, as a means of reviewing their results and teaching them the procedure of setting up a Punnett square.

Virtual Fruit Fly Crosses

Virtual fruit fly crosses were performed using an online lab (http://bioweb.wku.edu/courses/Biol114/Vfly1.asp). This lab instructs students on the various phenotypes and corresponding genotypes found among fruit flies. It also strongly reinforces terminology such as phenotype versus genotype, dominant versus recessive, heterozygous versus homozygous, and F1 and F2 generations. Students worked in pairs at computers and were guided through crosses forming the F1 and F2 generations. For each cross, the lab required that they record the ratios, proportions, and probabilities ("percentage") related to the offspring. Students were also prompted to answer questions regarding the results of their cross. After completing their virtual crosses students were given an additional assignment of recording their data in the form of a Punnett square. The activity and data were then discussed as a class. The time-on-task entailed approximately one hour.

Genetics Jigsaw Puzzle

On day one, students in Group B performed a genetics jigsaw puzzle activity entitled "Finding a Gene on the Chromosome Map" (http://learn.genetics.utah.edu/archive/pedigree/). This online learning activity uses a very simple and familiar concept – jigsaw puzzles – to introduce genetics concepts. It is a surprisingly easy way to reinforce the structural differences between DNA, genes and chromosomes, how chromosomes and their associated genes are passed from generation to generation, the difference between a gene and a trait, and how to read a pedigree.

As a class, students were first guided through the analogy of a person's genetic makeup being like a puzzle, in which each puzzle piece represents a chromosome containing certain genes. While humans would share puzzle pieces of the same size and number, each piece might be of a different color, representing genetic variance (alleles). Once students understood the analogy, they were then guided through the reading of a pedigree belonging to a family with a fictitious disorder, Whirling Disorder. Puzzles were distributed that represented the genetic makeup of members of the Whirling Disorder

family, each varying in color patterns. Working in groups of 4-5, students were instructed to find the chromosome (puzzle piece) that contained the gene for the disorder and to write down their explanation of why that chromosome was chosen. Students were additionally asked whether the disorder was dominant or recessive, and were told to create Punnett squares showing the inheritance patterns that would be seen in both scenarios. Students worked autonomously throughout the activity. The time-on-task was approximately 30 minutes. Once finished, the process of finding the gene for Whirling Disorder was discussed as a class. Students were also referred back to the pedigree to see if their Punnett squares matched the inheritance pattern seen therein.

The Cookie Analogy

        This activity entitled, "Food for Thought: the Cookie Analogy," was developed by Sue Johnson of the Center for Biology Education at the University of Wisconsin (Johnson, 1991). Like the genetic jigsaw puzzles, this activity uses a familiar concept – baking cookies – to explain unfamiliar genetics concepts. It may seem simplistic at first, but embedded in this activity are numerous analogies and opportunities to reinforce genetics concepts, including genotype (the cookie recipe), phenotype (appearance of cookies), alleles (e.g., butter vs. margarine vs. shortening; sugar-free chocolate chips vs. regular), mutations (e.g., replacing sugar with salt; omitting an ingredient) and environmental effects on genes (e.g., gas vs. electric oven; type of cookie sheet used).

        On day one students were assigned one of four recipes for cookies and told to bake them and bring to the next lab. This 'homework' also involved answering "Questions for the Baker," which are reflective questions on the process and ingredients used to bake the cookies. At the following lab, cookies were displayed and students divided into groups of 4-5 for purposes of analyzing their data. This was done by answering "Research Group Analysis" questions, focused on the concepts mentioned above, and (of course) by tasting each of the cookies. Due to the nature of these rather in-depth analysis questions, results were discussed as a class after students had completed their group work. The time-on-task involved

approximately 10 minutes the first class period to introduce the activity and homework, and an entire lab unit of two hours for cookie analysis and class discussion.

Interestingly, between days one and two of the activity, several students emailed the instructor requesting to make changes in their recipe. For example, one student disliked chocolate and asked to replace chocolate chips with peanut butter chips. Another student wanted to add coconut to her recipe. These changes were allowed but kept a secret from the other students. During analysis of the cookies, the alterations to the recipe (the 'genotype') were used to discuss mutations and how they may/may not be beneficial to the 'survival' of a cookie.

Notebook Reflections

At the conclusion of each group's lab activities, students were asked to record in their notebook responses to reflective questions about the activities. Responses were used to measure students' attitudes and the perceived effectiveness of each lab activity. Below are the questions used for Group A. Group B received the same questions related to their activities.

1. The coin tosses were…
2. The fruit fly crossing was…
3. Was either/both lab(s) helpful in your understanding of genetics terms/concepts? Please explain how they were or were not.
4. What questions/difficulties do you still have?

RESULTS

Genetics Survey

Of the 42 students taking the survey, 50% were nursing students, 21.4% were in other Allied Health programs, 14.3% were Education majors, and the remaining 14.3% reported other majors (e.g., business, psychology). Most students were freshman (65%), followed by sophomores (27.5%) and those in their junior/3rd year (7.5%). Two students did not record their academic year. Twenty-

seven (27) students reported taking an introductory college level biology course for non-majors. Nineteen (19) indicated receiving a grade of B or better; however, not all students recorded or could remember their grades received. Nine (9) students had taken or were currently taking the College's General Biology II lecture course, in which genetics concepts are taught.

Due to the nature of the genetics questions being open-ended, there were a variety of responses, many of which could be grouped into categories. Table 1 summarizes the categories and occurrence of responses for each question. For each question, the total number of students responding is listed. It is to be noted that though a response fell into a certain category, it may have been an inaccurate answer. Student responses that showed trends and/or prevalent misconceptions are discussed according to the question asked.

Table 1. Genetics Survey Results

Questions and Categories of Response	% (No. of responses)
1. Do you think the study of genetics is important? (42 responses)	
yes	100.0 (42)
no	0.0 (0)
2. Why or why not? (40 responses)	
detection of disease/birth defects	52.5 (21)
knowledge of one's own body/genetics	37.5 (15)
both	2.5 (1)
other (e.g., career preparedness, general knowledge)	7.5 (3)
3. In studying genetics, I am interested in learning more about…. (34 responses)	
mutations/diseases/birth defects	20.6 (7)
reproduction/inheritance	20.6 (7)
chromosomes/DNA/genes	20.6 (7)
anything/everything	17.6 (6)
my own genetics	11.8 (4)
other (Punnett squares, research)	8.8 (3)

4. Define DNA (39 responses)	
structural description	82.1 (32)
functional description/inheritance-related	15.4 (6)
both structural and functional	2.6 (1)
5. Define Gene (26 responses)	
structural description	30.8 (8)
functional description/inheritance-related	65.4 (17)
both structural and functional	3.8 (1)
6. Define Chromosome (30 responses)	
structural description	83.3 (25)
functional description/inheritance-related	16.7 (5)
7. Define Allele (2 responses)	
alternate form of gene (or similar)	50.0 (1)
other	50.0 (1)
8. Define Genotype (8 responses)	
genetic makeup for a trait (or similar)	50.0 (4)
other	50.0 (4)
9. Define Phenotype (5 responses)	
physical expression of a gene (or similar)	20.0 (1)
other	80.0 (4)
10. Rank these structures, in order of their structure, from largest to smallest: DNA, Gene, Nucleus, Chromosome, Cell (41 responses)	
cell as largest	58.5 (24)
• cell followed by nucleus	36.6 (15)
• entire sequence correct	19.5 (8)
other	41.5 (17)
11. What do the letters in DNA stand for? (30 responses)	
Deoxyribonucleic Acid	56.7 (17)
other (most omitted part of name)	43.3 (13)

12. Where in your body is DNA found? (36 responses)	
cells/nucleus of cells	55.6 (20)
in the blood	22.2 (8)
in genes	5.6 (2)
other (random locations in body/ "everywhere")	16.7 (6)
13. What is a 'mutation' in DNA? (29 responses)	
chromosomal abnormality (most related to number)	41.4 (12)
DNA abnormality/malformation	24.1 (7)
change in DNA sequence	20.7 (6)
other	13.8 (4)
14. What happens to a person when their DNA is mutated? (26 responses)	
disease/deformity/miscarriage/birth defect	84.6 (22)
other	15.4 (4)
15. Cells in different body tissues (e.g., liver, skin) appear and behave differently. How do these differences relate to the DNA found in those cells? (19 responses)	
DNA is same but different genes are 'turned on'	31.6 (6)
DNA is different in different cells	10.5 (2)
other	57.9 (11)
16. What is mitosis? (36 responses)	
division of somatic cells (or similar)	41.7 (15)
other (incomplete answers, e.g., cell division, replication of chromosomes, attempts to draw a phase)	58.3 (21)
17. What is meiosis? (30 responses)	
division of gametes (or similar)	56.7 (17)
other (same as question 16.)	43.3 (13)

18. What are some differences between mitosis and meiosis? (32 responses)	
contrasted daughter cell and/or chromosome numbers; daughters are/are not genetically identical; meiosis involves two divisions	53.1 (17)
other (see text)	46.9 (15)
19. What is the male sex cell? Where in the body is it produced? (40 responses)	
sperm + testes	55.0 (22)
other (see text)	45.0 (18)
20. What is the female sex cell? Where in the body is it produced? (39 responses)	
egg/ovum/oocyte + ovaries	59.0 (23)
other (see text)	41.0 (16)

Defining terms: DNA, gene, chromosome, allele, genotype, phenotype.

Definitions of terms showed that students had incomplete understanding of these concepts. Most students did not respond to the terms "allele," "genotype," and "phenotype"; a few responses accurately described these terms, but the remaining ("other") did not show any clear understanding. This was not surprising, based on student reports of prior biology courses taken. Of the 42 students who took the survey, 27 indicated they had completed a college-level general biology course, in which the concepts of DNA, genes and chromosomes are usually introduced. The concepts of alleles, genotype and phenotype, however, may not have been covered. At our institution, these concepts are not taught until General Biology II.

Many defined the terms "DNA," "gene" and "chromosome." Similar to the findings of Marbach-Ad (2001), students' definitions were incomplete and most focused on single aspects of the concept. Structural definitions of DNA described it as a double helix, as containing genes or simply stated what the letters DNA stand for.

Functional definitions of DNA tended to relate to a person/organism and were very macro in nature (e.g., "determines our traits"), or focused only on one aspect of DNA function ("instructions for proteins"). Structural definitions of gene stated that it contained or formed DNA. One student defined a gene as being equivalent to cells that "carry chromosomes;" four students equated a gene to a trait. Inheritance-type responses were very general and were mostly macro in nature ("passed on from parent to offspring"). One student described a gene as a "unit of hereditary information." When asked to explain this, the student could not but stated that it was the definition he was taught. This student persisted in giving this same definition throughout the quarter, despite being encouraged to find a more meaningful, descriptive understanding of a gene.

In defining chromosomes, answers were again very general and showed a lack of holistic understanding. Most responses related a chromosome to DNA. They either said it contained DNA, DNA "wrapped around proteins", or was coiled/condensed DNA. Four students showed improper size sequencing, stating that a chromosome "makes up DNA." Some definitions simply stated chromosomes were found in the nucleus, indicated the number found in human cells or gave examples, such as the X and Y chromosomes.

Rank the following terms, in order of their structure, from largest to smallest: DNA, gene, nucleus, chromosome, cell.

Responses to this question demonstrated great lack of understanding related to size sequencing, as was seen by Lewis et al (2000, 2000a, and 2000b). Of the 41 students who responded, only 24 correctly ranked cell as largest. Even fewer knew that nucleus was second in size, and only 8 students correctly ranked all terms according to their structure. DNA was accepted as being either larger or smaller than a gene. DNA is structurally larger than a gene when approached as a whole – DNA strands are larger than a gene sequence. However, one could approach a gene as containing DNA base sequences and therefore being larger in structure.

What is a mutation in DNA? and What happens to a person when their DNA is mutated?

Surprising about the responses to this question was the almost equal numbers of students describing a mutation as related to DNA (13) as to chromosomes (12; most referred to an improper number). Only 6 students described a mutation as a change in the DNA sequence; others said DNA was "malformed" or "abnormal." Most students believed that mutations have very negative consequences (e.g., disease, deformity, miscarriage, birth defect). Only 3 students indicated a mutation could be *without* physical effect; none reported that it could *enhance* one's ability to survive or reproduce, or related mutations to evolution.

Cells in different body tissues (e.g., liver versus skin) appear and behave differently. How do these differences relate to the DNA found in those cells?

Less than half of the students responded to this question, and most answers were nonsensical. Only 6 students indicated some level of conceptual understanding, one of whom stated, "The DNA is the same; different genes, however, are activated in different cells." Lewis et al (2000c) probed students' understanding of the genetic content in somatic cells versus gametes. Only 4% of 478 students understood that all somatic cells carry the same genetic information regardless of function. Most students believed cells contain only the genetic information needed for their particular functions.

What is the male sex cell and where in the body is it produced? And what is the female sex cell and where in the body is it produced?

Almost all students responded to this question, and more than half gave accurate answers. Of the responses that fell into the "other" category, a common trend was to confuse the 'sex cells' with the 'sex chromosomes' (e.g., "XY [or Y] in testes", "XX [or X] in ovaries").

Notebook Reflections

Next, I wished to evaluate students' perceptions of the effectiveness of lab activities in reinforcing genetics concepts.

Following their participation in each lab activity, students were asked to record their responses to open-ended statements and reflective questions. Students in Group A largely commented on the predictability of the coin tosses, and their responses were very brief. The general consensus among students was that the results were as expected. Sample responses to the open-ended question, "The coin tosses were…," included:

- …predictable. I have always heard about tossing coins being 50/50 results.
- …predictable. I could do without.
- …very close to the expected amount.

Only one student commented that the coin tosses were "fun." In response to the question of either lab being helpful in their understanding of genetics terms or concepts, students described the coin tosses as "slow" and "boring." Two students recorded their appreciation of a hands-on activity, but did not indicate to which they referred (coin tosses or fruit flies or both). Two additional comments focused on the helpfulness of coin tosses in teaching them the concept of probability.

Students found the virtual fruit fly crosses initially confusing due to the symbols used (e.g., "v" for vestigial combined with "+" for wild type). Up to this point, Punnett squares performed in lab had used more obvious symbols such as "B" for a brown eye color allele. All groups required assistance and prompting initially. Some students stated the activity was "confusing as first" and "made me think." Yet, with prompting they were able to complete the activity. Notebook reflections were positive, several students referring to the activity as "very interesting." Students stated:

- The fruit fly lab made me think more than just tossing a couple of coins.
- It let me think outside the box ….

Most students saw the activity as helpful in understanding Punnett squares, citing that it made them "come to life" and it "allowed a practical use of the terms we are learning."   One student said the activity was "…confusing at first…but when going over it as a class was helpful and I understood Punnett Squares better." This

same student also indicated that the crosses helped in understanding the differences between genotype and phenotype. In response to the final question (What questions/difficulties do you still have?), several students indicated that Punnett squares were still problematic. Students even verbally requested additional time to practice Punnett squares in class.

Comments from students in Group B were very positive and more thorough in regard to their lab activities.   Overall, the greatest reported benefit of the genetic jigsaw puzzle activity was the visualization of what happens as traits are inherited across multiple generations. Students were able to link events occurring at the level of the organism (presence of Whirling Disorder) with sub-cellular concepts of genes and chromosomes. They also reported a better understanding of the concepts of genotype and dominant versus recessive genes. When introducing the genetic jigsaw puzzle activity students quickly grasped how to read a pedigree and find persons affected with Whirling Disorder. But when given the puzzles representing chromosomal makeup for family members and asked to determine which chromosome (puzzle piece) carried the gene for the disorder, students assumed it would be very difficult. Once they began searching for the chromosome, the rationale became clear to most students: the first generation father in the pedigree had Whirling Disorder and his puzzle contained only red pieces; thus students needed to find the red puzzle piece that all affected family members had in common.

In response to the questions, "The genetic jigsaw puzzle activity was…" and "Was either/both lab(s) helpful…," students described the activity as:

- … really cool because you hear people talk about different diseases or traits being passed on, and it was cool seeing exactly what it [the disease – Whirling Disorder] was and how to find it.
- … helpful. With the color coding [of chromosomes/ puzzle pieces] it helped to see a trait passed down visually.
- … very helpful. It made you really think even

though once you found the answer it was simple.
- It was challenging at first, but I think it helped most with understanding dominant vs. recessive traits.
- … fun, and a great way of learning about genetics. It was a great visualization… a great activity in understanding of genotype.
- … a fun activity. You know of families with different kinds of issues, some may be serious, e.g. cancer, and some might just be interesting like wearing a pair of glasses. You don't really think of how this is passed down, but I will from now on.

As described in Methods, the Cookie Analogy was introduced briefly during one lab unit and students were given a homework assignment involving baking cookies. Many students commented that on day one they were skeptical about the relatedness of this activity to genetics. Students stated,
- I didn't really see how baking cookies related to genetics….
- At the time the assignment was given I couldn't understand what it had to do with genetics….
- … not sure what making cookies has to do with biology, but will find out on Tuesday.

On day two, following group analysis of cookie data and extensive class discussion, students were better able to see the connections with genetics concepts. Based on notebook reflections, this activity was most helpful in reinforcing the concepts of genotype, phenotype, and alleles. Multiple students expressed their surprise that the same cookie recipe (genotype) could result in so many cookies with different appearances (phenotype). They drew connections between this and the varying appearances among children of the same parents, suggesting that the activity also reinforced how genetic recombination occurring in meiosis causes genetically different gametes, and thus offspring. Student responses to the questions, "The cookie analogy was…" and "Was either/both lab(s) helpful…" included the following:

- … very insightful. The extent of the practical application was to a much greater degree than expected.
- It was amazing how different the same recipe turned out in the cookie activity. I was skeptical about the practical application of this activity, but after observing the results I was pleasantly surprised at the variations and conceptual application and relevance.
- None of the cookies looked or tasted the same. Many factors played a role, like the pan, and ingredients, oven temp. etc.
- After having class discussion about the cookies, I now have a better understanding on why we made cookies. It's amazing to see the same recipe could produce so many different cookies. Just like humans – the same 2 people could have several kids but none identical….
- The cookie lab was very helpful because being able to see how all the cookies, even though they had similar makeup, they were all unique. And looking in terms of ingredients lets you realize how each "allele" affects the outcome.
- The activity helped to understand phenotypes … and genotypes – the makeup of the cookie – the different recipes.
- The comparisons between recipes and genes were fun and informative…. It's easier for me to remember things if I can relate them to real life.

Just as with Group A, the most common area of remaining question or difficulty reported by students in Group B was Punnett squares. This seemed to be an area of general confusion. One student stated, "[Punnett squares] seem easy until I have to do one on my own." Specific difficulties cited were with dihybrid crosses and those showing incomplete dominance.

Discussion

The purpose of the present research was to improve pedagogy in an undergraduate General Biology II laboratory for non-science majors. To do this, students' level of genetics literacy was first examined, and misconceptions addressed in instruction. Next, the effectiveness of different lab activities was evaluated by students' notebook reflections.

Survey Results and Teaching Strategies

Students' level of genetics literacy was ascertained by a survey administered at the beginning of the course. Instruction was designed based on the major misconceptions revealed by the survey, and also based on recommendations in the literature. Instruction centered on different levels of organization that genetics encompasses, namely the organism, cells and molecules. Students can find genetics concepts confusing because these concepts belong to multiple levels of organization. This is compounded by the abundance of terminology that belongs only to certain levels (e.g., phenotype of the *organism,* daughter *cells,* homologous *chromosomes*). Knippels et al (2005) recommend that genetics instruction begins at the level of the organism and be sequenced to avoid random changes between levels. Marbach-Ad and Stavy (2000) point out that students need to make connections between levels and extrapolate processes occurring at the cellular and molecular (the "micro") levels from events occurring at the level of the organism (the "macro"). Both views are valid; yet it seems that before students begin connecting concepts between levels, they must understand them sequentially, one level at a time.

In this study, instruction began at the level of the organism. When asked in the survey why the study of genetics is important, most students' responses were on the level of the organism as a whole. They focused on detection and prevention of disease/birth defects and the need to know one's own body. Therefore, on day one students were first asked how genetics is relevant to their lives. Their responses guided discussion that encompassed prenatal testing and amniocentesis, the uses of cloning, hereditary diseases within a family, and students' own awareness of how their genetic traits are seen in their offspring. This gave students an opportunity to participate in

familiar discussion and build up their confidence related to the topic of genetics. It also invested students in the topic by showing its relevance to their own lives.

Following discussion on the level of the organism we then moved to the molecular level. Instruction focused on the molecular level before the cellular level so that students would understand the distinctions between genes, DNA and chromosomes, a necessary foundation for understanding events occurring at the cellular level, namely mitosis and meiosis. This also provided opportunity to address students' misconceptions related to terminology, size sequencing, and mutations as they apply to this level. As revealed by the survey, definitions of terms, even when accurate, indicated a superficial and compartmentalized understanding of concepts. Similar to the findings of Marbach-Ad (2001), which also showed students' compartmentalized understanding, students in the present study defined terms according to structural or functional properties but did not relate the two. Their general responses indicated either a lack of holistic understanding of these concepts, or that they were recording the information that was the simplest to process or that was most familiar to them (as demonstrated by the student persistently describing a gene as a "unit of hereditary information"). Marbach-Ad and Stavy (2000) found that when asked to explain macroscopic (pertaining to the organism) genetic events, students used terms like 'gene' and 'trait'; however, when asked to explain further the meaning of these terms, they could not. Students may use such terms in the classroom yet only have a vague understanding of their meaning.

Students also showed a poor understanding of the size sequence of DNA, genes and chromosomes. An inability to see the structural relationships between concepts such as DNA, genes and chromosomes has been reported. For example, Lewis (2000a) gave a similar size sequence probe to students of age14-16 who were nearing the end of a national science curriculum. Out of 482 responses only 85 gave a "scientifically valid" sequence, yet 25% of these responses indicated genes as being larger than chromosomes.

One reason students may find molecular concepts difficult is that they cannot 'visualize' them. It is easier to learn concepts

at the level of the organism or cell because these structural levels have a visual representation to students. In order for students to have a constant visual reference during instruction, three simple illustrations were drawn on the board: a portion of double-stranded DNA containing complementary base pairs (highlighting a single strand's sequence as a gene), a DNA double helix, and a tightly coiled chromosome. They were used to explain the differences between a gene, DNA and a chromosome, and to show the size sequence of these structures. These simple pictures helped students distinguish these concepts in both structure and function simultaneously. Terminology was then applied to them. e.g., the gene was used to introduce the concept of 'alleles,' which was then used to distinguish differences between 'dominant' versus 'recessive,' and 'homozygous' versus 'heterozygous.' The chromosome was used to explain the concept of 'homologous' pairs and to distinguish between this and 'sister' chromatids. In subsequent classes, it was a regular practice to begin by reviewing terms as they apply to the different levels of organization.

Few students understood that a mutation occurs when the DNA base sequence is changed. Most of them reported a mutation to affect chromosomes (usually chromosome number) and the results to be disease or birth defects. To address this, the illustration of a gene as a sequence of DNA bases was used to show the effects of erasing or changing a single base (e.g., A to C). Students were shown how this may or may not alter the affected amino acid and thus the protein. This led to discussion of how a protein's function may be unaffected, hindered or enhanced by mutation. Discussion allowed the concept of mutations to be linked to evolution, natural selection, and survival of the fittest.

Students also had misconceptions related to DNA's function in different tissues. When asked in the survey to compare the DNA found in cells of different body tissues (Question 15), only 19 students responded and most answers were nonsense. Only 6 students understood that the DNA would be the same in those cells, and that differences in function and appearance are due to activation of different genes. To address this, a contrast was made between the different appearances and functions of skin, liver and nervous cells.

Most students were familiar with the skin pigment melanin and its role in protecting DNA from ultraviolet rays. They could easily see how the gene(s) needed for melanin production may be activated more often in skin cells as opposed to liver cells or neurons, while liver cells may make far more enzymes and neurons more neurotransmitters like dopamine; however, the genes are present in all cells because the DNA is the same.

Lastly, instruction proceeded to the cellular level, focusing specifically on mitosis and meiosis. Twenty-seven (27) of 42 students reported taking a college level introductory biology course, in which they were likely exposed to the processes of mitosis and meiosis. Survey responses showed a familiarity with these concepts but an incomplete understanding of their distinctions. Students also confused the sex *cells* with the sex *chromosomes*. Therefore, the processes of mitosis and meiosis were reviewed in detail, especially in regard to genetic recombination (crossing over) occurring in Prophase I and chromosome separation forming haploid gametes. This allowed for reinforcement of correct terminology and its application to different structural levels (e.g., sex cells, sister chromatids, daughter cells). The principles of meiosis were also continually revisited later when performing Punnett squares. If students do not understand that a Punnett square represents the possible genes in the gametes of two parents and their combinations in offspring, then the Punnett square remains abstract and meaningless. When given the genotypes of two parents to cross in the Punnett square (e.g., "Bb" for a heterozygous brown-eyed parent), students were always asked questions such as, "How would these alleles be split in meiosis?" or "What possible alleles would you see in the mother's and father's gametes?" Students were frequently reminded while setting up Punnett squares to view the parents' alleles as representing the possible sperm and egg that could unite in fertilization. Yet, even with this reinforcement, students initially found Punnett squares to be confusing and needed additional class time devoted to this topic.

Student Responses to Lab Activities

Following instruction, students participated in various

lab activities to reinforce genetics concepts. Evaluation of the effectiveness of these activities was based on student reflections in their lab notebooks. Overall, responses to the coin toss activity in Group A indicated a lack of novelty. Results were as expected and students described the activity as "boring" and "predictable." This type of response is consistent with other students' perceptions in the past. Coin tosses are designed to reinforce probability as it relates to producing offspring. Two students reported that it did so. Reflections on the virtual fruit fly crosses were surprisingly positive. For years, students have performed actual fruit fly crosses using real flies in this lab course. They have often been frustrated with results that don't match the 'rules' of crosses, or have lost interest in this activity which lasts all quarter. Changing this activity to a virtual one seemed to have a different effect. Students cited the benefits of the critical thinking encouraged by the activity. They were challenged to examine the concepts of genotype and phenotype in an unfamiliar species with unfamiliar traits. It is noted that on a test administered later in the quarter, all students in Group A correctly explained the concept of 'phenotype.' The additional assignment of taking their results and displaying them in a Punnett square was cited as helpful in reinforcing the process of creating Punnett squares.

Reflections on the genetic jigsaw puzzle and Cookie Analogy activities used in Group B were very positive. Students found the jigsaw puzzle activity fun and acknowledged its simplicity in introducing genetics concepts. The Whirling Disorder portion of this activity reinforced their appreciation for genetics on the level of the organism, and also linked the organism to events involving genes and chromosomes. Student reflections on the Cookie Analogy were quite thorough. Though its relevance to genetics was initially unseen, students found it to be highly applicable. The most cited conceptual relevance was to genotype, phenotype, alleles and to variation among the offspring of two parents.

It seems obvious what students would choose if given a choice between tossing coins or baking cookies. Yet, why did students deem the Cookie Analogy and genetic jigsaw puzzles effective learning activities? One reason could be that both lab activities revolved

around very simple concepts. Yet, their application to the teaching of genetics was novel and provided simple explanations to abstract concepts. It is likely overwhelming to a student to be expected to understand genetic events happening at multiple levels simultaneously, as well as the many terms that apply to these events. But baking cookies and looking at jigsaw puzzles—that's not very scary. Students found it fun and were surprised (even relieved) that something fun could be used to explain genetics. It is noted that when students were told on day one that they were being surveyed for their knowledge of genetics, they were apprehensive and embarrassed before even seeing the questions. Simple activities such as the jigsaw puzzles and Cookie Analogy may diffuse fears related to genetics.

     Another reason these activities were effective may lie in the *familiarity* of their concepts. They used what would be familiar to any student to teach new and abstract concepts. This approach to learning models principles set forth by David Paul Ausubel. Ivie (1998) summarized Ausubel's learning theory and examined its use in teaching higher order thinking skills in public education. Ausubel believed that meaningful learning occurs when new knowledge or concepts can be incorporated into existing concepts in the learner's mind. He argued that our minds organize and categorize information in such a way that new and/or specific concepts are assimilated under existing and more general concepts. There is a hierarchy of our thinking that proceeds from general to specific. If new information can be assimilated or incorporated under more broad concepts that we have already mastered, it is more likely to be meaningfully learned. Thus, in the present research, the new and abstract genetics concepts students were exposed to may have been more easily assimilated by associating them with the existing concepts of jigsaw puzzles or baking cookies. In each activity specific genetics concepts were related to specific steps or concepts involved in the activity. For example, in the jigsaw puzzle activity an individual's genome was represented by an entire puzzle, chromosomes by puzzle pieces, and variations in alleles by different colored pieces. In the Cookie Analogy genotype was represented by the cookie recipe, phenotype by the cookie appearance/taste, alleles by the use of butter versus margarine, and mutations by ingredient

substitution/deletion (to name a few).

Finally, some suggestions are offered for those who may wish to use either activity. When using the genetic jigsaw puzzles, students initially assumed it would be difficult to find the gene for Whirling Disorder. A few students maintained the idea that it must be a hard activity and were unable to see the ease of the rationale. It was important that students work through the activity in their groups, *without* the assistance of the instructor. It encouraged students to exercise analytical reasoning skills; furthermore, discovering the rationale *themselves* reinforced the linkage between physical traits and genes/chromosomes. Once finished, it greatly benefited the class to together retrace the pedigree and the process of finding the chromosome carrying the gene. In the Cookie Analogy, some connections between the analogy and genetics concepts were not obvious to students. Class discussion during analysis on day two was essential due to the in-depth nature of the analysis questions. Also essential to the success of this activity was its completion by the instructor *prior to* the lab. This involved answering the "Questions for the Baker" and "Research Group Analysis" questions. Unless the instructor is prepared, the full relevance of the activity to genetics may be lost on students. For example, students may miss the relevance of such questions as, "Would any change in a recipe be as 'fit' or beneficial as any other and what might determine its 'fitness'?" and "Can you think of cookies that seem to be specific to one ethnic group or geographic location" (Johnson, 1991, p. 9)? In the present study, students identified "fit" changes in a recipe as those that would make the cookies taste better or preserve longer, thus increasing the likelihood that the recipe will be used again and passed on to others (the concept of survival). Students would not have been able to draw these connections without first being taught about survival of the fittest and its relationship to genes and mutations. They referenced fortune cookies and flan as desserts that seem to be specific to an ethnic group or location. The presence of these desserts in other cultures was used as an example of how environmental changes (e.g., ease of travel, relocation of ethnic groups) can expose ethnic groups to once-isolated genes.

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Biographical Information

Mary Ellen DeHoff has been an Assistant Professor of Biology for five years at the University of Cincinnati–Clermont. Her areas of interest are in helping students discover and use their unique learning styles, the use of concept maps in teaching and learning, and the enhancement of education in anatomy & physiology. She and a colleague, Krista L. Clark, are presently concluding a year-long study examining cat dissection versus clay modeling in the teaching of muscles, blood vessels and nerves in anatomy. She can be contacted at the following addresses:

dehoffme@ucmail.uc.edu
University of Cincinnati – Clermont
4200 Clermont College Dr.
Batavia, OH 45103

Collaboration between Faculty and Librarians to Improve Students' Information Literacy Skills

**Stephena E. Harmony, Rita Kumar, Brenda Refaei, &
Claudia Skutar**
University of Cincinnati—Raymond Walters

The project described in this paper is the result of the work of three English composition faculty and a senior librarian who were part of a learning community from a range of disciplines (humanities, social sciences, sciences, and career programs). The learning community's mission was to develop common language we could use at the institutional level to measure students' growth in critical thinking across disciplines. As our learning community began to grapple with developing appropriate means for assessing critical thinking, we created research designs specific to our disciplines that would stimulate students' critical thinking development. Our subgroup of this learning community was concerned about the critical thinking skills students bring to a research project. This paper shares our initial concerns and describes the steps we took to address our perceptions of students' information literacy needs. Faculty and librarians in other disciplines and institutions may be able to use some of the techniques described in this paper to develop better integration of library instruction in course-specific research projects.

Composition professors are often frustrated with students' inability to apply appropriate information literacy skills to writing their research papers. Students have difficulty finding sources. Many students are overly reliant upon the Internet in their search for sources (Calkins and Kelly; Holliday and Fagerheim). To help students learn about other search possibilities, composition professors frequently invite library faculty to demonstrate to students the use of library databases. Students are impressed by the information available in the library, but are frustrated when they try to conduct their own searches after library instruction because they have trouble finding appropriate search terms for specific information. Once they have found a source,

students often have difficulty evaluating its appropriateness for their audience and purpose (Flanagin and Metzger). Some students do not understand why Wikipedia or Dr. Phil.com may not be appropriate sources for an academic research paper. Other students may find academic sources, but the sources are only tangentially related to their topic, and then they struggle to make the source fit their purposes. Faculty also have observed that students have difficulty integrating the source material into their writing. Composition professors are most surprised when students have difficulty with the seemingly simple matter of using correct citation formats within the paper and at the end. It appears that students have difficulty identifying the type of source they have, so they are unsure of which documentation style to use.

Librarians share many of the same frustrations that faculty experience when students seek assistance in the library. Helping students to identify key concepts, select the appropriate databases, and construct searches are the areas librarians spend most of their time working one-on-one with students, who often do not understand the structure and organization of information in this age of the Internet and have unrealistic expectations of the search process (Sorensen and Dahl). Because Internet search engine interfaces are very straightforward, guiding students to library research databases can be a challenge. By comparison, the organization of the library's website may appear confusing and overwhelming with many decisions to make (e.g., articles vs. books, subject-specific vs. general databases, etc.) The next challenge for students is identifying keywords and understanding how to construct a search in a library research database, which is a very different process than simply typing a phrase in one box when using an Internet search engine. The concept of combining key words to narrow the focus of the search is also confusing. When students retrieve their results they tend to focus on only those titles that display the keywords they entered rather than evaluating each article for its relevancy.

Although librarians often collaborate with faculty in developing classroom presentations on library research skills, they rarely receive enough feedback on how well the students performed in the library research-related assignments. Comments from faculty

or observations when working with students following the library instruction provide some anecdotal data to librarians on the success of their instruction, but not enough to help librarians to clarify their instruction or to create supplementary guides and tutorials.

Overview of Information Literacy Standards
        Faculty and librarian frustrations led to the collaborative development of pedagogical interventions by three composition faculty and one senior librarian to enhance students' critical thinking by focusing on information literacy skills. The rationale for these interventions has its basis in the strong consensus in higher education about the importance of students' ability to apply such literacy skills both in the classroom and in today's technologically-oriented society (Sellen). Information literacy encompasses a specific set of critical thinking skills pertaining to the use of information. In 2000 the Association of College and Research Libraries (ACRL), the professional organization of academic librarians, published a document defining information literacy as having the abilities "to recognize when information is needed" and "to locate, evaluate, and use effectively the needed information" (Association of College and Research Libraries). This document specifies the following five standards an information-literate student will be able to demonstrate:

1. Determine the nature and extent of information needed;

2. Access needed information effectively and efficiently;

3. Evaluate information and its sources critically and incorporate it effectively into the student's knowledge base and value system;

4. Use information effectively to accomplish a specific purpose;

5. Understand the ethical, legal and socio-economic issues surrounding the use of information and access and use information ethically and legally. (Association of College and Research Libraries)

The first three ACRL standards (identifying information needed, accessing information, and evaluating information) are particularly pertinent to building the critical thinking requirements of a research project. Therefore, these standards were incorporated into the information literacy instruction in three composition classrooms.

Pedagogical Interventions

The first step of the research project was determining the students' baseline abilities in locating and evaluating information sources. Through a classroom exercise, faculty illustrated the process of concept mapping to identify key terms and relationships on a topic. Students then created a concept map for their research topic, searched for and selected two sources and completed a research log documenting how they found these sources and explained why they were relevant and credible. Once students completed their concept maps and research logs, the librarian taught three information literacy focused sessions: reviewing the research process; searching online databases for journal articles; and evaluating sources for relevance and reliability. Following the library instruction, students created a new concept map, searched for additional articles and completed a second research log on their topic. The faculty and librarian created a Primary Trait Assessment (PTA) scale (see Appendix 3) to measure the difference in students' abilities to find and evaluate information sources prior to and following library instruction.

Concept Mapping

As part of the research project, we hypothesized that information literacy instruction would improve student critical thinking and planned to use concept maps to assess results. We created a simple concept map exercise to measure any changes in students' thinking because "self-evaluation of individual knowledge may be done on a map-based representation of one's own knowledge" to help students evaluate "knowledge available or not available for coping effectively with a particular task situation" (Tergan, Gräber, & Neumann 331). Concept maps are visual representations of how a person connects ideas to other ideas. Per Novak, the originator of this often-tested technique:

> Concept maps are intended to represent meaningful relationships between concepts in the form of propositions. *Propositions* are two or more concept labels linked by words in a semantic unit. In its simplest form, a concept map would be just two concepts connected by a linking word to form a proposition. For example, "sky is blue" would represent a simple concept map forming a valid proposition about the concepts "sky" and "blue." (15)

Using this tool as Novak described it would allow students and faculty to see how students connected the ideas related to their research topic. The concept maps would help students identify areas where they needed more information for their research project.

Prior to the information literacy instruction and the students' first research-based essay assignment, they were asked to create a simple concept map representing their knowledge about dogs. As a class, students generated terms and made connections between ideas. While students called out terms and suggested connections, the professor recorded the map on large presentation pads for future reference. When students seemed to slow down, the professor encouraged students to provide more concepts and connections. Once students understood how to create a concept map, they were asked to write one on their research topic. The concept maps allowed the professors and the librarian to assess the students' ability to effectively focus their research topics.

Following the information literacy instruction, students were again asked to create a concept map on the same research topics that they had addressed earlier**.** They were requested to include what they had learned from their library searches to their post information literacy instruction concept maps. These concept maps were used to help students organize the information in their research papers.

Research Log

Before the information literacy instruction, students were required to work in groups to find sources and then write a research log entry for each source describing how they found the source and

why they thought it was appropriate for the purpose/audience. The purpose of the research log was to evaluate how well the student could access needed information effectively and efficiently, could evaluate information and its sources critically, and could incorporate selected information into the research project.

The research log questions (see Appendix 1) were designed to determine the level of student competency pre- and post- information literacy instruction for the following three ACRL standards: identifying information need, finding information, and evaluating information. The researchers were interested in determining whether the information literacy instruction had any impact on the students' ability to identify, find and evaluate information since inefficiency in these areas had been a source of frustration for them in the composition class. Students were encouraged to think about their process of searching for sources when they completed a research log.

Both the concept maps and research logs served as evaluative tools for the faculty and librarian to determine the information literacy skills of students' pre- and post-library instruction. Additionally, they helped students focus on their research topics and think critically about the search process as they went through the information literacy instruction.

Information Literacy Instruction

During the first information literacy instruction session, the librarian explained each of the components of a successful research project:

1. Defining the topic and identifying key concepts, types and scopes of information sources;

2. Searching information sources including databases, catalogs, Internet;

3. Selecting and evaluating sources;

4. Analyzing and synthesizing information sources;

5. Documenting sources.

In addition to reviewing the research process, the librarian described the variety of available information sources, focusing on the differences between scholarly journals and popular magazines. Understanding the characteristics of different types of publications is essential for students to be able to evaluate and select resources that are relevant and credible.

To promote active learning during this information-packed session, the librarian integrated two in-class activities. Before distributing the research guide she prepared for the students, she created a "fill-in-the-blank" version for students to complete during her presentation to promote active listening and to gather information on student comprehension. The librarian reviewed the results and discussed those concepts that students appeared to not understand at the next session. The second activity focused on the differences between scholarly journals and popular magazines. In the online environment many of the distinguishing characteristics between scholarly and popular articles are not readily evident because only the text is displayed. When students compare the print copies side-by-side, they quickly comprehend the differences such as the format of the articles, the presence of photographs and advertisements, the language used in the titles and articles, the identification of authors, and so forth. For this activity, the librarian divided the class into small groups, distributed pairs of print issues of scholarly journals and popular magazines and allotted a few minutes for students to identify the characteristics of each publication. The librarian asked a student from each group to give a brief class presentation on the group's determination of which publication was a scholarly journal and which was a popular magazine and why. The class discussion served as an effective review and engaged students in actively thinking about how to select relevant resources for their topic.

In the second information literacy session the librarian spent the first portion of class time explaining how to search online databases for articles. Using the terms and relationships identified in the class-created concept map on dogs, she illustrated how to construct a keyword search and combine terms using Boolean operators (e.g., and, or). She explained how to interpret database records, access the

full-text articles and refine search results. She also emphasized the importance of documenting sources and demonstrated the citation help tools that a number of databases provide to create citations in a specific style. Students spent the remaining class time working on their research topic under the guidance of the faculty and librarian.

For the third information literacy instruction session, the librarian discussed and illustrated the process of evaluating and selecting relevant and credible sources. She created and distributed a rubric outlining specific characteristics to assist students in selecting appropriate resources (see Appendix 2). Students determined if these characteristics were "clearly identifiable," "somewhat identifiable" or "not identifiable" for the following questions:

1. Who is the author?
2. Who is the intended audience?
3. What is the purpose of the source?
4. What is the viewpoint of the author?
5. How current is the source?
6. How reliable is the source?

Examples of characteristics to identify the intended audience include: source states the intended audience (expert, knowledgeable lay person, novice); or audience is implied by the source (e.g., scholarly journal or popular magazine); and use of language and word choices (e.g., technical terms). As in the second session, students were provided time to continue working on their research topic with assistance from the faculty and librarian.

Primary Trait Assessment

As part of the larger faculty learning community, we needed to develop a PTA that would measure students' critical thinking. Our subgroup developed a PTA scale (see Appendix 3) to assess students' critical thinking relevant to information literacy as demonstrated in their research log entries both pre- and post-library instruction. Studies show that these rubrics can aid student critical thinking through instructor clarification of assignment expectations. By "demystifying

the expectations they have for students [and] articulating their values for the classroom and the types of disciplinary abilities they want to emphasize," instructors both improve teaching practice and the critical thinking of their students (Condon and Kelly-Riley 65). Use of rubrics in this clarification process provides "explicit cues on how to think," and makes students more aware of self-regulation of their own thinking processes (Schamber and Mahoney 108-09). To help clarify our expectations for information literacy, we developed PTA scales to assess students' research log responses.

We used the ACRL's criteria for information literacy as the starting point for our PTA scale and chose the first three standards. The language for the PTA needed to match our institution's rubric for critical thinking as a general education requirement. This project was designed to contribute to our institution's overall assessment of students' critical thinking. Once the PTA was developed, two colleagues reviewed it for clarity. We believe this integrated PTA will provide useful information about students' development of critical thinking specific to information literacy that may help in planning more widespread interventions.

Conclusion

Although we are still in the data collection phase of this project, we believe the techniques described here can be useful to faculty and librarians working at other institutions with students' information literacy skills. Our preliminary findings support this contention. In a small sample of student concept maps examined following the initial classroom interventions of library instruction, we noted that 61 percent of these students increased the number of concepts listed on their maps and 57 percent increased the number of relationships linking and describing the concepts on their maps, a majority in both categories.[1] We measured both because naming the relationships between concepts is as important to demonstrating knowledge and critical thinking as is naming the concepts themselves. As Tergan, Gräber, and Neumann note: "In order to make generated knowledge accessible for future use, it must be organized according

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1 *This initial sample comprised 23 students from two sections of a first-year com-position course.*

to some semantic or pragmatic rationale, and represented in a format mirroring the cognitive affordances for coping with a particular task situation" (332). Both concepts and the relationships described between them form the full semantic propositions which reveal the level of student knowledge and understanding needed for a particular task which, in composition, is the writing/research task that our intervention targeted.

This positive preliminary data points to an increase in student understanding of the research topics on which they honed their information literacy skills in the classroom. Such interventions also open up the possibility for increased transfer of information literacy skills beyond the composition classroom as the following student comment suggests:

> After we had the librarian come in and teach us how to use the online website EBSCO host[2] (sic), I found that it was really nice to use, not just for this class, but my other classes, too. I used it for my sociology class, and I like the fact that you can choose what kinds of articles you want to find, such as peer-reviewed articles or newspapers, magazines, etc.

Another student noted, "The instruction on how to use the library catalog and the organization of key terms to search for a subject was the most helpful." Such a collaboratively designed intervention initiative implemented in three classrooms simultaneously offers the potential for integrated instruction and more opportunities for follow up. The process of working together in a faculty learning community broadened the members' conception of critical thinking as it relates to information literacy skills. The collaborative aspect of the interventions provided the involved faculty members and the librarian both an opportunity to share ideas and discuss the way the intervention was received in their respective classrooms and a common forum to learn and improve teaching strategies from the shared experience.

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2 *EBSCOhost produces a number of full-text article databases such as Academic Search Complete.*

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Biographical Information

Stephena E. Harmony received her MSLS from Case Western Reserve University and is an associate senior librarian at the University of Cincinnati Raymond Walters College. She is the co-author of the publication, *Working with Faculty to Design Undergraduate Information Literacy Programs* (1999). Her primary responsibilities include library instruction, collection development and reference services. Her email address is: stephena.harmony@uc.edu

Rita Kumar is an associate professor in the Department of English and Communication at the University of Cincinnati Raymond Walters College. Her research interests include problem based learning, English as a second language, and active learning techniques. She has published articles in these areas. Her email address is: rita.kumar@uc.edu

Brenda Refaei received her doctorate from the University of Cincinnati and is an assistant professor in the Department of English and Communication at the University of Cincinnati Raymond Walters College. She is involved in research in active learning techniques and has published articles on second language acquisition. Her email address is: refaeibg@uc.edu

Claudia Skutar received her doctorate from the University of Cincinnati and is an assistant professor in the Department of English and Communication at the University of Cincinnati Raymond Walters College. Her research interests include ecocomposition, service learning, and concept mapping. Her email address is: claudia.skutar@uc.edu

All the authors can be reached at Raymond Walters College, 9555 Plainfield Rd., Cincinnati, OH 45236

Appendix 1
Research Log Questions

Identifying Information Needed:
1. What is it you want to know?
2. What kind of information do you need?
3. How much information do you need?

Finding Information:
1. What is the best way to gather this information?
2. Are you using the best terms for this search?
3. Are you able to find the information? Where did you find it?

Evaluating Information:
1. Why is this source of information relevant to the topic?
2. Why is this a credible source of information?
3. What other interpretations or points of view does the author present? What personal biases can be found in the text?
4. What new things did you learn from this information about your topic?

Describe the Concept Map:
1. How does your concept map demonstrate that you know how to identify your information need?
2. How does your concept map illustrate the sources of information you found?

Appendix 2
How to Evaluate Information Resources (Articles & Web Sites)
English Composition 102
Spring 2009

Introduction:

Before using a source for your paper, you should evaluate the information by answering a number of questions about the accuracy and purpose of the source. The following scale lists six questions and identifies characteristics to look for when evaluating how useful and meaningful the source will be for your paper.

You should first identify the type of source it is since this will determine the purpose, audience and reliability of the information and how it will be presented:

- Scholarly journals (sometimes referred to as peer reviewed or academic journals): articles written by experts such as researchers or professors to report on research findings, propose new theories, or to advance knowledge in a discipline
- Popular magazines and newspapers: articles written by journalists and professional writers to report on events (news magazines and newspapers), or information about certain products or hobbies (popular niche magazines)
- Web sites: written by anyone (scholar, professor, journalist, any individual including school children) on any topic that may or may not be objective; identify the type of site:
  - ➢ .com or biz—commercial
  - ➢ .org—nonprofit or advocacy group
  - ➢ .edu—educational institution
  - ➢ .gov or.mil—government or military
  - ➢ .net or .name—personal web site

Evaluating Articles and Web Sites:

When examining the articles and web sites you selected, answer the following questions. The more clearly identifiable the characteristics are for each question, the more useful and reliable the source will be.

Questions to Ask	Clearly Identifiable	Some What Identifiable	Not Identifiable
Who is the Author?	Identifies the author (either an individual or organization); includes complete contact information (e.g. email, address, or phone); and/or provides credentials of individuals or a description of the organization or sponsor of the web site (e.g. biography, resume, list of other works written by the author; for web sites includes "about us" section or history of organization)	Indentifies author, but provides brief or incomplete information on the credentials, description of the organization or contact information (e.g. provides author's name but does not identify institutional affiliation; provides name of organization, but no description of what the organization does)	Author is not identified and no information about credentials or the organization is provided OR Author/organization is identified, but upon further examination turns out to be false or misleading
Who is the intended Audience?	Defines intended audience (expert, knowledgeable lay person, novice) or audience is implied by type of source (e.g. scholarly journal, popular magazine); uses appropriate language or word choices (e.g. technical terms, descriptions and definitions of technical terms)		Does not define intended audience; does not use appropriate language or word choices--this may be the case for some web sites and popular publications

What is the Purpose of the source?	Explicitly states the purpose and describes goals, objectives, or reasons for publishing the article or web site (e.g. to describe, to explain, to summarize, to advocate, to state an opinion, etc.)	Provides a statement of purpose, but the language used to describe the goals, objectives, or reasons are vague and very general	There is no statement of purpose
What is the Viewpoint of the author?	Author's style clearly indicates viewpoint such as the use of language choices (e.g. neutral or emotional words or terminology); selection and use of evidence to support argument is inclusive, balanced and logical If a web site, check the "about us" section for a statement about the site's sponsor; if an article, determine the reputation of the journal (check the "Magazines for Libraries" print reference book—call number Z 6941. M23)	Author's use of language and data inconsistent (e.g. stated purpose is to provide objective information, but language often used includes persuasive terminology; data used is selective to support viewpoint and often omits relevant information that does not fit the author's argument)	Author uses "loaded" terminology; data is very selective, inaccurate or non-existent

How Current is the source?	Identifies dates of information sources cited in article or on web site; if a web site, identifies the dates for the content of the web site in addition to the creation of the web site itself	Some of the dates of sources used in article are too old or not relevant for your use; dates for the content of the web site not clearly identified or distinguished from the site's creation	Few or no dates are identified for sources used in the article or for the content and creation of the web site
How Reliable is the source?	Identifies and cites sources used in the article or for the web site (bibliography or works cited); these sources can be retrieved and used to verify content; information is accurate when compared with other sources	Cites some or all sources; web site may include lists of other resources, but does not consistently indicate how to retrieve them; information is inconsistent in accuracy when compared with other sources	Does not cite sources; does not identify sources referred to on the web site; may include other resources but does not indicate how to retrieve them; information often inaccurate when compared with other sources

Additional guides to use when evaluating sources:

- RWC Student Guide: "How to Evaluate the Information You Find" http://www.libraries.uc.edu/libraries/rwc/guides/class/evaluatinginfo.html
- The Allyn and Bacon Guide to Writing. 5th edition (on reserve in the RWC Library) Chapter 21: Evaluating Resources

Prepared by Stephena E. Harmony, Associate Senior Librarian
Winter Quarter, 2009

Appendix 3
Finding and Evaluating Sources Primary Trait Assessment Scale

Outcomes					
Performance Indicators	5	4	3	2	1
Identifying Information Need	Demonstrates excellence in analyzing the assignment to identify key concepts, synonyms, and subject terms that describe the information need	Demonstrates proficiency at identifying key concepts, synonyms, and subject terms that describe the information need	Demonstrates adequacy in identifying key concepts, synonyms, and subject terms that describe the information need	Demonstrates limited ability to identify key concepts, synonyms, and subject terms that describe the information need	Demonstrates deficiency in identifying key concepts, synonyms, and subject terms that describe the information need
	Consistently identifies the differences in information sources in various sources (e.g. book, journal, article, data base, website)	Usually identifies the differences in information sources in various sources (e.g. book, journal, article, data base, website)	Frequently identifies the differences in information sources in various sources (e.g. book, journal, article, data base, website)	Occasionally identifies the differences in information sources in various sources (e.g. book, journal, article, data base, website)	Rarely identifies the differences in information sources in various sources (e.g. book, journal, article, data base, website)
	Consistently knows the scope and purpose of these resources	Usually understands the scope and purpose of these resources	Frequently recognizes the scope and purpose of these resources	Occasionally realizes the scope and purpose of these resources	Rarely able to identify the scope and purpose of these resources

Finding Information	Consistently identifies and uses a variety of appropriate sources based on depth, relevance, scope and purpose	Usually identifies and uses some appropriate sources based on depth, relevance, scope and purpose	Frequently identifies and uses a few appropriate sources based on depth, relevance, scope and purpose	Occasionally identifies and uses minimal appropriate sources based on depth, relevance, scope and purpose	Rarely identifies and uses appropriate sources based on depth, relevance, scope and purpose
	Consistently performs an effective search using appropriate keywords and synonyms	Usually performs a search using appropriate keywords and synonyms	Frequently performs a simple search using appropriate keywords and synonyms	Occasionally performs a simple search using appropriate keywords and synonyms	Rarely performs an effective search using appropriate keywords and synonyms
	Consistently uses search results to successfully retrieve information (e.g. book, full-text article)	Usually able to use search results to retrieve information that is readily available	Frequently able to use search results to retrieve information, but has difficulty in accessing off campus materials or full text articles	Occasionally able to use search results, but needs assistance to retrieve information	Rarely able to use search results or retrieve information

Evaluating Information	Consistently evaluates whether the retrieved information is relevant and performs additional searches if needed	Usually evaluates whether the retrieved information is relevant; performs additional searches if needed	Frequently evaluates whether the retrieved information is relevant; may perform additional searches	Occasionally evaluates whether the retrieved information is relevant; does not perform additional searches	Rarely evaluates whether the retrieved information is relevant; does not perform additional searches
	Demonstrates excellence in evaluating and determining credibility and provides evidence (reliability, validity, accuracy, author, & currency)	Demonstrates proficiency in evaluating and determining credibility and provides explanation (reliability, validity, accuracy, author, & currency)	Demonstrates adequacy in evaluating and identifies some of the credibility components (reliability, validity, accuracy, author, & currency)	Demonstrates limitations in evaluating and determining credibility (reliability, validity, accuracy, author, & currency) by failing to address one or more components	Demonstrates deficiency in evaluating and is unable to identify credibility components (reliability, validity, accuracy, author, & currency)
	Demonstrates excellence in evaluating writer's point of view and/or bias by providing examples and explanation	Demonstrates proficiency in evaluating writer's point of view and/or bias by providing explanation	Demonstrates adequacy in evaluating writer's point of view and/or bias by discussing some issues raised	Demonstrates limitations in evaluating writer's point of view and/or bias and has difficulty with explaining issues raised	Demonstrates deficiency in evaluating writer's point of view and/or bias and is unable to provide examples or explanation

RADIUS: A Model for Enhancing Biology Teaching and Community Service

Mohannad AL-Saghir and Tarig Higazi
Ohio University—Zanesville

Abstract:

RADIUS (Risk Awareness of Disease and Infection Undergraduate Study) is a multipurpose project aimed at providing Ohio University Zanesville students with a superior learning experience through a field-based, hands-on and problem-based curriculum centered on scientific thinking. Here RADIUS investigates the presence of parasitic and microbial contaminants in public parks and playgrounds in Zanesville, Ohio and provides information to the local community health sector.

RADIUS involved over 100 undergraduate Ohio University students who collected swab and soil samples from public places and analyzed them in the laboratory. Students used current technology to identify potential environmental risk factors and dynamics of infectious agents in the local community. Students were highly satisfied with their participation and the learning experience of RADIUS as well as the community service component. Students' interest and enthusiasm was also reflected in their presentation and continuous contribution to the project. RADIUS activities identified 10 important infectious agents contaminating local public places. Examples of how this information can raise awareness and help estimate the risk of acquiring these infectious agents in the environment are also presented. This study indicates RADIUS can have a positive impact on undergraduate learning while providing community service.

Introduction

Modern approaches in teaching science to undergraduate and graduate students emphasize the importance of supplementing traditional lecture format with practical and field projects (Hoffman

2001). These methods allow students to apply scientific theories and methods in the "real world" and provide them with a true opportunity to be active participants in the learning process. Furthermore, data generated from these projects may be extremely useful to the local community. We developed and initiated a pilot undergraduate learning tool to provide Ohio University Zanesville (OUZ) students with active learning experience through a problem-based curriculum centered on scientific thinking. In addition, the project provides service to the local community in the health sector. Risk Assessment of Disease and Infection Undergraduate Study (RADIUS) is a multipurpose project combining active learning experience, faculty-students research and community service. The students use state-of-the-art techniques to study environmental contamination with infectious agents in public places in the local community as an integral part of their curricula.

The environmental route of transmission for many parasites and microbial agents is important, with water, soil and food being particularly significant reservoirs. The potential for producing large numbers of transmissive stages and their environmental robustness pose persistent threats to the public's health. Few studies have been conducted in the United States to quantify the potential risk associated with encountering parasitic/microbial infections in the environment (Wagner and Stewart, 2000; Chorazy and Richardson, 2005; Segner and Scholthof 2007). To our knowledge, no such study has been conducted in southeastern Ohio. Environmental survey of infectious agents in public places in the community could enhance OUZ undergraduate students' learning experience and foster a better understanding of the risk of acquiring these infections in the region. RADIUS is aimed at investigating the contamination by parasitic/microbial infectious agents in environmental samples collected from public parks and children's playgrounds in Zanesville, southeastern Ohio. Previous studies have suggested these areas as priority sites for research on the occurrence of and potential exposure to infectious disease agents (Reynolds et al., 2005). We coordinate and supervise students as they adapt current techniques to screen for the contaminants. The techniques used are quick, specific, highly sensitive, easy to learn and cost effective especially when screening for multiple

infectious agents in the same sample (Kuske et al., 2006).

The RADIUS activities provide a model for the teaching of scientific methods applicable in both in the class-room and the field which leads to increased learning, fosters student-faculty research, and provides service to the local community. Here we describe the RADIUS activities as well as its impact on the students learning and how it can contribute to the health of local community.

MATERIALS AND METHODS

Study Sites and Sampling

The local area surrounding Ohio University Zanesville (OUZ) campus was chosen as the study area for many reasons. The primary reason is to involve OUZ undergraduate students in sample collection and analysis. Moreover, the extensive data available on infectious agents and the cooperative spirit and encouragement of the Zanesville-Muskingum County Health Department personnel and the local community indicated a genuine interest and need for this type of study. Six study locations representing various micro-environments within the Zanesville area were selected close to localities of high reported infectious disease cases (data not shown). These sites represent four school playgrounds and two popular public parks.

Thirty-two samples were collected from various surfaces on each site. Each study site was visited twice during academic year (2007/2008) to collect swab and soil samples from the same surfaces during each visit. One visit was carried out in the fall (late September 2007) and the second in the spring (late April 2008). These sampling schedules provided the opportunity to estimate the persistence and dynamicity of environmental contaminants in the study sites, and allows for better estimation of the risk of acquiring each of the infectious agents detected. Biannual sample collection also provided the opportunity for more students to participate in sample collection exercise.

Biochemical Testing and DNA Extraction

Surfaces of playground and public park equipments were swabbed with sterile, cotton-tipped applicators moistened with tryptic

soy broth (TSB) for the collection of bacterial pathogens: soil samples were also collected in sterile containers from the same sites. Both the swabs and the soil samples were transferred into Tryptic Soy Agar (TSA) medium, a general purpose standard medium for recovery of a wide variety of bacteria (Klyen et al., 2007). Pure culture of each candidate colony was obtained through sub-culturing single colonies in the same original media (TSA). Samples from pure cultures were Gram stained and morphologically identified. Individual pure cultures were then used for biochemical testing using the API system (https://apiweb.biomerieux.com). API strips included standard carbohydrate, citrate, gelatin and starch hydrolysis tests. API web software package (https://apiweb.biomerieux.com) was then used to identify bacterial isolates based on the result of the biochemical analysis. These procedures allow for the identification of bacterial isolates to the species level.

DNA was extracted from soil samples using PowerSoil DNA isolation kits (MO BIO Laboratories, Inc.; Carlsbad, CA) following the manufacturer's protocols. Extracted DNA was stored at -80°C for later investigation.

Students' Involvement and Evaluation

Students of Elementary Microbiology and Human Anatomy and Physiology I classes were chosen to participate in the RADIUS project; and the curricula of these classes were revised to include these activities. Prior to RADIUS, Elementary Microbiology students used to collect indoor campus-based samples for their laboratory activities. In RADIUS, students collected, stored and identified microbial agents in environmental samples from public areas in Zanesville. As a follow up for a new DNA extraction lab activity, Anatomy and Physiology students also extracted DNA from the collected environmental samples for future molecular testing and confirmation of the presence of infectious agents. In both classes, additional laboratory sessions were created to emphasize safety precautions and procedures used to collect and analyze samples from the field. Students from these classes were able to meet and discuss ways to improve their performance in the project through predesigned social hours. Such peer discussions have

been shown to enhance understanding of concepts and benefit the majority of students (Smith et al 2009).

In addition, individual students from these classes were involved in extra activities in the lab and data analysis (Figure 1). They also prepared and presented outlines of their RADIUS activities in regional and national conferences and continue to be part of the ongoing RADIUS activities.

The impact of the RADIUS activities on participating students and their satisfaction with their role and outcomes were measured by a specifically designed questionnaire developed by the OUZ Learning Advancement Center. The questions targeted personal satisfaction as well as the design and service components of the study (Figure 2).

RESULTS

Students' Satisfaction

The major outcome of the RADIUS is the impact on Ohio University-Zanesville students. OUZ students who participated in RADIUS were highly satisfied with the learning outcomes of the RADIUS project (Figure 2). Students were overwhelmingly satisfied with the positive learning experience of RADIUS, as well as the design and implementation of the study (Figure 2 A- C). Students were also pleased with the community service component of the study and strongly agree that it promoted increased community awareness and may aid in reduction of transmission of pathogens and diseases in the local community (Figure 2 D – F).

The impact of RADIUS was also seen in the student motivation and enthusiasm during and after the two rounds of the project. Students participating in RADIUS have met and discussed ways to improve implementation of the project through planned social hours. In addition, some interested students are currently contributing to ongoing laboratory activities and a couple of them have presented their perspective of the RADIUS at regional and national meetings (J. Pilant and M. Burkett. Abstr. Association of University Regional Campuses of Ohio (AURCO) annual meeting. 2008; M. Burkett and J. Pilant. Abstr. Ohio University Student Research and Creative Activity Exhibition, 2008).

Infectious Contaminants of Public Places

The RADIUS activities described in Materials and Methods revealed 10 important infectious agent contaminants of local public places (Table 1). The most significant pathogens found in this study were *Escherichia coli*, *Micrococcus species, Staphylococcus aureus*, *Staphylococcus auricularis*, and *Staphylococcus xylosus*. The pathogens detected in this study represent bacterial isolates that persist in the environment (Hazen et al., 2007; Mathewson et al., 1992; Zirakzadeh and Patel, 2006; Kubitschek, 1990; Madigan et al., 2006; Todar, 2007). All public places under study were contaminated with at least six pathogens (Table 1). The percentage of surfaces contaminated with these infectious agents ranged between 6% and 32% per public site (Table 1) with *Staphylococcus xylosus* present on 32% of the tested surfaces in playground 4. Four pathogens were detected in all of the study sites examined while the rest were present in one to five sites (Table 1). All sites were positive for the same agents both in the fall of 2007 and the spring of 2008 (data not shown). However, differences in the prevalence of some pathogens within sites were seen (data not shown).

Students also learned the basics of nucleic acid extraction process and extracted DNA from environmental soil samples. These samples are stored for future studies to confirm the presence of infectious agents and screen for additional agents. These studies are outside the scope of this manuscript (Figure 1).

Public Health Awareness

RADIUS is being performed in full collaboration with the local Health Department and leadership of the public study locations. Public health officers contributed to the selection of study sites and design of experimental activities. Detailed information on the detected infectious agents and contaminated surfaces/sites is shared with the local Health Department for further analysis and intervention.

Discussion

The RADIUS project is described as a model to enrich teaching and provide public health awareness in the local community. Students

performed the RADIUS activities both in the field and classroom settings. RADIUS used state-of-the-art techniques to enhance undergraduate microbiology and biology education by investigating the risk of acquiring microbial infections in Zanesville, OH. Students investigated the presence of infectious agents in environmental samples collected from public parks and playgrounds in the area. The prevalence of these agents in soil helps to identify risk factors for environmental contamination. Students were trained on standard and advanced practices for testing of these agents. These activities provided students with hands-on and relevant learning experience based on scientific methods and critical thinking. Collaboration with the local Health Department allowed for a realistic and practical design based on scientific data and geared towards public safety. It also contributed to the students' interest in the project as they provide information necessary for awareness and prediction of the risk of acquiring these infectious agents in the local environment. Findings of the RADIUS study are periodically shared with the public health officers of the local Health Department for further analysis and intervention.

Learning outcomes of the RADIUS activities were measured through an evaluation tool specifically designed by the Learning Advancement Center, OUZ (Figure 2). Students involved in RADIUS were highly satisfied with the positive learning experience and with their service to the community where they live and work. In addition, we observed the impact of RADIUS on the students' interest and enthusiasm. An added advantage of the project was the identification of a group of students who are interested in expanding their involvement and contribution to advanced laboratory studies beyond the capabilities of the designated RADIUS laboratory sessions. These students presented their perspective of the project at regional and national conferences and continue to contribute to the project.

While the results of this pilot project were positive and beneficial, a full implementation of this type of project in the undergraduate curriculum should include a qualitative measurement of student learning. This would involve a control group of students with a mechanism for providing additional factors that would influence

students' learning and performance. As this was a pilot project, we felt it was most important to establish the community connections and student interest and impressions for the design.

Description of RADIUS as model for teaching enrichment is the primary focus of this paper. However, the RADIUS activities have identified potential environmental risk factors for encountering infectious agents in the study area. The identification of real world situations provided the students with stimulating learning experience. These activities represent an overall approach to upgrade learning experience that provided added value by bringing wider community service concepts into the class-room learning experience. For example, students participated in active surveillance activities beneficial to the local Health Department and the community. Outcomes of these activities will help raise awareness of the risk associated with acquiring the detected infectious agents, in high risk areas and how contamination can be minimized. The fact that our study sites are extensively used by the community may explain the prevalence and persistence of these pathogens in the study areas. Many of the pathogens identified here cause diseases in community and medical settings, thus underscore the value of this expanded form of teaching.

In terms of raising awareness of infectious agents and environmental contaminants, the participants identified several infectious agents in various public places in the community including *E. coli*, and three species of *Staphylococcus* (Table 1). This data provided general information about the prevalence of these infectious agents in the study area, along with a detailed mapping of these agents within each public study site. The fact that RADIUS activities were performed biannually (Fall and Spring) will reveal epidemiological and seasonal changes that address the dynamics of the infectious agents present in the Zanesville area. Further molecular identification and epidemiologic genotyping (Feng et al., 2008; Rose et al., 2003) of these infectious agents would provide more information about their dynamicity within and between public study sites. Such information is essential for further investigation and intervention by the local health Department and other interested parties.

RADIUS findings are periodically shared with the local Health

Department and directors of the public study sites. The RADIUS data continues to assist interested parties assess the risk of acquiring the reported infectious agents in the community. These activities could also serve as an active surveillance and early warning system for the community and local public health and other authorities. Providing such information to the local authorities enables them to react promptly and implement immediate, short- and long-term interventions and would be vital in case of epidemics or bioterrorism (Palumbo et al., 2008). Examples of public health interventions include educational programs describing disease transmission and hygiene, the single most important method people can use to prevent infection.

In the future, RADIUS project would include the implementation of the rest of the molecular studies shown in Figure 1, expanding study sites into neighboring areas and other Ohio University campuses, attraction and recruitment of graduate students and additional undergraduate students from various disciplines and incorporation of new techniques as they become available. In addition, RADIUS represents a pilot model for teaching enhancement and community service that can be replicated partially or entirely by biology faculties everywhere.

Acknowledgments

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Figure Legends:

Figure 1:

An outline of RADIUS current and future activities and role of the students.

* indicate steps involving the whole class while ^ indicate steps involving selected students. All activities were performed under supervision of the authors following strict safety guidelines.
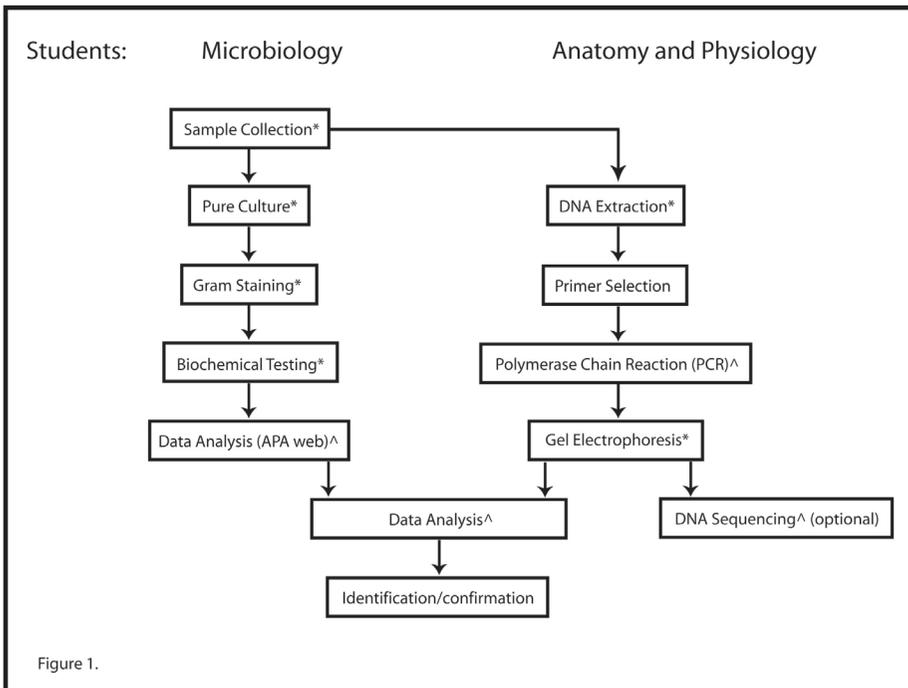
Figure 1.

Figure 2:

(Panels A – F): RADIUS impact and student's satisfaction, Fall 2007.

A.

Did your experience provide a positive learning atmosphere?

B.

Do you think the procedure design was easy to follow?

C.

Do you think the experiment fit the experimental/project goal?

D.

Do you think this project met community needs?

E.

■ % of student

Would you support this project in a
different community area?

F.

■ % of student

The advantages of this project promoted increased community awareness
and may aid in reduction of transmission of pathogens and diseases?

Table Footnotes:

Table 1: Presence of major infectious agents in public study sites in Zanesville OH, Fall 2007 shown as percentage of contaminated surfaces per site.

Pathogen	Public Park 1	Public Park 2	Playground 1	Playground 2	Playground 3	Playground 4
Aeromonas hydrophila	7%	8%	12.5%	12.5%	6%	0
Enterobacter aerogenes	0	0	0	12.5%	9%	0
Escherichia coli	0	12%	0	12.5%	0	0
Micrococcus spp	7%	8%	9%	0	6%	11%
Proteus mirabilis	13%	8%	6%	9%	6%	7%
Pseudomonas luteola	10%	12%	9%	12.5%	6%	7%
P. aeruginosa	10%	0	0	0	0	0
Staphylococcus aureus	10%	8%	12.5%	12.5%	12.5%	14%
S. auricularis	10%	16%	0	0	6%	7%
S. xylosus	10%	8%	19%	12.5%	19%	32%

Table header spans: **Site**

Pre-service Teachers' Expectations of a University Education Program

Anna F. Lyon and Kenneth L. Rosengarten
Wright State University

Introduction

The motivation to teach has many sources. According to Manuel and Hughes (2006), the top three reasons the participants in their study chose teaching as a career were 1) they had always wanted to be a teacher, 2) there were one or more teachers in their family, and/or 3) they expressed admiration for a teacher they had as a child. Potential early childhood education teacher candidates at Wright State University on both the main and Lake Campuses offer similar responses during interviews. Rarely does a student express a deep interest in an academic subject area. Responses to questions regarding why the potential candidate chose the teaching field tend to remain in the affective domain with the most common answer being a love of working with children.

In the introduction of his book, *The Courage to Teach*, (1998) Parker Palmer writes, "We teach who we are" (p. 2). This statement is the inspiration for this research project. Institutions of higher learning have many state and national objectives they must address. As these are being taught, does the university take into consideration what kind of teacher the college student wishes to be? What does the student feel is important to learn? Are the objectives that the university teaches and those the student wants to learn a good match? If not, are students disappointed with their university experience? Do they feel prepared to teach well upon graduation?

The Assignment

Students attending orientation at the Lake Campus of Wright State University and those enrolled in EDE 304, Best Principles and Practices in Early Childhood Education, on the main campus were assigned to write a letter to themselves in which they address the

following prompts: (1) What do you want to learn in the next two years? (2) What kind of experiences do you hope to have in your Phase experience? (3) What kind of student teacher do you want to be? (4) Where would you like to work as a teacher? (5) What kind of classroom behavior would you not tolerate? (6) What do you foresee as your greatest strengths? (7) What do you foresee as something you will need to address? The first letter to themselves at the start of the program is written at their orientation meeting or on the first day of class, and sealed in an envelope with their name on it. During the course of the two years required to complete the program the letter is forgotten as the students get involved in their university classes and internships in elementary classrooms.

During their final class at the university, towards the end of the quarter, the letters are redistributed to the students. After their initial surprise at receiving the returned letter, the students read the letter they wrote. Although it was only two years ago, some of the students feel as if it were a lifetime in which they wrote about their wants and desires to be a quality teacher. The students are only too eager to write a response to their original self-reflective letter, thus letting the university know if indeed their goals were met. Both letters are collected on the last day of class.

The Study

While this project began as an assignment, it soon became clear that student responses yielded a wealth of data. Although the use of an existing assignment as the data source imposes limitations on research studies, no changes were made to the existing assignment since several quarters of data had been collected. The researchers decided to use the existing data as a pilot study to determine if a more formal research project would be helpful.

Data were collected from approximately one hundred students entering initial early childhood classes. Data from both the initial and final letters were included in this pilot study. The data were coded using open coding as described by Creswell (2006). The two researchers and a graduate assistant coded the data in order to achieve triangulation.

The purpose of this study was to have students identify their goals and to determine if students felt that the university was responding to their goals as stated in their initial letters. The following research questions were posed: What do the teacher candidates at Wright State University main and Lake Campuses predict they need to learn during their two years in the Early Childhood Education program? Upon completion of the Early Childhood Education program, do the teacher candidates at Wright State University main and Lake Campuses feel their needs/expectations have been met?

Review of the Literature

Since they have spent several years attending elementary and high school, teacher candidates tend to enter the field of teaching feeling as if they know about school and teaching. Remembering their experiences as students and recalling influential teachers' calls up fond memories for many teacher candidates for whom school was a place where they felt comfortable and where they were successful. They often name a particular teacher they hope to emulate (Manuel & Hughes, 2006; Hattingh & Kock, 2008). Malmberg (2006) found that teacher candidates' previous experiences in education are related to their perceptions of what the teaching profession will be like.

It is important for expectations of teaching to match the realities of teaching. Teacher candidates are often surprised by the realities of teacher workload, disruptive student behaviors, and pressures from state testing.

Wilhelm, Dewhurst-Savellis and Parker (2000) found that the best predictor of teacher retention is the extent to which teacher candidates anticipated gaining pleasure from teaching as a career. Kyriacou and Kunc (2007) determined that "At a time when teacher retention is an area of concern, it is becoming increasingly important to understand how beginning teachers' expectations about teaching as a career impacts their decision to remain in the field."

In a study of marketing students, Appleton-Knapp and Krentler (2006) found that "A good way to ensure that students have appropriate expectations is simply to ask them on the first day of the term to list everything they expect to get from the course." By doing

this, unrealistic expectations can be addressed and misconceptions clarified. The literature clearly supports asking students to reflect on their goals, and for universities to help students understand the realities of teaching so that their expectations are realistic.

Findings

The Initial Letter

The majority of the initial letters listed vague and nonspecific goals. Statements such as these listed below are examples of typical student responses.

Question 1: What do you want to learn in the next two years?
- How to be a good teacher
- How to teach in creative and fun ways
- Behavior management

Question 2: What kind of experiences do you hope to have in your Phase experiences?
- Skills needed to be a great teacher
- Learn new teaching techniques
- Hope to have good and bad CT's to learn both sides of the teaching experience
- Want to learn discipline techniques

Question 3: What kind of teacher do you want to be?
- Be a real part of the classroom
- To leave a good impression on the people I interact with
- Be a good role model\Learn to set up my own classroom that is welcoming

Question 4: Where would you like to work as a teacher?
- Small school
- Home town
- Any school district that will challenge me
- Live close to home

Question 5: What classroom behavior would you not tolerate?
- Name calling
- Disrespect
- Screaming and yelling

- Bullying
- Children who won't try

Question 6: What do you foresee as your greatest strengths?
- My strength is compassion. I have a passion to make a difference and relate to students
- My strength will be my caring personality along with my creative mind

Question 7: What do you foresee as something you will need to address?
- Doubting myself
- Being completely comfortable in the classroom
- Spelling
- Getting attached
- Perfectionist
- Starting too many projects at one time

The Final Reflection

The reflections to their initial letter tended to address the realities of teaching to a greater degree. Listed below are some selected responses.
- "I didn't know if I would be able to handle misbehavior. This is a weakness that I have noticed has become one of my strengths."
- "Classroom management is something I feel I have improved on over the past two years"
- "Becoming a teacher was more than I expected."
- "I am proud to say that today through my experiences I am able to adjust my lessons and assessments based on my communication and observations."
- "All-in-all I feel that for the most part my fears and doubts have gone away and I now I will be a great teacher."
- "When I finished reading the letter I found I was proud of myself because of the things I had in the letter are things that I still believe or have changed to make myself a better educator in the classroom."

Responses in the final reflection letter tended to take the initial vague statements and add some reality. Classroom management was the topic mentioned most often. Students learned that in order to be a "good teacher" they needed to have a system of classroom management in place.

Implications

The students entering the Early Childhood Education program at Wright State University Lake and main campuses enter the field of teaching with very positive views of teaching and teachers. They tend to have an almost idealized view of the classroom and look forward to a long career in teaching. Their enthusiasm for teaching is commendable and should be fostered. The majority of the students in this pilot study reported being satisfied with the education they received in the Early Childhood Education Program. While this is gratifying to the researchers, a more careful study might yield more valuable information that could assist in program improvement.

While writing the initial letter, it might prove helpful to ask students to elaborate on their answers. For example, when a student writes that they wish to become a good teacher, it might be useful to have them describe the characteristics of a good teacher. Additional probing may help students clarify their goals and be better able to learn a great deal more in both their university classes and in their internships.

As the assignment now stands, little discussion takes place at the time the initial letters are written. Discussions regarding student goals and the realities of teaching would seem to be most appropriate at this time. By helping students better match their goals to the realities of teaching, it might be possible to help students have a better understanding of the profession of teaching, and therefore, have more realistic expectations.

The initial letter is guided by questions to prompt student thinking. An opportunity to write in a more free form might bring out some thoughts and ideas not addressed in the questions. This might cause students to reflect and write on a broader range of topics. The final reflection is written at a time when teacher candidates are

completing their program of study and are ready to graduate. They are in a positive frame of mind and are excited to begin their careers. It might be helpful to have a third opportunity to reflect at the mid-point of the program. The mid-point seems to be time of high stress for many teacher candidates and may yield valuable data.

Conclusions

Although this pilot study has limitations, it seems to be valuable to ask teacher candidates to state their goals at the beginning of the Early Childhood Education program, and reflect on these goals at the end of the program. Leaving the university feeling that they have achieved their goals is a positive experience for students. The majority of the students completing the Early Childhood Education program at Wright State University felt their goals were met and reported feeling prepared to teach.

A well-structured research study might yield more valuable information to help the university determine if they are indeed helping teacher candidates clarify and meet goals. The research data could then be used to assist faculty as they meet and attempt to enhance university courses, help teacher candidates have a realistic view of teaching as they begin the Early Childhood Education program, and allow the university and teacher candidates to work together more closely to achieve common goals.

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Biographical Information

Dr. Anna F. Lyon is an assistant professor of Early Childhood Education at Wright State University in Dayton. Dr. Lyon is a former Reading Recovery teacher, reading specialist, and elementary classroom teacher.

Dr. Kenneth L. Rosengarten is an assistant professor of Early Childhood Education at Wright State University. Dr. Rosengarten is a former middle school teacher and gifted supervisor.

Service-Learning: An Educational Experience

Kenneth L. Rosengarten, Gwendolyn Bergman, Kevin Kramer, Andrea Hemmert, and Melissa Messick
Wright State University—Lake

Abstract

Service learning is not a new concept in teaching and learning. This paper presents information about service learning activity that was introduced into a pre-education class, Education in a Democracy. The class members volunteered their time at Mercer County Head Start reading to the students. A panel of the students wrote a survey to ascertain the results of adding the service-learning component. The survey assessed whether the literature describing service learning and the experience of the students are congruous. Basically what the researcher wanted to know is whether the students looked at their service learning activity as a learning experience.

Introduction

Wright State University - Lake Campus offers a class entitled Education in a Democracy. The undergraduate catalog course description is as follows: "This course explores the role and relationship of education in a democracy to concepts of civil society, social justice, access to knowledge, and development of character in the young" (Wright State University Undergraduate Catalog, 2007). During the winter quarter of 2008, the Education in Democracy class opted to participate in a learning project rather than take a final exam; the students stated they would rather get involved with people than do a written final. This process was repeated during the Spring Quarter, and during the summer, service-learning was formally introduced in the class as a requirement.

There are many definitions of service-learning, but the following captures the core concept:

"Service-learning combines service objectives with
learning objectives with the intent that the activity
changes both the recipient and the provider of the

service. This is accomplished by combining service
tasks with structured opportunities that link the task
to self-reflection, self-discovery and the acquisition
and comprehension of values, skills, and knowledge
content." (Learn and Serve America's National Service-
Learning Clearinghouse, 2008, para. 5)

In order to ascertain service learning activities' effectiveness,
a survey was developed and distributed to the class. Since service-
learning is such a broad topic, the review of literature centers on the
survey questions listed. The college students involved were early
and middle pre-education majors. The service-learning activity was
supposed to help the students prepare for community involvement as
teachers by, expanding their views of diversity and practices, of social
responsibility, citizenship skills, and confidence in and commitment
to service-learning projects. This article explores and confirms these
basic principles.

Review of Literature

The literature for service-learning covers a wide range of
topics. The first topic is *career and community development*. Two
important questions about this topic are:

- In terms of education, does being involved in a service-learning
  project better help the college student prepare for a future job as an
  educator and give the student a better understanding as a teacher?
- By being involved in a service-learning project, could a pre-service
  teacher deal with future students effectively?

In their book *Where's the Learning in Service-learning*,
Eyler and Giles state: "When we interviewed students
about what made their service-learning effective, they
offered lots of examples of particular assignments and
approaches, but they consistently stressed the importance
of what they did in the community; their relationships
with others – community members, peers, faculty; and the
challenge of integrating their service and academic study
though reflection" (1999. p. 167).

This relationship with others through community involvement seemed to be crucial with pre-service teachers. Root, Callahan, and Sepanski attempt to address some of the gaps in research by asking the following:

1. What effects does service-learning within teacher education have on pre-service teachers' perceptions of students as assessed by a qualitative self-report measure?

2. What effects does service-learning have on pre-service teachers' perceptions of teaching as assessed by a qualitative, self-report measure?

3. What characteristics of their service-learning experience predict whether pre-service teachers will report a change in their perceptions of students and teaching?

4. How does pre-service teacher's performance on quantitative and qualitative outcome measures compare? (2000. p. 225)

The results of the study by Root, Callahan and Sepanski indicated that the students were affected in a positive manner by educational service-learning projects. (2000) The students who participated in the study demonstrated increased awareness of dealing with future students.

In terms of diversity, pre-service teachers stated that during the service-learning experience, they were made much more aware of students' needs. The candidates at Wright State University - Lake Campus met students who attended Head Start in Celina, Ohio. For some of the Wright State students, this was the first time working with clients approved for a program based on yearly income. The preschoolers and their families could be profiled as low income and dysfunctional. This stereotyping could cause other people to react negatively towards them and to hold lower expectations for the students and the program. In 1999, Eyler and Giles presented their findings on the impact of service-learning upon students' stereotyping behaviors, which include:

- Service-learning students develop a more positive view of the people they work with over the course of a semester.

- Students report that their service-learning contributes to their sense that the people they work with are "like me" and demonstrates their growing appreciation for other cultures. (p. 54)

Except for the family income, many of the education candidates found the Head Start student to be just like themselves in many ways. The preschool students' families may have met income guidelines, and the students may have had a learning disability or trouble focusing on the task, but all in all, the college students discovered their own likes and dislikes to be similar to preschoolers.

Service-learning impacts commitment. A program developed by Jeffrey Brudney and Colleen Mackey is entitled Service-Learning Impacting Citizenship (SLIC). The philosophy behind SLIC is to engage the young person with real-world knowledge and skills. The SLIC website on service-learning states that as an end result of SLIC, it is hoped that youth will experience the importance of active citizenship and remain engaged citizens throughout their lives (Service-Learning Impacting Citizenship, 2008, para. 2).

Another website developed by the Learn and Serve Clearinghouse discussed making service-learning a lifetime commitment. The website even listed the following job search sites with an emphasis on the socially responsible career: "Campus Compact - resources for nonprofit & service-learning projects; Careers in the Common Good - hosted by Brown University; Ecoemploy.com - environmental jobs; and Teach for America Jobs Making Service a Lifetime Commitment" (p. 5).

All of the literature reviewed in the service-learning literature had a section on reflection, as an integral part of service-learning and the culmination of the learning task. Each time the college students participated in a service-learning session at Head Start, they were required to do a reflection. The professor wanted the students to consider what they did, evaluate what was successful and unsuccessful with the Head Start students, and plan for future service-learning engagements. The students were asked to do the reflection as soon as possible.

As Rahina Wade stated, in *Community Service-Learning: A Guide to Including Service in Public School Curriculum*, "Reflection

is a means for reliving or recapturing our experience in order to make sense of it, to learn from it, and to develop new understandings and appreciations" (1997, p. 94). According to one of the Campus Compact websites, there are three reflections that can be done: "reflections before the experience, reflections during the experience, and reflections after the experience" (Compact.org, 2001, p. 1). For the class working with Head Start, the students were to combine all three and were given a series of useful questions to guide their reflections. (Wade 1997).

- What happened at your service project this week?
- How did people respond to you?
- What problems did you experience?
- How did you respond to the problems?
- What successes did you experience?
- What is your biggest challenge in this project?
- What are your plans for next week? (p.99)

At first, the students' writing was questionable; they tended to summarize the day's events. "Reflection is not a didactic retelling of the events at a service site. . ." (Learn and Serve America's National Service-Learning Clearinghouse, 2008, p. 1). Over time, the students' writing satisfied the requirement that the writing be introspective and interpretive of the events that occurred during the service-learning experience.

The Service-Learning Project: The Assignment
Students in the course Education in a Democracy, ED 210, had the option of volunteering for a community service event in lieu of the final exam, winter quarter of 2008. All of the students chose to volunteer for the Big Brother/Big Sister organization.
This process was repeated during the Spring Quarter of 2008, with the culminating activity being raising money for scholarships and a missionary trip to Haiti.
During the summer of 2008, the course officially became a service-learning class. Wright State University has a service-learning director, and after several summer meetings, the fall quarter students

received the syllabus for the ED 210 class which stated: "This course is a service-learning course. An official definition of service-learning is currently being developed for Wright State, but in general, service-learning is a mutually beneficial partnership between the university and community members, formed for the purposes of:

- meeting academic learning objectives
- preparing students for citizenship
- meeting community needs

Service-learning courses place equal emphasis on the quality of the service and the learning. Therefore, all parties have an equal stake in the success of the projects. In this course Head Start will provide you with real contexts for applying course content and skills, and you will provide valuable mentoring to the children there. Attendance and proper attire is mandatory; specifics will be given during class."

After that, administrators came to the class to prepare the college students for working with the Head Start students. At this time, house-keeping details, attire, and responsibilities were discussed with the college class. Basically, each college student would take two Head Start students and read to them. During a normal class time, each student would read to four Head Start students; the college student did this approximately eight times during the quarter. During the quarter, the preschoolers were provided with books and extension activities.

After a few meetings, the college students began bringing in their own books and activities, with the college professor's approval, to utilize with the Head Start students. Actual quotation from student journals were correlated with the following topics: community/career development, diversity, commitment, and confidence. Examples of the students' comments are below:

Community and Career Development
- "This service-learning project is an excellent opportunity for us as an education class to get our feet wet in a real classroom setting." (Messick, 2008)
- "This really made me feel good because I know I am preparing myself for my future so I can do a better job." (Kramer, 2008)

Diversity
- "I am really getting a better feel with the younger children." (Kramer, 2008)
- "During my time at Head Start, I learned a great deal about the student during our short time together. The children shared stories about their classroom, home life and personal likes and dislikes." (Bergman, 2008)

Commitment
- "I am enjoying searching for extra reading activities to bring with me each week."
- (Messick, 2008)
- "I was very pleased today because we finally got Zachary to go with us. He was the last child in the room to warm up to us. I wasn't sure if he would come with us, but I kept trying and he finally changed his mind. As we were walking he said, 'I am a big boy because I am going with you.' I am glad that I kept trying until he came because he began to relax and really enjoy it." (Bergman, 2008)

Confidence
- "Today we read the series of books *If You Gave a Mouse a Cookie*. One little boy could recite and follow along with the book, *If You Give a Moose a Muffin*. You could tell by the expression in his voice and on his face how proud of himself he was for remembering the story so well. This in turn made me feel quite proud and happy for him." (Messick, 2008)
- "Today I had the most positive experience with the children that I've ever had. After our drawing and animal reviews, I told the two boys that it was time to go. Both of the boys looked at me and actually said, 'We don't want to go back to class. We want to stay with you." (Kramer, 2008)

Citizenship
- "It really meant a lot to me for the little girl to trust me and finally come out with us. I was really kind of touched when she asked

me to hold her doll baby. I feel that I am really making strides with these kids." (Kramer, 2008)

- "These children were excited about being picked to come with me, and even though I was not a significant person in their lives, they were still excited about that one on one time with me." (Bergman, 2008)

Reflection was the last question on the Service-Learning Project Survey form. This question did not deal with the Head Start students, but on the reflective piece of the college students learning. As the quarter progressed, the reflections became more in depth, and the goal of the reflective piece was accomplished. Looking back, the reflection solidified the learning.

The Survey and Data
Four students worked with the professor to ascertain the attitudes towards service-learning of the ten students who took the course ED 210 during the fall quarter 2008. The process was:

1. For ease of survey tabulation, a Likert Scale format was used.
2. The 11 questions focused on community involvement as a teacher, diversity, social responsibility, citizenship skills, confidence, and commitment to the service-learning project.
3. The survey was electronically sent to the students who participated in the service-learning project.
4. The surveys could be returned anonymously by email or postal mail.
5. Six surveys were returned (n = 6)

The data will be examined question by question.

Question 1: The service-learning project helped me learn to prepare
          for my future job as an educator.
          33% -- Somewhat Agree
          66% -- Strongly Agree

Question 2: The service-learning project gave me a better
understanding of teaching.
17% -- Neutral
17% -- Somewhat Agree
66% -- Strongly Agree

Question 3: The service-learning project made an impact on my future
dealings with students.
50% -- Somewhat Agree
50% -- Strongly Agree

Question 4: The service-learning project was something that I looked
forward to each time it was scheduled.
100% -- Strongly Agree

Question 5: The service-learning project I participated in enhanced
my educational skills.
16% -- Neutral
84% -- Strongly Agree

Question 6: The time I spent in service-learning made an impact on all
involved.
100% -- Strongly Agree

Question 7: I would like to see service-learning worked into other
educational classes.
100% -- Strongly Agree

Question 8: Attending the service-learning project prompted me to put
extra effort into the project.
50% -- Somewhat Agree
50% -- Strongly Agree

Question 9: If the service-learning project required additional time, other than normal class time, I would be willing to volunteer to do more.
33% -- Neutral
33% -- Somewhat Agree
33% -- Strongly Agree

Question 10: This service-learning project/class broadened my view of diversity.
60% -- Somewhat Agree
40% -- Strongly Agree

Question 11: The reflections done after each service-learning session reinforced what I did that day.
20% -- Strongly Disagree
40% -- Somewhat Agree
40% -- Strongly Agree

Service Learning Project Survey

Instructions: Please rate how strongly you agree or disagree with each of the following statements by placing a check mark in the appropriate box. Return to faculty secretary's office or score it electronically (anyway you wish to mark it) and email to linda.helentjaris@wright.edu by January 26, 2009. To keep it anonymous, please do not put your name on it. Thank you.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	1.	The service learning project helped me learn to prepare for my future job as an educator.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	2.	The service learning project gave me a better understanding of teaching.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	3.	The service learning project made an impact on my future dealings with students.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	4.	The service learning project was something that I looked forward to each time it was scheduled.

Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	5. The service learning project I participated in enhanced my educational skills.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	6. The time I spent in service learning made an impact on all involved.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	7. I would like to see service learning worked into other educational classes.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	8. Attending the service learning project prompted me to put extra effort into the project.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	9. If the service learning project required additional time, other than normal class time, I would be willing to volunteer to do more.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	10. This service learning project/class broadened by view of diversity.
Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree	11. The reflections done after each service-learning session reinforced what I did that day.

Interpretation of Data

The college students learned from the class what the literature said they would. Statements 1, 2, 3, and 6 of the survey dealt with community and career development. With an average of 70.5% for the four statements all being in the strongly agree category, the college students impacted both the students and themselves, thus affecting their community and career development.

Survey statements 4, 5, and 9 deal with commitment. The scores for those three statements are 100%, 84%, and 33% respectively. Statements 4 and 5 show that the students were committed to the project. Statement 9 suggests that one-third of the students surveyed were neutral about spending additional time volunteering. Based on survey results although the majority of the students learned from and enjoyed the project, some felt that they could not afford any extra time on the project.

Statements 7 and 8 deal with confidence issues. When asked if the students would like to see service-learning integrated into other education classes, 100% of the students said they would. Because the

project was well-organized by Head Start personnel, all of the students who returned the survey somewhat or strongly agreed to the statement.

Question 10 deals with diversity. The last two evaluations by the National Council of Accreditation for Teacher Education cited the Lake Campus for lack of diversity. A service-learning project, when planned correctly, can broaden one's view of diversity. With all of the responses being in the somewhat agree and strongly agree columns, the issue of diversity was addressed. At the end of the service learning class, the students were more tolerant of the Head Start students who attended the program.

The last statement deals with reflections, and this was the only survey question that had a "strongly disagree" response (20%). Although 80% of the students stated that they strongly or somewhat agreed that the reflection reinforced their experience with the Head Start students, clearly more time must be spent in class discussing and working on the journal. The students wrote their journals outside of class; these reflections need to be more teacher directed.

The results of the survey indicate that the students internalized the objectives of Education in a Democracy, although the survey was small. The students will be continuously surveyed as they complete the course and service-learning experience to build upon the data. If one of the goals of such a class is to prepare the students to graduate and work in a democracy, then the students must learn to be involved in the community, to appreciate diversity, and to develop a sense of commitment and confidence in what they are doing. The college students learned by utilizing a hands-on experience what the class should be; they began to learn what it takes to be a teacher and adult in a democratic society.

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Biographical Information

Ken Rosengarten has been teaching and performing research in the area of education for the past five years at Wright State University —Lake Campus. He received his B.S. from The Ohio State University, his Masters from Wright State University, and his Ph.D. from Capella University. During the summer of 2008, he began teaching a service learning class. Together with Gwendolyn Bergman, Kevin Kramer, Andrea Hemmert, and Melissa Messick, the above research was completed.

Kenneth L. Rosengarten, Ph.D.
Wright State University—Lake
7600 State Route 703
Celina, Ohio 45822
kenneth.rosengarten@wright.edu

University Regional Centers: Save Major Higher Education Expenses

John Sikula
Ashland University
and
Andrew Sikula, Sr.
Marshall University—Lewis College of Business

Abstract

The authors outline how University Regional Centers can save major higher education expenses in an era when such is of critical importance to students, parents, and university personnel.

Introduction

The costs of higher education have been rising nationally at a time when the economy has been lagging. People are less able than in the past to be able to afford furthering their education. In the past, when the economy was slow, higher education flourished. This is not necessarily the case today, particularly at some private institutions (1). Ashland University, for example, has been struggling to maintain enrollments at both the undergraduate and graduate levels.

These are very difficult times in higher education. Several states are reducing their support for institutions of higher education. California is a prime example. Colleges and universities across the country are: cutting or freezing salaries; canceling or postponing hiring searches and sabbaticals; delaying construction projects; reducing travel; and engaging in a host of other budget reducing measures. Ashland University and Bowling Green State University are but two examples where scores of full-time employees have been laid off in the last two years. To make up for reduced budgets, some institutions of higher education are investing more in regional centers, where often there are students wanting to take classes, but they are not wanting to travel long distances to do so. Cost-benefit margins are generally better at regional centers than they are at main campuses.

Students interested in higher education today shop around more than ever before. They are looking for cost savings and convenience. The attention to more convenience for students will multiply over the next decade. Students will increasingly expect access to classes from cellular phones and other portable electronic devices (2). An effective way to provide this convenience is via university regional centers where both the students and the institutions of higher education (IHEs) can easily cut expenses and still provide quality programs to meet identified needs.

Cost Savings for Students

Many students today recognize the value of higher education, but they do not have the time or resources to go away from home to a residential campus. According to a recent *Chronicle of Higher Education* Research Services report, the traditional four years away from home – spent living and learning and growing into adulthood – will continue to wane (2). More students today study part-time, take courses from multiple institutions, and jump in and out of colleges (2). The costs of a residential campus include food, housing, moving and transportation expenses, activity fees, infrastructure and a host of other expenses. Main campuses are more likely to have senior, tenured and highly paid faculty and experienced staff than most regional centers. Their physical plants are generally more expensive to maintain than regional centers. At regional centers, parking is usually less of a problem and access to major highways and public transportation is generally better. This is why they are built where they are located.

Geographic factors can result in more cost-effective programming at regional centers where adjuncts rather than full-time faculty often predominate the teaching ranks. Adjuncts generally bring current, real-world and job-embedded experience with them and are sometimes more collaborative, cooperative and student friendly than full-time faculty. Regional center faculty generally recognize the need to be entrepreneurial and to compete for student enrollments today. Of course, there are some drawbacks to using adjuncts. They often teach at multiple universities and are not as loyal as are full-time faculty. Also, if their numbers and ratio to full-time faculty are high,

accrediting agencies get alarmed. Local adjuncts often are less likely to have doctoral degrees than full-time faculty on main campuses. The regional centers of IHEs usually are: closer to a student's home; staffed with untenured and junior faculty; less likely to sponsor social activities; and, more prone to focus on teaching. Faculty at regional centers usually have fewer research and service responsibilities, which are common on main campuses. Further, there seldom are sporting contests, community functions and other events to distract students from learning. Compare, for example, the events and activities associated daily with The Ohio State University, as compared with those at one of its regional campuses.

Cost Savings for IHES

There are innumerable committee meetings, political battles and turf wars evident on the main campus of institutions of higher education today. Battles often involve raises, facilities, workloads, travel, professional development, etc.   As budgets shrink, these squabbles often intensify. Personnel frequently are tied up for hours at a time and on a regular basis in activities only remotely related to student learning. Faculty senate and governance issues also prevail on main campuses. Usually there are not as many resource-draining concerns at regional centers. Long committee meetings are far less prevalent at regional centers. Also, the physical facilities at regional centers are usually newer and less expensive to staff, and they are more likely to be dedicated to academics and instruction. Look, for example, at the regional campuses of Kent State University to illustrate this statement.

Regional centers generally are established near population bases. Classes can be a little larger than normal because if an insufficient number of students do not register, then classes are more likely to be canceled than on main campuses where tenured faculty, teaching load considerations, and curriculum balance are more likely to prevail as reasons used to justify smaller classes. Regional centers can provide increased revenue streams and additional opportunities to collaborate with businesses, school districts, and community colleges. They help IHEs with visibility and name recognition.

The trend today is toward low-cost, online options in higher education (2). Technology can be employed at regional centers to link important classes and experiences conducted elsewhere. Face-to-face educational experiences often are more expensive in terms of time and resources than those provided electronically. Many institutions of higher education today find that their computer assisted and online classes fill much more rapidly than those offered in a traditional format. This is certainly true at Ashland University. The advances in instructional technology can facilitate regional center growth and can help provide the same quality of instruction available at main campuses and major teaching-learning centers, often at a fraction of the expense.

Conclusion

More and more students today are looking for lower-cost alternatives to attending residential colleges and universities (1 and 2). To address the economic situation in America and the desires of more students wanting higher education, IHEs today would be wise to invest more in regional centers where timely, cost effective and convenient educational programs can be delivered more efficiently than on many main campuses. Traditional colleges and universities must change along the lines indicated in this article or they will continue to lose students to community colleges and to for-profit universities.

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Biographical Information

John Sikula is Executive Director for Regional Centers,

Massillon-Stark Center Director, and formerly Vice President for Regional Centers and Outreach at Ashland University in Ashland, Ohio. He was an Education Dean for 25 years, previously serving in this capacity at Indiana University Northwest (1976-84), California State University, Long Beach (1984-95), National University (1995-97), and Ashland University (1998-2001). Dr. Sikula is former President of the National Association of Teacher Educators (ATE), 1989-90. He was the Founding President of the State of California Association of Teacher Educators (SCATE), 1984-86.

Dr. Sikula has served as a consultant to schools, universities, professional associations, and education-related groups in all 50 states and 27 countries. His writings include some 200 professional publications, including having been Senior Editor of the 1996 award-winning *Handbook of Research on Teacher Education*, Second Edition, published by Macmillan.

Dr. Sikula has a Ph.D. from Case Western Reserve University in Foundations of Education. His honors include five ATE Presidential Awards for Service (1986, 1993, 1995, 1998, & 1999); being recognized by ATE as "Distinguished Educator" (1996) and as "Distinguished Member" (1994); being selected via national competition as one of the 75 "Young Educational Leaders of America" by Phi Delta Kappa (1981); having received an "Outstanding Teaching Award" from the University of Toledo (1971); and having been named Wadsworth Publishing Distinguished Teacher Educator (2001).

Dr. Sikula's fields of specialization and areas of research include educational leadership, schooling reform, history and philosophy of education, and educational sociology.

John Sikula
Regional Centers Executive Director
Ashland University
401 College Avenue
Ashland, Ohio 44805
Phone: 419-289-5751
Fax: 419-289-5949
E-mail: jsikula@ashland.edu

Andrew Sikula, Sr., John's identical twin brother, is an internationally known business educator who has been part of higher education for nearly 50 years. His B.A. degree is from Hiram College in Ohio and his M.B.A. and Ph.D. degrees are from Michigan State University. Dr. Sikula has been a full professor at five different universities where he has served as dean and/or associate dean including Marshall University, California State University-Northridge, California State University-Chico, Chicago State University, and Murray State University. Dr. Sikula currently serves as the Richard G. Miller Distinguished Professor of Management and Business Ethics, Director of the Graduate School of Management, and Associate Dean of the Elizabeth McDowell Lewis College of Business at Marshall University. He first introduced the concepts of Moral Management and Moral Maximization into the academic business and management literature over 40 years ago. He is the author of over 200 books, journal articles, proceedings, reports and papers. He also serves as an expert witness in business ethics court cases.

Andrew Sikula, Sr.
Associate Dean for Academic Programs
Marshall University Lewis College of Business
One Marshall Drive
Huntington, West Virginia 25755
Phone: 304-696-5000
Fax: 304-696-4344
E-mail: sikula@marshall.edu

Is Video Podcasting on Your Playlist? The How-To and Why for Regional Campuses

Steven M. Toepfer
Kent State University—Salem

Abstract

This paper provides an all-in-one exploration of video podcasting and is a resource for those who wish to use and understand the technology. Pedagogical and practical uses are explored within the specific podcast format of video podcasting. Data from a special topics podcast course was examined to assess student interest and learning. Results indicate improvement across all variables and observation regarding student motivation suggests the medium is a highly effective educational tool. Implications for regional campuses are discussed.

Introduction

The scholarly spotlight has recently shined on podcasting: the distribution of media files (audio, video, and other graphically displayed content such as text) via syndicated feeds to which users can subscribe in order to automatically receive new content over the internet to play on a computer, iPod, iPhone, or Apple TV (iTunes, 2009). According to Dixon and Greenson (2006) the key characteristics of a podcast are: 1) file-based downloads as opposed to streaming media, 2) subscription-based content that is enabled by user selection, and 3) the content is consumable on portable devices for playback.

The term "pod" originated from Apple's iPod device which was unrelated to the later term "podcasting." The "casting" portion of the name was derived from broadcasting which originated from radio technology (Ormond, 2008; Economist, Heart on the Street, 2006). The marriage of these two root words has resulted in the popular buzzword, "podcasting." The term is so popular that the Oxford American Dictionary declared "podcasting" the "World of the Year" in 2005 (Oxford University Press, 2005; Skiba, 2006).

University interest has turned its attention toward the medium as a powerful tool for disseminating information. Institutions of higher education provide training and generate original knowledge through the delivery of content. It is likely that podcasting has received significant attention by scholars and teachers due to its pedagogic potential (Krull, 1998; Latchman & Gillet, 2000; McMullin & Owen, 2002; Ostendorf, 1997; Reisslein, Seeling & Reisslein, 2005; Unruh, 2000).

This paper focuses on a specific type of podcast, the video podcast, as a tool for enhancing individual learning and expanding the presence of academic institutions. The case is made that video podcasting is an underutilized and inexpensive resource that can enhance pedagogy under carefully guided circumstances. While information provided here is applicable to any institution the current article focuses on the regional campus. Similar to other institutions, regional campuses can benefit from podcasting by expanding its sphere of influence. However, the technology appears to be an apt match for the regional campus as evidenced by the mission statement of this author's home campus;

> The mission of the Regional Campuses System is to make the resources of the 27th largest university in the country accessible to the citizens of Northeast Ohio. The regional campuses are also charged with the task of delivering a wide variety of area-specific technical education and training to the communities they serve (Kent State University Faculty Handbook, 2009).

To start we take a closer look at what a video podcast is, it's usage by students and faculty, attitudes toward technology, and what is required to create a podcast. A small dataset is then presented, not to generalize, but to exemplify the effect of producing a major-specific, student and content-driven podcast. The paper will conclude with a discussion of the benefits and drawbacks of video podcasting.

Literature Review
How Podcasting Works – The "What-Is" and "How-To"

A podcast is a set of media files (audio, video, and other content such as text) downloaded or "pushed" to a client/viewer (personal computer, iTunes, or MP3 Player) by using RSS or syndicated feeds to which one can subscribe. By subscribing to a podcast the user never has to seek out the source again, instead new content or episodes are delivered (pushed) to the subscription location. This is done with what is called a "Really Simple Syndication" (RSS) feed that is comprised of a few lines of Extensible Markup Language (XML): An extensible language used to create custom commands (figure 1).

```
<?xml version="1.0" encoding="UTF-8"?>
<rss xmlns:itunes=" http://131.123.218.1/hdfs/podcast-1.0.dtd" version="2.0">
  <channel> [...]
    <item>
    <title>Lecture 1 (video): Hardware</title> [...]
    <itunes:author>Steven M. Toepfer</itunes:author>
    <itunes:summary> The Human Development and Family Studies (HDFS)
PodCast is a news broadcast that covers research,
      major happenings in the major, campus events, and more. If you are a HDFS
major at Kent State University or elsewhere,
      thinking about becoming one, or care to stay on the cutting edge of human
development and family issues this is the PodCast
      for you.</itunes:summary>
  <itunes:duration>10:47</itunes:duration>
  <enclosure url=" http://www.bigfatego.com/hdfspodcast/"
        type="video/quicktime"
        length="210092794" />
    <pubDate>Thu, 06 Aug 2009 18:34:00 EST</pubDate>
   </item> [...]
  </channel>
</rss>
```

Figure 1. A podcast is defined by its RSS feed, a text file that delineates the parameters of the podcast's actual content. Clients (iTunes, mp3 players, etc.) monitor the file for changes and require the instruction the RSS feed provides to generate the interface (Figure 2). Users subscribe to the podcast with the URL to this feed. This excerpt shows the HDFS podcast.

RSS code is not typically visible to users, running in the background, and is a text file that provides a URL (Uniform Resource Locator or website address) for the podcast so the client can find the content. The RSS feed provides the podcast's content and generates the interface for iTunes and other clients (figure 2). The RSS method provides new content that becomes available for automatic download on a computer, iPod, iPhone, or Apple TV, etc. This process is often called the subscribe-and-push model (Philippe & Flatin, 2000).
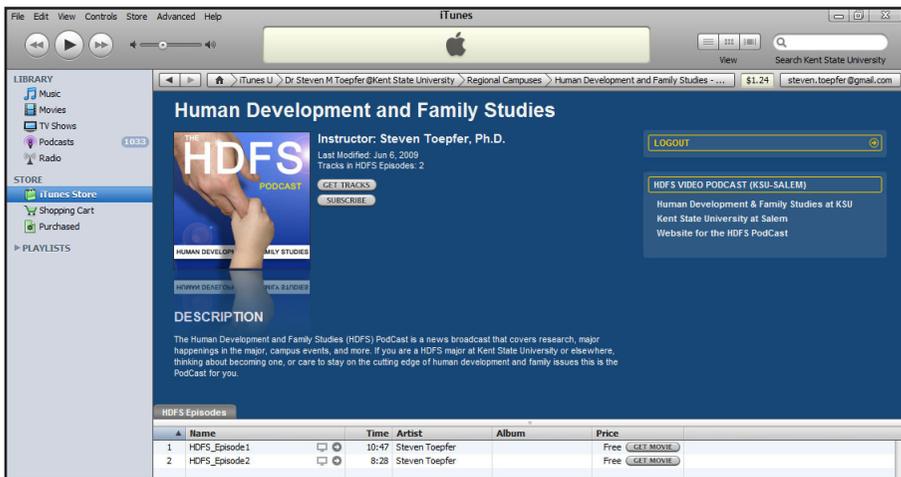
Figure 2. The HDFS special topics course was made available on iTunes (pictured above), its own website, and will eventually find its way to other podcast outlets. As new episodes are produced they will be uploaded to these sites and subscribers will have the new content downloaded or "pushed" to their client when the application is started.

The "subscribe and push" or "push" model is based on the publish/subscribe/distribute paradigm (Philippe & Flatin, 2000) where new content is published, users subscribe, and the content is distributed or pushed to the client application. This publish/subscribe framework (PS) is illustrated in *figure 3* and demonstrates the life-cycle of the internet-based podcast.

Figure 3. Podcast publish/subscribe/push model. Shown is the process involved when a user subscribes to a podcast using the Internet. The symbol labeled "Podcast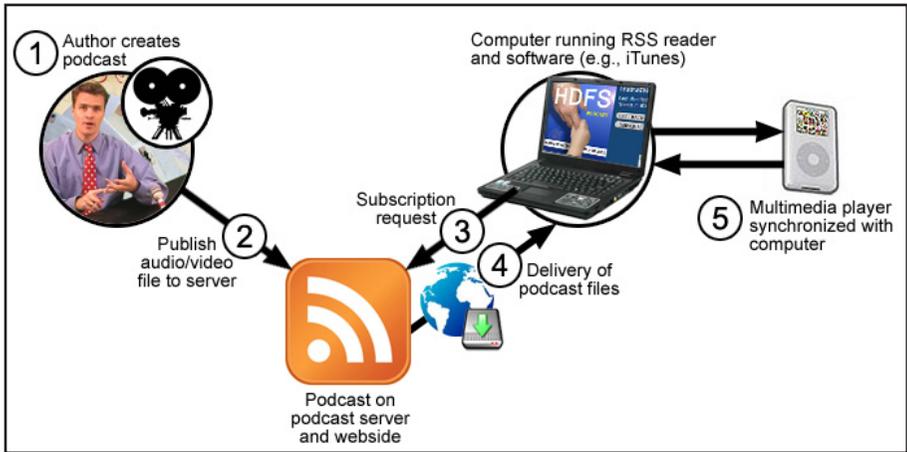 on podcast server and website" represents the actual podcast and is the universal icon which often doubles as a subscription link on websites.

Podcasts are one element in the emergence of second generation usage of the World Wide Web, otherwise known as Web 2.0. This is not a new version of the internet but indicates an evolved new use of it, one that relies on higher bandwidth and new social needs (Alexander, 2006). Web 2.0 is driven by non-linear and dynamic communication, information sharing, interoperability, collaboration, and heightened social-networking via social-networking sites that promote video-sharing, wikis, blogs, folksonomies (tagging and managing content), twittering, Facebook, and even Second Life, and online gaming. These formats have been classified as e-learning and represent what O'Reilly (2004) called the read/write web. The Web 2.0 evolution signifies new directions and abundant opportunities for educators if they are willing to explore the possibilities.

Podcast Prevalence and Usage

A study examined 103 institutions of higher education across

the United States and found that 73.7% of students owned laptops, nearly 100% owned mobile phones or smartphones, and 76.4% owned MP3 players (Salaway, Caruso & Nelson, 2007). Similar findings come from Oliver and Goerke (2007) in Australia, with almost half of freshmen owning a laptop, 96.4% owning a mobile phone, and over 69% owning an MP3 player. The consensus on the pervasive nature of mobile computing and podcasting is high, but how is it used in higher education?

Generally, podcasts have been used in various formats (video or audio) in educational settings as supplemental resources (Bongey, Cizadlo & Kalnbach, 2006; Huntsberger & Stavitsky, 2007) to support written texts (Stanley, 2006) and motivate and engage students (Edirisingha & Salmon, 2007). Others have used podcasting to increase student readiness for exams and supplement assignments (Copley, 2007; Evans, 2008). In other instances podcasts have been embraced more fully, beyond the common supplementary role, making it a major focus of the course (Abdous, Camarena & Facer, 2009).

The Harvard Extension School's Computer Science department uses both audio and video formats with great success with students and the public. Between January and September 2006 they acquired between 6,000 and 10,000 subscribers from over 50 countries where 62% of those were from the United States (Malan, 2007). In terms of how those subscribers used the technology they found that 45% used the podcasts for review and 18% as an alternative to class attendance. Most students (71%) listened to or watched lectures on their computers as opposed to mobile devices.

While some researchers (Malan, 2007) view podcasting as a marginal improvement on existing trends like ITFS (Instructional Television Fixed Service), the primary form of video delivery by universities (Shephard, 2003; Reisslein, Seeling, Reisslein, 2005), its greatest strength escapes no detractor - the ability to reach broader audiences. Others view this type of computer-based instruction for college students in a wholly positive light (Kulik, Kulik & Cohen, 1980). Hilgenberg & Tolone (2000) found students have long held a positive attitude toward video-based distance learning in general. Researchers have found multimedia learning that incorporates audio,

video, animation, graphics, and text has significant benefits (Mayer & Moreno, 2003). Cofield (2002) compared the effectiveness of distance learning with and without embedded streaming video clips and found that video helped hold student attention and even conveyed the presence of the instructor when not in the room.

How and where do students typically use podcasts? Interestingly, one study found that 20% of students listened to podcasts on mobile devices while 80% preferred using their computers (Evans, 2008). A New York study found that 96% of students had mp3 players but only 5% had used them to listen to podcasts of a classroom lecture (McKinney, Dyck & Luber, 2009). The study also examined whether or not podcasts could replace professors and found absolutely no evidence for such a substitute. They did report that students who used podcasts did significantly better than those who did not.

At the time of this writing only 3 of the 8 regional campuses in the university system had posted podcasts on iTunes University. Of the seven available podcasts with content 43% were in video format. A better metric for assessing podcast usage is to look at the number or total tracks. As the second largest university in the state there was a total of 805, counting the four episodes produced by HDFS. The main campus produced 94.4% of those podcasts while regional campuses accounted for 5.6%. Of those podcasts 66.7% were audio only, 22.2% were video, and 11.1% contained a mixture of both audio and video. In the case of those hybrid podcasts the video was usually in slideshow format, using PowerPoint slides or rotating backgrounds of still images. Many of the video podcasts were commercials produced by technically oriented disciplines and faculty development offices.

Educational Effectiveness

Recent studies have found that instructors who use podcasts for various instructional purposes have students are who are more likely to use this technology and to report academic benefits (Abdous, Camarena & Facer, 2009). Educational advantages have been reported by researchers for students who engaged a video podcast-like condition during their courses (Cramer, Collins, Snider, and Fawcett, 2007; Spickard, Smithers, Cordray, Gigante & Wofford,

2004). A podcast-condition is one that incorporates visual multimedia presentation such as a video, PowerPoint slides, or audio clips. The "podcast-condition" is emphasized in order to differentiate it from the copious research on, and use of, various other technologies. It is tempting to draw the conclusion that all technology is the same and over generalize findings across formats and domains.

There is ample research indicating that podcasting is effective when it is course and curricula driven with a clear purpose and rationale for its instructional use (Copley, 2007; Herrington & Kervin, 2007). Kurtz, Fenwick and Ellsworth (2007) report that students who had used podcasts of classroom lectures for review received higher course grades than students who only listened to class lectures while in their classrooms. Not all research indicates that podcasting is academically advantageous. Some researchers repudiate the benefits of podcasting (Stephenson, Brown & Griffin, 2008) while others (Lee, Miller & Newnham, 2009) call attention to the paucity of empirical evidence on its true impact. Another way to assess the effectiveness of podcasting is to examine the strong appeal among students and public as a way to understand podcasting's ability to reach willing minds.

Students' attitude about using podcasts has been largely positive. Evans (2008) reported that podcasts helped students revise their notes more effectively than the textbook. Other investigators (Cramer, Collins, Snider & Fawcett, 2007) found that students who engaged podcast-like conditions for 100 minutes or more had higher test scores. According to Evans (2008) students valued the flexibility and mobility of mobile learning (m-learning) but the great majority did not employ that aspect of the medium. Instead, they used podcasts at a desktop computer.

Public opinion polls encourage the use of various technologies in the classroom. A survey found that 98 percent of parents believe it is important for students to learn how to use computers even before they graduate from high school (Chmielewski, 1997). Teachers expressed a stronger sentiment in a separate survey. Teachers in the United States ranked computer skills as more important than the study of European history, biology, chemistry, and physics. These secondary education teachers also reported that learning technology was more important

than reading modern and classic American literature or learning practical job skills (Oppenheimer, 1997). This is important because research has shown that younger people tend to hold a more positive attitude toward technology (Ahadiat, 2005; Morris, 1988). These are potential post-secondary students that, according to Kukulska-Hulme & Shield (2007) want to "take control of what they learn" (Kukulska-Hulme & Shield, 2007) and podcasting allows for that element of education on multiple ways; increased flexibility, portability, time-shifting, and the ability to overcome time constraints (Thorne & Payne, 2005). Some suggest this is a more active approach to learning (Klamma, Cao & Spaniol, 2007). These factors are particularly important for the non-residential regional campus student because they commute and tend to hold at least one job. Mobility provides a more dynamic and manual mode that can be custom fit to the residential student's schedule and needs.

Faculty Attitudes Toward Podcasting

It is difficult to gauge faculty attitude regarding podcasting because the literature on the subject is anemic. Faculty and staff in different disciplines use it at disproportionate frequencies and differing ways. However, it is generally accepted that faculty/staff usage is increasing (Lee, Miller & Newnham, 2009).

One way the literature addresses the issue is to assess impediments to faculty use of podcasting. But, even in this regard, much of the literature focuses on the broader discussion of instructional technology rather than podcasts specifically (Ahadiat, 2005). In terms of instructional technology the top five reasons that influence faculty use, in order of importance, are as follows; Improved student learning, equipment availability, clear advantages over traditional delivery, compatibility with course materials, and compatibility with existing materials (Ahadiat, 2005). These can easily be grouped according into the new categories of educational benefits and compatibility. The educational benefits have been, in part, addressed earlier in this article and the emerging literature suggests there are clear benefits, especially when instructors form a clear connection to course criteria, as opposed to use podcasting for

technology's sake (Copley, 2007; Herrington & Kervin, 2007). The issue of compatibility is a little more difficult due to finding creative uses of podcasting as well as the time to learn and create a podcast. Ahadiat (2005) found that time and technical support was also a factor.

There may be some level of stigma or resistance to new technologies and with time as a factor the hurdles may be too much to ask of uninterested faculty. Some researchers have explored the fear of technology with some interesting results. Stephenson, Brown, and Griffin (2008) found that podcasting and similar technologies do not seem to be threatening student opinion of traditional lectures. They found that 93% of students preferred such computer-based learning as a supplement to traditional delivery and still preferred in-class lectures. For faculty concerned that podcasting may replace them Ormond (2009) found that students still want traditional lectures and that podcasting simply provides educators another way to meet today's students in their own environment (Ormond, 2009).

Yet, others are less sympathetic toward faculty and the technology learning curve. Malan (2007) has stated that podcasts of lectures are relatively easy for educators to create. This is most likely true due to the lack of editing involved in recording a lecture. However, it also produces a podcast which is less captivating, depending on the presentation. There are various formats available and potentially limited only by imagination. At this author's university a news format was produced in order to deliver major related content in an engaging and digestible format.

Video PodCast Requirements – Hardware and Software
The type of podcast largely dictates the required equipment and the cost. A simple audio podcast can be made for free with the software that comes with Microsoft (e.g., MovieMaker) or Apple (e.g., iMovie) operating systems. Table 1 shows the range of equipment and associated cost that the term podcast encompasses. An audio podcast can be made for free on a university computer. If the library owns a video camera a video podcast can also be created for no cost. On the other hand, you can spend tens of thousands of dollars if desired. Table 1 provides a snapshot of possible route. It is not a comprehensive list

but is intended to cover more than the average podcaster needs.

Table 1. Video Podcast Equipment		
	Open Source or OS Packaged Software Options (Free)	**Professional or High-End Options (Purchased)**
Hardware		N/A**
Computer*	N/A**	
Video Camera*	N/A**	N/A**
Microphone*	N/A	Directional Microphone
Lighting*	N/A	Lighting w/ "Soft Boxes"
External Hard Drive	N/A	1TB Enclosed Hard Drive
Software		
Video Editors*	MovieMaker WAX ZS4	Adobe Premier CS4[1] ULead
Graphic Editors	Gimp	PhotoShop CS4
Audio Editors	Audacity	Adobe Sound Booth[2]
Screen Capture	CamStudio	
Video Conversion	RadVideo	
Publishing Tools[3]	Mozilla SeaMonkey Quanta Plus Bluefish Microsoft Publisher	Adobe Dreamweaver[1]

*Required equipment. Items with no asterisk are optional. **It is assumed that standard university equipment in either a computer lab or faculty/staff office is sufficient. [1]Professional grade considered best option. [2]Often comes bundled with other software (e.g., Sound Booth may come with Adobe Premier) or other software handles audio tasks, for example. [3]Only necessary if a corresponding website is planned.

Table 1. provides an overview of podcasting equipment but does not address the possible depth and number of choices available for items such as the computer and video camera. Most standard university computers with Windows XP, Vista, or Windows 7 should be able to

process video editing.

The cost of the first semester was about $700 and used equipment the library already owned. The second semester we had the good fortune to be the recipient of an $8500 grant that was used for the professional grade software, laptop, lighting, and HD television camera.

The Studio

The podcast studio can be any location where filming occurs. In most cases this is a classroom (lecture), lab (demonstration), or other (e.g., desk, interview, etc.) space that provides a backdrop and context for the podcast. The studio can be as simple or elaborate as needed. A permanent space for filming has advantages such as controlled lighting, enhancing efficiency, and the ability to create a predictable and therefore comfortable setting for the audience.

The Human Development and Family Studies PodCast Course

The present author conducted a special topics course in the department of Human Development and Family Studies (HDFS) called the "HDFS Major Podcast Course." The major strengthens students understanding of human and family development across the lifespan. The goal of the course was to deliver news and research from the field and provide information about related campus news and events.

The ability to subscribe via RSS feed made podcasting a practical and appealing choice. The video podcast was thought to be more engaging for today's young adults who enjoy and embrace Web 2.0 media (YouTube, streaming video, podcasting, etc.). In addition, the mobile flexibility of the medium would cater to the non-residential lifestyle of the regional campus student population. We know that most people consume podcasts at a desktop computer but it is more adaptable than a class schedule. The class met twice a week for 2 hours and 50 minutes each time.

The class was 100% project based. It was student driven and instructor guided. Students were responsible for creating two video podcasts and a 2-minute audio podcast. The minor audio podcast project familiarized each participant with the Audacity software while

they constructed the tutorial-based episode. Each of the video episodes was grounded in HDFS research, news, and other segments which included a job search for HDFS majors, a look at HDFS graduate programs, an interview with the department chair, and other content such as an "Around Town" segment. The second year class created a "Student Wish List" that focused on campus improvements they would like to see.

The course was organized around student roles. Following the initial lecture regarding podcasting each student played a self-selected primary role: Writer, technical director, project manager, news anchor, technical advisor, etc. The process required teamwork and cooperation. All students were involved in brainstorming and choosing the topics. While continued input was important the roles provided specialized work and a division of labor that was essential for a successful project.

Methods

In-house questionnaires were administered to twenty-one student participants from two sections over the course of a year. A pre and post test was used to assess change in related skills due to the HDFS Podcast course experience. The following variables were of primary interest: familiarity with podcasting, enthusiasm, podcasting as a learning aid for major content, overall project value, motivation, video editing, audio editing, photographic editing, writing ability, general computer knowledge, and public speaking. Each of the questions was rated on a 5-point Likert scale where 1 indicated low scores and 5 signified high scores. Surveys were administered on the first and last day of the 5-week course.

A statistical analysis based on such a small sample (n=21) would not provide enough power to support findings, should they exist. Instead, the present investigation is exploratory. The methodology was intended to measure potential change due to course experience and provide insights into effective versus ineffective components.

Results

Pre-post test results indicated an increase in every variable over the course of the semester. Table 2 shows the pre-post mean scores for

the variables. These variables are grouped into two domains: attitude toward podcasting and technical variables associated with specific skills necessary to produce a video podcast with a production crew.

Table 2. Mean Pre-Post Test Scores (n=21).	Pre-Test	Post-Test
Attitude Toward Podcasting		
Familiarity with Podcasting	2.00	3.38
Enthusiasm for Podcasting	3.62	4.24
Value of Video Podcasting	3.76	4.29
Motivation for Podcasting	3.38	3.90
Team Value in Production	3.81	4.19
Technical Skills		
Video Editing	1.48	2.14
Audio Editing	1.52	3.19
Photo Editing	2.00	2.33
Writing	3.14	3.86
Computer Knowledge	3.43	3.95
Public Speaking	3.05	3.52

Due to the small sample size tests of significance were not conducted. As a result it is beyond the scope of the present investigation to make conclusions regarding what factors may or may not be significant. However, the data is informative in terms of general trends and student experience. Coupled with instructor observations the surveys provide important feedback for the discussion.

Discussion

This article presented three domains of information regarding the use of video podcasts in higher education: the "what-is" and "how-to" summary, a literature review regarding podcast use, and data from a video podcast course. The results provide a well-rounded understanding of video podcasting and support the careful use of video podcasting for educational purposes.

The literature review serves as a detailed guide for learning the technical side of video podcasting as well as a practical guide for getting started. Recent research (Dey, Burn & Gerdes, 2009) has shown that the pervasive barrier that once stood in the way of faculty's use of technology in the classroom (i.e., learning curve, intimidation, etc.) has evolved to a mixed bag of attitudes which "spans stubborn resistance to eager early adoption" (pg. 378). The present literature review attempted to smooth the path to video podcasting by outlining the process.

The data from the HDFS Podcast course showed improvement across every variable. While it is impossible to draw conclusions of significance, it is clear that the course experience had positive effects for students. Possibly the most interesting observation involves student motivation. Pre-post test means indicate what appears to be a modest improvement of .52, but motivation (and enthusiasm) were fairly high prior to the class, suggesting that improvement had less room to grow. Nonetheless, the data fail to illustrate participant behavior on motivation and enthusiasm as well as observation.

Motivation and enthusiasm can, however, be assessed beyond empirical strictures. Observation of motivation over two semesters was striking. Student motivation as illustrated by behavior was higher than any other class conducted by the present author. Both sections of the class ended at 9:20 p.m. but the first semester it was an effort to get them out the door by 10:00 p.m. The maintenance staff changed their hours to accommodate the student's extra efforts. At the start of the second semester the Assistant Dean directed the instructor to avoid such late nights. The instructor conveyed this edict to the second year class. The students, without prompting, asked to come to class an hour early. Most students showed up an hour early for the rest of the semester. They worked hard, appeared to enjoy themselves, and openly expressed great excitement about producing publically available episodes. These students had fun!

Both quantitative and qualitative data from the current study support findings by Lee and Chan (2007) that showed the academic use of podcasting allows for constant accessibility to the educational process while simultaneously enabling more personalized control over

it. The academic use of podcasting allows for constant accessibility to the teaching and learning experience, while enabling the on-demand learner to control and personalize the learning process (Lee & Chan, 2007; Salinas, 2006). Others have suggested this dynamic allows the instructor to better respond to students' needs (Sawatpanit, Suthers & Fleming, 2004). These findings were certainly supported by the HDFS podcast course.

Some factors did not improve as expected, especially the technical skills (e.g., photo editing, writing, computer knowledge, and public speaking). This may be easier to understand when considering the role-centered nature of the class. After the initial lecture students became somewhat compartmentalized in their roles: writers wrote, anchors spoke on-camera, and the technical director worked the camera and managed the set. In the case of photo editing a single person focused on that task. The mean scores for the other 20 participants were unaffected by the experience, assuring that no mean change would be registered. It may explain why larger pre-post differences were recorded in attitude as opposed to the technical domain. The podcast project touched everyone's understanding and attitude but technical skills were isolated to those who used them.

The Importance of Video Podcasting for Regional Campuses
The medium of video podcasting has potential for higher education at large, but the regional campuses may be able to glean from it particular advantages. Based on the literature review, nature of the technology, and data presented in this article there are five primary reasons which make video podcasting a sound resource for the regional campus.

First, video podcasting allows educators to reach mobile and busy students. This is arguably the great majority of the composition of the regional campus study body. While some studies found that most podcasts consumers (71%) prefer to listen/watch lectures on their desktop computers versus mobile devices, it provides flexibility that is otherwise nonexistent. For example, podcasts allow for review at any location with an internet connection. A connection is not necessary if content has been previously downloaded. Video podcasting allows

students to choose when and where they consume material. For the commuter-student that works one or more jobs and has a family it provides an important set of options.

Second, the inherent technical skills necessary to produce a video podcast fit the mission statement of many regional institutions, albeit in a specific way. For example, the Kent State University handbook emphasizes the importance of "specific technical education and training to the communities they serve" (Kent State University Faculty Handbook, 2009). The HDFS podcast course showed improvement in every category assessed, from *general understanding* of the medium to *video editing*. The data supported the notion that technical skills are acquired through the production of major-related episodes. In this case the product was used on the local television station, connecting the university with the community.

The skills inherent in video podcasting meet a larger and growing cultural demand for multimedia options. With estimates that nearly 100% of students own mobile phones or smart phones, 76.4% MP3 players, and 73.7% laptops (Salaway, Caruso & Nelson, 2007), video podcasting and the associated skills necessary to produce them, become a requirement rather than the esoteric practice of a few cutting edge "techies" who enjoy exploring electronics. Video podcasting begins to fit like the proverbial hand-in-glove relationship it already is for many young students. It would behoove regional campuses to provide a glove that fits. Podcast technologies meet a growing social need which video podcasting is a major part (Alexander, 2006). This is no small matter when graduates are seeking jobs. Evans (2008) points out that stronger support for podcasting exists in the secondary sector, compared to higher education, which makes such knowledge more valuable as a transferable skill set.

Third, the dissemination of information is vastly increased by online content because it allows the end-user to consume materials wherever they wish. A regional campus has the opportunity to walk with a larger footprint by making content available via podcast. Malan (2007) stated that the greatest strength of online content such as podcasting is the ability to reach audiences. A regional campus often reaches into the local community to find students who may

not otherwise be able to attend a residential school. Simultaneously, delivering content in this way makes podcasting a powerful advertising tool.

Fourth, video podcasting is inexpensive. Most campuses already have the resources to produce video content with the hardware and software that already exists in its libraries and computer labs. The first semester of the HDFS Podcast course was conducted for approximately $700. The second semester was benefited from an $8500 award but that investment was more than enough to establish a semi-permanent high quality studio for the entire campus. The equipment purchased with those funds further improved production quality and streamlined the production process, especially with regard to capturing and editing video. This allowed students to focus on creating episode segments and major related content.

Fifth and possibly most significant, video podcasting engages students and improves motivation. Hilgenberg & Tolone (2000) found students have long had a positive attitude toward video-based distance learning in general. The HDFS Podcast class showed how invested students can be when engaged with the medium. Limited quantitative data restricted our ability to generalize but qualitative observation spoke volumes. Students willingly stayed late and came to class early. They proudly took ownership over the project and showed a strong desire to present a professional end-product to the public. A pronounced level of perfectionism was apparent. Students demonstrated great excitement for sharing their work with others and they enjoyed it.

Conclusion

The goal of the HDFS Podcast course was to empower the student through video podcasting and the purpose of this article was to demonstrate how. The literature review and data was intended to outline the "how-to" of video podcasting and make a case for its well-planned use to meet the goals of higher education, particularly at a regional campus. The data from two semesters provided a modicum of support for both technical benefits and the powerful motivating nature of the work.

In the spirit of social constructivism (Vygotsky, 1962; Berger & Luckmann, 1966; Searle, 1995; Kukla, 2000) students were inspired and educated, as a result of their participation in the course, in formative social interactions. The course format (news broadcast) required high levels of teamwork and cooperation in order to function. The syndication of the podcast episodes was a motivating agent which created a type of learning community which inspired creativity, prompted them to grapple with content from the major, and marshaled pride and ownership of their work. In doing so, it found harmony with the university mission statement and connected the students and campus with the community.

Most importantly, students reported learning from the podcast experience. They learned on the technical level and enhanced their knowledge of major content. Students enjoyed the class and flexed their creative muscle to produce a professional video podcast for public consumption. If for no other reason, educators should consider video podcasting an inexpensive and powerful tool for engaging and inspiring students.

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Biographical Information
        Dr. Steven Toepfer is an Assistant Professor of Human Development and Family Studies at Kent State University, Salem. He teaches undergraduate and graduate courses on interpersonal relations and the family, child development, adolescent development, parent-child relations, and more. His research is primarily focused on intentional activity and well-being, family cohesion and emotional distance regulation, and the multi-method assessment of individuals and family systems. He has published a book and a variety of papers in professional journals on these subjects. He lives in North-East Ohio with his wife, three-year old son, and a fabulous cat named FattyLumpkin.

Use of Blackboard to Support and Mentor Reading Practicum Participants

Lynn C. Walsh
Ohio University—Southern

Abstract

  Blackboard Academic Suite, an online management system, was used to support and mentor Ohio University Southern students enrolled in a reading practicum. Practicing teachers offered support and assistance through Blackboard's discussion board. While many reading courses are required in the preparation of literacy instructors, the addition of the discussion board seemed to add tremendous benefit to this particular practicum. This benefit was seen in the reflections posted by the pre-service teachers and in the dialogues that took place on-line. Blackboard's format can be easily adapted to facilitate other courses involving field experiences and internships.

Use of Blackboard to Support and Mentor Reading Practicum Participants

  Blackboard Academic Suite, a course management system, offers umbrella access to technology tools and practices that allow effective teaching and engaged learning. (Carmean & Haefner, 2002) The discussion board component in Blackboard Academic Suite allows instructors to post questions in a discussion forum, so students can answer and respond to each others' answers and opinions, thus facilitating discussion without meeting face to face. An added plus is that both the instructor and students are able to access the discussion format at times most convenient for them. Students do not always have to learn from the teacher, they can also learn by discussing problems, beliefs, and expectations with each other. This technology supports meaningful learning as it becomes a "mindtool" as well as a productivity tool. Mindtools are computer-based tools and learning environments that have been adapted to function as intellectual partners with the learner in order to engage and facilitate critical

thinking and higher order learning. (Jonassen, 2000)

As educators, we know that learning is enhanced when it is more like a team effort than a solo race. We know that good learning, like good work, is collaborative and social, not competitive and isolated, and that working with others often increases involvement in learning since sharing one's ideas and responding to others improves thinking and deepens understanding (Clickering and Ehrmann, 1996.) Discussion formats such as the one in Blackboard Academic Suite can facilitate enhanced, meaningful, and collaborative learning.

The Discussion Board component in Blackboard Academic Suite was used to facilitate the field experience in the Reading Lab Practicum that includes an application of a developmental approach to problem cases in reading instruction, participation in diagnostic examination, facilitation of parent and teacher conferences, establishment of individual procedures in tutoring, preparation of a case study report, and a weekly group discussion period. Blackboard was the only means of discussion and the pre-service teachers were able to take control of their own learning, note failures, plan ahead, and reflect on other classmate's entries.

Course Design

Participants in this course included both practicing and pre-service teachers. Three practicing teachers, representing several area school districts, enrolled in the course to receive college credit toward renewing their licensure or to acquire a reading endorsement. Along with these practicing teachers, six pre-service teachers were enrolled in the course. The pre-service teachers were taking the course to add a reading endorsement to initial licensure. The discussion board was incorporated in the course as a means to meet the needs of both groups. The practicing teachers were unavailable during the day when the pre-service teachers were on campus and the pre-service teachers could gain much from the practicing teachers' experiences.

The practicing teachers met with the pre-service teachers the first class period to became acquainted and then offered support and mentoring throughout the remainder of the quarter. This support and mentoring was provided through the on-line discussion board

facilitated through Blackboard Academic Suite.

Initially as the instructor, I felt the need to facilitate discussion by requiring responses to some specific questions. Both pre-service and practicing teachers were asked to account their successes and challenges in tutoring their students and to reflect on three things they learned throughout the course of the quarter. All participants were required to share an observation weekly and to respond to two statements made by another participant. Overall, responses reflected by the pre-service students about the students they were tutoring indicated that they observed,

- reading fluency increase,
- automatic use of several reading strategies modeled during tutoring,
- improved writing skills,
- the use of inflection by students when reading, and
- the effect that positive reinforcement had on the tutored students performance.

These observations directly reflected the material presented in the text. The pre-service teachers indicated that they enjoyed teaching reading especially one-on-one and they found the students they tutored eager to become better readers. They discovered that the tutored students seemed to respond favorably to positive support along with repetition and practice. In reflecting about what they had learned as tutors, the pre-service teachers saw that any progress was worthwhile and that patience on their part was critical. Practicing teachers' reflections and responses reinforced the pre-service teachers' observations. Most interesting were the questions that the pre-service teachers asked the practicing teachers, these questions seemed to connect to the responses and statements posted in the discussion board.

Specific Question Responses

While the above responses were somewhat anticipated, the specific questions asked by the pre-service teachers of the practicing teachers produced some beneficial knowledge. The practicing teachers offered real life responses to many questions that the students had

while testing and tutoring their students and the collaboration had the affect of reinforcing the classroom theory and textbook material. Certainly, it appeared that the pre-service teachers felt comfortable in asking additional questions of the practicing teachers.

Some specific examples of this collaborative learning included specific questions for the practicing teachers. One set of questions asked by a pre-service teacher was:

- How do you separate the children's home lives from their school lives?
- How do you not give extra slack to a child when his/her father just left for Iraq? How much slack is too much?
- How do you decide who really is having trouble with a problem at home and who is just lazy?

These questions and concerns were echoed in the majority of the questions proposed to the practicing teachers.

Responses from Practicing Teachers Included
- It is hard to separate the child's life from home to school. The child brings any troubles to school with them.
- It is up to the teacher to try to help this child. If you basically know what the problem may be, then sometimes a group discussion with your class will help. This way it does not put this one child "on the spot". Hearing answers from other children can help this child.
- This may be a good time to have a parent conference.

Another Observation Followed by a Question was
- Lately, I have noticed that (well always noticed) that teachers are teaching to the students in the middle of the road, especially with reading. The lower students get intervention for help and the higher students are essentially ignored for a job well done. What are tricks, tips, or techniques that you use to motivate your higher students to become better readers, other than using AR (Accelerated Reader) or something equivalent to that?

The Responses Included:
- I have learned from a veteran teacher (30+ years) that students can be reading a story at 2nd grade level, but you can allow them to look at the story on several cognitive levels.
- Grouping….Grouping…Grouping
- With below level students focus on vocabulary and making sure students understand the purpose for reading the story, the main idea, and can give you an oral or written response to the sequence of story.
- With above level students have them compare and contrast with other stories they have read, allow them to look up the author on the Internet, or take a section from the story and have them rewrite it. Have them change/add adjectives, synonyms, etc. Then have the students read their new version to their classmates.
- It only takes a few small changes to make a big difference in the life of a student.

Yet Another Pre-Service Teacher Asked this Series of Questions of a Practicing Teacher:
- What is the best way to get a parent to have their child tested after asking multiple times to do so?
- What is the best way to get student's interesting in reading something they are not particularly interested about, and
- What is the best way to get parents involved in their student's reading?

A Practicing Teacher Responded
- About parents; some are receptive to helping their child at home, give them extra books, encourage the child to talk about their day at school and then if they have their reading book, have them read to the parent. Some parents will not care even if you tell them their child may fail….this is so sad and here is a challenge for the teacher to find a relative, a brother or a sister, to help at home. You cannot change parents, they are either interested in their child's work or they are not …sad, but true.

Many of the above responses from the practicing teachers often
touched on issues not focused on the textbook and most probably
would not have been addressed in classroom discussion; however, they
were brought up in the on-line discussion.

Participants' Final Thoughts
        Some final thoughts about what both the pre-service and
practicing teachers felt they had learned were shared in the discussion
board and included:

- I have learned that time can get away from you when so many
  things are going on in the classroom.
- I have also learned that high interest materials are essential to
  helping any student. If they are enjoying while learning it can
  make some of the hardest jobs seem simple.
- I have learned a lot from my peers in this class as I have read
  their comments on Blackboard. I can relate to some of them
  and to the others I think, "What a challenge they have!" I have
  learned from my fellow classmates several good ideas and
  intend to utilize them in teaching even if I am substituting; I
  want to thank all my classmates for all their ideas and their
  hard work this quarter.
- I have learned that no matter how much you prepare you can't
  change the weather and you just have to settle when things
  cannot get done because of unforeseen causes.
- I have enjoyed the dialog between practicing teachers and soon
  to be teachers. To all of you….keep the faith and remember
  why you chose to teach. It is all about making a difference in
  the life of a small person :) I would love to keep in touch with
  peers from other districts, if you would like to email/dialog
  with me I can be reached at …….
- Oh…I love that you identified the most important part of
  teaching a child. It is letting them know that you care about
  them. If all it took was someone speaking/telling the process
  (instruction) then a computer program that spoke could be a
  teacher. It takes personal contact.
- Thanks for reminding us all!

Conclusion

  The discussion board in the Blackboard Academic Suite combined with the participation of the practicing teachers certainly enhanced the quality of the pre-service students' experience in this reading practicum, while contributing to a quality learning experience. The discussion board's use created a team effort where practicing and pre-service teachers became intellectual partners engaging in critical thinking. While many reading courses are required in the preparation of literacy instructors, the addition of the mentoring by practicing teachers seems to add a tremendous benefit to this particular practicum. This benefit was seen in the reflections posted by the pre-service teachers and in the dialogues that took place on-line. Initially questions were posted to initiate conversation, but those questions did not need to be continued beyond the first week. The addition of the on-line discussion/mentoring may also have contributed to the increased quality of the case studies submitted by the pre-service teachers at the end of the quarter.

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Biographical Information

      Lynn Walsh is an Assistant Professor in the Education Department of Ohio University – Southern, where she teaches language arts methods and reading courses. Lynn acts as Director of the Education Department at Ohio University Southern. She earned her Ed.D. in Curriculum and Instruction from Baylor University and can be reached at walshl@ohio.edu or Ohio University Southern, 1804 Liberty Ave., Ironton, OH 45638.

Views from the Branch: Faculty, Staff, and Students' Perspectives of Communication and Competition with a Main Campus

Jason S. Wrench
State University of New York at New Paltz

Shannon Brogan
Kentucky State University

Tisa Brown and Charles Pennington, III
Ohio University—Eastern

Abstract

The current study attempted to identify a major problem in the management and functioning of branch campuses that result because of perceptions of cooperation and competition with a main campus. This study found that branch campus participants' perceptions of the main campus' cooperativeness or competitiveness directly impacted how they interacted with and experienced the main campus. Specifically, this study found that cooperativeness positively related and competitiveness negatively related to branch campus participants' perceptions of communication satisfaction with the main campus, the belief in branch and main campus cohesion, positive attitudes towards the main campus, and the belief that the six campuses of Ohio University (5 branch and 1 main) were truly "one-university." Furthermore, the study qualitatively illustrated some of the problems Ohio University's branch campuses have with their main campus.

Review of the Literature

In 1862 the United States Congress passed the Morrill Act that universalized higher education within the United States by providing land and money for every state to establish institutions of higher education. For the almost a century, most states relied on their flagship institutions to provide higher education opportunities to its states citizenry. According to The College Board (2008) there are currently

over 2,000 institutions that offer baccalaureate degrees or higher and over 1,700 community and technical colleges. Of this nearly 4,000 institutions of higher learning within the United States, 640 of these institutions providing baccalaureate degrees belong to some kind of university system, and more than 1,000 of the two-year institutions belong to some kind of system. A profound organizational change has taken place in many post-secondary educational institutions over the last four decades; single institutions have formed public multi-campus systems in order to coordinate statewide systems of higher education (Creswell, 1985).

According to Schuman (2009), a "branch" campus is one that is exists within a university system of some kind. One of the most interesting relationships then becomes the one that exists between a system's main campus and its various branches. While Schuman (2009) notes that the term "branch" is not a term agreed upon universally by various institutions of higher education, he argues that branch is "…probably the most common descriptor used by the public and perhaps by system administrators and inhabitants of main campuses. Because it implies a kind of dependency and subsidiary role, it tends to be a term that is viewed unfavorably by those it describes" (p. 5). Other commonly used terms are affiliate units, coordinate campuses, regional campuses, and satellite campuses. For the purposes of most academic work examining university systems, the terms "main campus" and "branch campus" are typically used to describe the superordinate and subordinate positions within the system, so we will use those terms within this paper as well. No matter what we call these types of campuses, Schuman (2009) notes that "Branch campuses are an important, large, and diverse segment of our higher education universe, but they are poorly understood and often undervalued" (p. 8). One major reason for the poor understanding of branch campuses is because they are largely ignored in academic literature (Fonseca & Bird, 2007).

The goal of the current project is to provide an empirical analysis of the faculty, staff, and students on branch campuses' perceptions of their relationship and interaction with a main campus. To understand these relationships, an analysis of the research

examining university campus systems will occur, which will be followed by an analysis of the Ohio University system.

University Campus Systems

McCroskey and Richmond (1992) define an organization as "as a group of people working together to achieve common goals" (p. 1). McCroskey and Richmond (1992) further state that all educational organizations are systems, and the units or parts within the educational organization are interrelated and depend upon one another to make the whole organization function. While McCroskey and Richmond's (1992) book examines educational organizations in the context of public education and higher education institutions, branch campuses function as independent organizations that belong to one overarching organization. Each branch campus has many parts of a traditional organization (e.g., hierarchies, norms, networks, cultures, and environments), but branch campuses also belong to a overarching organization that has its own set of hierarchies, norms, networks, cultures, and environments. To understand how branch campuses function as both autonomous organizations and as organizations within a larger system, a discussion of the nature of university campus systems will be explored.

University campus systems (also referred to as branch, multi-site, or multicampus systems) have multiple locations that generally have a single head who is also the head of the largest, or main, campus, which serves as the single faculty governance body that speaks for all of the faculty on matters of curriculum, academic policies, and faculty membership (Schuman, 2009). Campuses with branches are characteristic of large flagship universities that formed these branches in response to demands for regional coverage often before the full flourishing of their states' comprehensive college and university systems. Multi-site institutions are characteristic of large urban community colleges that have enrollments and geographic catchment areas that are too large, or political districts that are too disparate, to be served by a single site. In such cases, it is possible to have "system like," multi-site campuses within true multi-campus systems (Gaither, 1999).

According to Gaither (1999), the essential function of public multi-campus systems is to advocate on behalf of certain state needs and perspectives that may not otherwise hold high priority with faculty and campus presidents. These needs commonly include issues related to accessibility or racial and gender diversity. Branch campuses serve accessibility and state needs for nontraditional students with personal, employment, and distance limitations. For example, Morrill's (1991) results of a survey concerning the University of Washington and the adult population of the state led to the creation of a regional campus in Tacoma, Washington. Morrill found over 250,000 adults between the ages of 25 and 44 had some community college or university education, but were geographically bound and could not pursue their baccalaureates, so the "issue this became one of social injustice and regional equity" (p. 2). The students who attend the Tacoma campus are "mostly older, working people with families, people who simply couldn't go to school if they had to go far from home" (Rivera, 2000, p. B1). This situation exemplifies the need for regional campuses, and demonstrates how important such sites are to nontraditional students with other responsibilities.

Thus far this discussion of multi-site campuses has been fairly general and lumped the various types of complex universities into one overarching category "multi-campus systems." McGuinness (1991) proposed that differentiating between the different types of multi-campus systems is important. For the purposes of this discussion, McGuinness describes three distinct multi-campus systems: multicampus universities, university systems, and multisite universities. Multisite universities generally have one chief administrator who functions as the head of the system but is not the chief administrator on one of the campuses within the system. The University of California and the State University of New York systems both fall into this category.

The second type of multi-campus system is the university system. A university system is differentiated from the other two systems because of three characteristics: 1) the system head is not the senior academic leader for all campuses within the system; 2) the various institutions within the system vary in terms of mission

and prestige; and 3) the evolution of these systems occurred because of consolidation of institutions and not as a result of specific system planning. The most notable system that falls into this category is the University of North Carolina system.

The final type of multi-campus system is the multisite university. A multisite university is characterized by strong, centralized control over academic programs emanating from the main campus. "All academic policies and programs are those of the main campus and faculty members are linked to the academic departments of that campus" (McGuinness, 1991, p. 2). For these institutions, the branch campus functions as an offshoot of the main campus and attempts to replicate the curriculum of the main campus. According to Dengerink (2009), the term "branch" for multisite universities refers to something like a tree branch, "an entity that is part of or an extension of a larger group located in a different part of a geographic area from the parent organization, somewhat like a bank branch" (p. 17). The three major systems in the state of Ohio are all examples of multisite universities (e.g., Kent State University, Ohio State University, and Ohio University).

Basic Structural Problems in Multi-campus Systems

As with any large, diverse organization, multi-campus systems are plagued with a number of problems. The two most commonly articulated problems relate to mission and treatment of branch faculty and students. As Kalikow (2009) noted, individuals working within a campus system will innately run into situations where the goals of the branch and the goals of the main campus are in competition with one another. Generally, the goals of the branch campus will be usurped by the goals of the main campus. Furthermore, in all multi-campus systems there is a finite resource pool. The more sites that exist within the system, the greater the strain placed on this resource pool. In essence, various branches often end up competing not only with the main campus for resources but with other branch campuses as well.

The second most commonly articulated problem that exists between branch campuses and main campuses is the treatment of branch campus faculty and students. There are inherent differences

between teaching at a main campus and teaching at a branch campus (Poling, LoSchiavo, & Shatz, 2009). Not only is there a stronger emphasis placed on teaching on branch campuses, but branch campuses also have higher teaching loads when compared with their main-campus counterparts. Additionally, Schuman (2009) noted that branch campus faculty generally have greater advising and service expectations when compared with their main campus counterparts. Historically, the increase in teaching, advising, and service by branch campus faculty was offset by a decrease in research expectations. However, as branch campuses have attempted to become more competitive in an increasing market, the need to set themselves apart by attracting top-notch teacher-scholars has increased the requirements for research in the promotion and tenure process at branch campuses in the United States (Padilla, 2009; Poling et al., 2009). While the nature of branch campuses has changed, there is still a perception within academia that individuals who teach on branch campuses are somehow "less than" those who teach on main campuses (Esterberg & Wooding, 2008; Padilla, 2009; Wolfe & Strange, 2003). Wolfe and Strange (2003) note that this perception that faculty on branches are seen as "less than" can also impact how branch campus faculty view themselves with some faculty viewing a job on a branch campus as a "'second-rate' appointment" (p. 357).

Ineffective Branch-Main Campus Communication

        One of the most problematic areas that can occur within the branch-main campus relationship is the quality of the communication between the various entities within a multi-site system. Several factors play a part for any regional campus system to communicate effectively with its main campus. If these factors are not adequately met, communication problems can lead to poor relationships within any dispersed organizational system (Doerfel & Taylor, 2004). The two most prominent communication problems that exist within a multi-site university system are consistency of branding and competitive versus cooperative communicative messages.

University Branding

Barton, Book, and Heaphy (2009) note, "One of the major communication challenges we face in academic administration is to maintain the appropriate balance in blending the university's 'family brand' and serving the needs of constituents of diverse regional campus communities" (p. 196). Specifically, Barton et al. (2009) note that within the Kent State University system students on the various branch campuses are receiving Kent State University degrees. As such, "This requires a degree of control being exercised by the central campus and administration to make sure that certain standards are maintained in advertising and that the message sent out is consistent with Kent State's overall image" (Barton et al., 2009, p. 196). While the degree may be a Kent State University degree, Barton et al. note that students on branch campuses tend to identify more closely with their local branch than with the main campus. In essence, while the Kent State brand is clear on all promotional materials, the various branches must have flexibility in advertising and promotion to reach their specific target audiences. As differing needs and goals are recognized, branch and main campuses often end up in a situation where both competitive and cooperative communicative messages are sent and received.

Competitive vs. Cooperative Communicative Messages

Kalikow (2009) noted that branch and main-campuses often have incongruent goals. These incongruent goals innately create an atmosphere of competition. Deutsch (1973) originally proposed competition-cooperation theory to explain the impact that competitive and cooperative messages have on organizational communication. Specifically, "competitive climates beget deceitful, coercive, threatening, suspicious communication, while cooperative climates beget supportive and empathetic communication, trust, and openness" (Doerfel & Fitzgerald, 2004, p. 554). Additionally, Pfeffer and Salancik's (1978) resource dependency theory posits that organizations that are reliant on another organization for resources will be more cooperative in their interactions with the organization that has the resources. On the other hand, those organizations that have

the resources will be viewed as competitive by those organizations needing resources. In the case of branch and main campuses, the main campus is viewed as the resource-rich organization and the branches are dependent upon the main campus for resources. Barney and Hesterly (2006) noted that "more and more frequently, competition seems to manifest itself between groups of co-operating firms rather than simply between firms" (p. 133). Ultimately, multi-campus systems emphasize competition between the branch and main campuses because of the resource structure.

     However, not all institutions existing in competitive networks must behave in a competitive manner. Lindskold, Betz, and Walters (1986) found that competitive conflict behaviors could become cooperative if one of the interactants behaved in a cooperative manner. Specifically, Lindskold et al. defined cooperative communication behaviors as ones that are honest, conciliatory, and responsive. Overall, "cooperative and competitive relationships produce processes and acts that encourage continuation of the established atmosphere that may provide an intuitive bias telling us that conflicts are intractable and difficult to change once escalation spirals begin" (Lindskold et al., 1986, p. 113). Furthermore, "Our naïve understanding of social interaction tells us not to ruin a trusting and cooperative relationship with deceit and exploitation; perhaps it should tell us to 'ruin' competitive and distrusting relationships with honest, conciliation, and responsiveness – all unambiguously communicated"(Lindskold et al., 1986, p. 113). In essence, Lindskold et al. believe that competitive communication behaviors beget competitive behaviors and cooperative communication behaviors beget cooperative communication behaviors. Additionally, Doerfel and Taylor (2004) found the same pattern of cooperative/competitive behaviors in their study examining the Croatian Civil Society Movement. In essence, if individuals within a multi-site university system perceive the main campus as cooperative, their communicative behavior will be different from those individuals who see the main campus as competitive.

Ohio University Campus System
     McGuinness (1991) proposed that there are three common

ways for multi-site systems to be established. For the purposes of the current study, one multisite university was chosen for analysis. Ohio University is a multisite university because the control over academic programs is relegated to the main campus in Athens, Ohio. In addition to the main campus, Ohio University has five regional campuses that were established 1940's and 1950's: Ohio University-Chillicothe (established in 1946), Ohio University-Eastern (established in 1957), Ohio University-Lancaster (established in 1956), Ohio University-Southern (established in 1956), and Ohio University-Zanesville (established in 1939 - Regional Higher Education, 2004). In addition to the five regional campuses, many of the regional campuses also have what Fonseca and Bird (2007) refer to as twigs or "branches of branch campuses served by branch campus faculty commuting from nearby sites" (¶ 4).

The Ohio University system was designed after World War II to help traditional and nontraditional students with personal, employment, and distance limitations seek baccalaureate and a handful of graduate degrees. According to Fonseca and Bird (2007), "79 percent of students attend college in their home state, most within a few hours drive of home" (¶ 3). Students at Ohio University branch campuses are "fundamentally place-bound: limited in their opportunities by financial constraints, family responsibilities, personal characteristics, lifestyle choices, or combinations of these factors" (Fonseca & Bird, 2007, ¶ 3). Because of the place-bound characteristics of the students who attend Ohio University's branch campuses, most of the students desire an education within a 30-minute commuting range. In fact, Leff (2004) quoted Kip Howard, former assistant vice president for enrollment services of Ohio University, as saying "It is possible for a person to stay at home and get an OU education; they can keep their job, go to school part time, work part time and get their degree." As for the actual make up of Ohio University's Regional Campuses and Centers system, Dr. Charles P. Bird (2003), Vice President for Ohio University's Regional Campuses and Centers notes that the regional campuses enroll "approximately 8,000 students per quarter, with an unduplicated annual headcount of nearly 12,000" (p. 4). As an organization that has one main campus

and five branch campuses, the university has attempted to stress the cooperation and collaboration of all six of the campuses through its "One University" branding approach.

According to Rodrick J. McDavis, president of Ohio University, as quoted by Lockhart (2009), "'We may have six campuses, but are one university,' he said. 'We do the same work. We're all about the education of students. We should never forget that each and every day, it's all about the education of students.'" While the branding idea of "one university" is consistent with the university's goals, not all students at Ohio University buy into this idea. In a 2005 article in *Outlook: Ohio University News and Information*, one branch campus student noted, "'The call for regional campus inclusion needs to be addressed … Often regional students feel disconnected from the main campus.'" Overall, the institutionalization of branch campuses is a growing phenomenon, but one that has not been adequately researched.

Rationale

The current study was performed to determine the nature of the communicative relationships between the branch campuses and the main campus at Ohio University. For the purposes of this study, a series of hypotheses and research questions have been posed.

According to Deutsch's (1973) competition-cooperation theory, individuals who enact cooperative behaviors are going to exhibit communication that is supportive and empathetic. Furthermore cooperative communication is also filled with trust and openness. On the contrary, individuals in competitive organizations engage in deceitful, coercive, threatening, suspicious communication. As such, faculty, staff, and students at Ohio University's branch campuses who perceive the main campus as engaging in cooperative communication will have higher levels of satisfaction with the main campus, perceptions of university cohesion, attitudes about the main campus, and the belief in the "one-university" brand when compared with individuals who perceive a competitive orientation with the main campus. Based on Deutsch's (1973) competition-cooperation theory, the following hypotheses are posed:

H1:   There will be a positive relationship between faculty, staff, and student perceptions of main campus cooperative behaviors and communication satisfaction with the main campus, perceptions of university cohesion, attitudes about the main campus, and the belief in the "one-university" brand.

H2:   There will be a negative relationship between faculty, staff, and student perceptions of main campus competitive behaviors and communication satisfaction with the main campus, perceptions of university cohesion, attitudes about the main campus, and the belief in the "one-university" brand.

In addition to the predicted hypotheses, the current study set out to explore qualitative perceptions of the various issues addressed in this study as well.

There are hierarchies, norms, networks, cultures, and environments that play a part in regional campus systems functioning as organizations (McCroskey & Richmond, 1992). [Successful regional campus systems] viewed each other as part of the whole rather than an "us verses them" mentality (Mallon, 2003).

RQ1:   Is there a sense of cohesiveness between Ohio University's regional and main campuses?

According to Mallon (2003), successful branch campuses perceived a sense of independence and openness in their communication with the main campus. On the other hand, individuals who felt they were being micromanaged by the main campus typically reported greater feelings of resentment and alienation from the main campus.

RQ2:   Are the regional campuses satisfied with the communication practices between Ohio University's regional and main campuses?

Criswell (1985) in his study of statewide multi-campus systems found that institutions in these systems maintain their own separate identity. The idea of branding and individual branch identity was also noted as an area of contention by Barton, Book, and Heaphy (2009). "It is our role to create educational opportunities [for the Ohio University regional campuses] in a wide variety of locations, using whatever delivery methods may be available to us that are consistent with our expectations for quality" (Bird, 2003).

RQ3:   Are regional campuses satisfied with the communication within their own campus?

Lastly, the study is setting out to determine if the qualitative comments obtained resemble the quantitative evidence found in this study related to the impact of competitiveness or cooperation with the main campus.

RQ4:   Do regional campuses feel there is a competitive relationship between Ohio University's regional and main campuses?

METHODS

Procedure and Participants
Participants in this study were recruited through a series of e-mails that were sent out at all five of the Ohio University regional campuses (Chillicothe, Eastern, Lancaster, Southern, & Zanesville) to all students, faculty, and staff. All potential participants were informed about the study and encouraged to participate. To participate in this study, participants were asked to fill out a questionnaire online.
Participants in this study were students, faculty, and staff from each of Ohio University's five branch campuses. A series of demographic questions were asked of all participants examining biological sex, age, campus, and length of time on that campus. The overall sample consisted of 284 females (75.5 %), 87 males (23.1

%), and 5 participants (1.3 %) who did not answer the biological sex question. The mean age for the sample was 29.86 (SD = 11.17). The next demographic question examined the campus location of each participant: 111 (29.5 %) participants were from Ohio University-Chillicothe, 89 (23.7 %) participants were from Ohio University-Eastern, 27 (7.2 %) participants were from Ohio University-Lancaster, 130 (34.6 %) participants were from Ohio University-Southern, 5 (1.3 %) participants were from Ohio University-Zanesville, and 14 (3.7 %) did not respond to the campus location question. The last demographic question asked participants to write down how long they had been on that campus. The mean length of time on a campus was 3.99 (SD = 5.14) years. These demographics can also be broken down by the demographic category of faculty, staff, and students.

The faculty demographics for the current study consisted of 15 females (51.7 %) and 14 males (78.3 %). The mean age for the sample was 46.76 (SD = 10.76). The last demographic question examined the campus location of each participant: 2 (6.9 %) participants were from Ohio University-Chillicothe, 8 (27.6 %) participants were from Ohio University-Eastern, 10 (34.5 %) participants were from Ohio University-Lancaster, 7 (24.1 %) participants were from Ohio University-Southern, and 2 (6.9 %) participants were from Ohio University-Zanesville. The mean length of time on a campus was 11.90 (SD = 9.60) years.

The staff demographics for the current study consisted of 21 females (67.7 %), 9 males (29 %), and 1 participants (3.2 %) who did not answer the biological sex question. The mean age for the sample was 44.03 (SD = 11.50). The last demographic question examined the campus location of each participant: 1 (3.2 %) participants were from Ohio University-Chillicothe, 4 (12.9 %) participants were from Ohio University-Eastern, 9 (29 %) participants were from Ohio University-Lancaster, and 16 (51.6 %) participants were from Ohio University-Southern. The mean length of time on a campus was 10.31 (SD = 6.23) years.

The student demographics for the current study consisted of 246 females (79.6 %), 62 males (20.1 %), and 1 participants (.3 %) who did not answer the biological sex question. The mean age for

the sample was 27.20 (*SD* = 8.82). The next demographic question examined the campus location of each participant: 108 (35 %) participants were from Ohio University-Chillicothe, 77 (24.9 %) participants were from Ohio University-Eastern, 7 (2.3 %) participants were from Ohio University-Lancaster, 106 (34.3 %) participants were from Ohio University-Southern, 2 (.6 %) participants were from Ohio University-Zanesville, and 9 (2.9 %) did not respond to the campus location question. The mean length of time on a campus was 2.58 (*SD* = 2.65) years.

In addition to the above demographic questions, students were also asked to respond to additional demographic questions. First, students were asked their school classification: 66 of the participants (21.4 %) were first year students, 70 of the participants (22.7 %) were sophomores, 59 of the participants (19.1 %) were juniors, 106 of the participants (34.3 %) were seniors, 3 of the participants (1 %) were graduate students, and 5 of the participants (1.6 %) did not answer the question. Next, students were asked if they planned on finishing their degree on their campus. 216 (69.9 %) planned on finishing their degrees on their regional campus, 66 (21.4 %) did not plan on finishing their degrees on their regional campus, 22 (7.1 %) were undecided, and 5 (1.6 %) did not respond to the question. Of those students who did not plan on finishing their degrees on their regional campus, 26 (38.8 %) planned on transferring to Athens to complete their degree, 20 (29.9 %) did not plan on transferring to Athens, and 21 (31.4 %) were still undecided.

QUANTITATIVE MEASUREMENT

Cooperation and Competition Survey

The Cooperation and Competition Survey was created by Doerfel and Taylor (2004) as a way to measure the extent to which an organizational member perceives her or his organization competing or cooperating with another organization. For the purposes of this study, participants were asked about the cooperative or competitive nature that exists between their regional campus and the Ohio University-Athens campus. The scale consists of 16 Likert-type items

ranging from 1 *strongly disagree* to 5 *strongly agree*. A principle components analysis was conducted of the original scale to verify the existence of two factors, however, one item, "This organization helps my organization gain access to funding," did not account for any of the variance in the two subscales (cooperative vs. competitive). The Cooperative Organizational Behaviors sub-scale consists of 10 items and had an alpha reliability of .90 ($M = 32.78$, $SD = 7.47$). The Competitive Organizational Behaviors sub-scale consists of 6 items and had an alpha reliability of .82 ($M = 13.88$, $SD = 4.13$). The combination of the two factors accounted for 54.76% of the variance.

Communication Satisfaction

Communication Satisfaction in this study was measured using the Generalized Belief Measure created by McCroskey (1966) and Richmond and McCroskey (1996). The Generalized Belief Measure was created by McCroskey (1966) as a way to measure beliefs about specific concepts. By attaining an individual's general belief about a given topic, the researcher can measure the degree to which an individual believes in a given statement. The statement measured in this study was "I am satisfied with my communicative relationship with Ohio University-Athens." The belief statement is then measured using a five item semantic differential scale with seven steps. The Cronbach's alpha reliability for the scale was .97 ($M = 17.02$, $SD = 9.70$).

University Cohesiveness Scale

The University Cohesiveness Scale was created for this study to measure the degree to which individuals perceived a cohesive nature among the various campuses. The scale consists of 8 Likert-type items range from 1 *strongly disagree* to 5 *strongly agree*. A principle component factor analysis of the 8 items was conducted (Table 1), which clearly indicated one primary factor that accounted for 46.28% of the variance. The Cronbach's alpha reliability for the scale was .83 ($M = 20.25$, $SD = 6.26$).

Generalized Attitude Measure

The Generalized Attitude Measure was a scale originally created by McCroskey (1966b) and later validated by McCroskey and Richmond (1989) as a tool for determining someone's overall attitude about a specific subject. The Generalized Attitude Measure is measured using a six item semantic differential scale with seven steps. For the purposes of this study, the Generalized Attitude Measure was utilized to determine the attitude of participants about their own campus (Chillicothe, Eastern, Lancaster, Southern, & Zanesville) and about the Athens campus. The alpha reliability for participants' attitudes about their own campus was .95 ($M = 31.73$, $SD = 11.25$); whereas, the alpha reliability for participants attitudes about Ohio University-Athens was .96 ($M = 25.03$, $SD = 10.73$).

One-University Belief

Participants' beliefs that Ohio University is made up of six campuses that create one university is commonly referred to as the "one-university" philosophy. To measures participants' perceptions of the one-university concept, the Generalized Belief Measure was utilized. The Generalized Belief Measure was created by McCroskey (1966a) and Richmond and McCroskey (1996) to measure beliefs about specific concepts. By attaining an individual's general belief about a given topic, the researcher can measure the degree to which an individual believes in a given statement. The statement measured in this study was "It doesn't matter if you're in Athens or on a regional campus, we're truly One University." The belief statement is then measured using a five item semantic differential scale with seven steps. The Cronbach's alpha reliability for the scale was .98 ($M = 16.79$, $SD = 10.96$).

Qualitative Questions

In addition to the above mentioned quantitative measures, participants were asked to respond to four qualitative questions: (1) "What do you feel would make you and your campus feel more "connected" with the main campus in Athens?" (2) "What Ohio University events do you attend, and at what campus(es) do you attend

events?" (3) "What changes would you like to see made involving the Athens campus and the regional campus you attend?" and (4) "Please list any additional comments you would like to make about communication at Ohio University that this survey may have helped generate." Participants were given ample room on the web-based survey for supplying their answers to the four qualitative questions.

RESULTS

Quantitative Results

To examine the two hypotheses, first a series of Pearson product-moment correlations were calculated between the cooperative and competitive organizational behaviors and the five dependent variables of interest in this study (communication satisfaction, university cohesion, attitude about the main campus, and belief in the one-university brand). Based on the correlational results, the first and second hypotheses were confirmed. Cooperative organizational behaviors were found to be positively related while competitive organizational behaviors were found to be negatively related to communication satisfaction, university cohesion, attitude about the main campus and belief in the "one-university" brand. These correlations can be found in Table 2.

Qualitative Results

To examine the qualitative research questions within this study, dominant themes from the participants that either supported or negated the overarching ideas are presented in italics. For the purposes of our analysis, the comments were not altered in any form. The exact grammatical structure and spelling reported here comes directly from the written comments of the participants. After reading comments from all participants, select quotations that clearly emphasize general themes seen throughout the entire set of answers and not just specific individual opinions were chosen as general representations of the dataset as a whole. The entire set of qualitative data can be gained from the lead author of this study. Furthermore, to limit the amount of space the results take up three answers for each of the research questions were chosen for use in this written analysis.

RQ1:   Is there a sense of cohesiveness between Ohio University's
        regional and main campuses?
        *In order for the students of regional campuses to feel
        like part of the Ohio University family, we need to be
        offered the same opportunities as Athens students when
        it comes to academia. I realize that some things, like
        over 50 majors at regional campuses are impossible
        but at least provide all the curriculum for the majors
        offered at regional campuses.*

        *I would like to see a change in the way students and
        personnel look at the branches. We ARE a part of
        Ohio University. The names "Branch" and "twig"
        (Proctorville Center) are not accurate descriptions as
        to the education you can receive here.*

        *Although we do have different staff, etc., visit from
        the Athens campus it might help to have more of this.
        For example, Athens Career Services office is willing
        to come to regionals and do workshops. This would
        give our students more access to Athens personnel
        and programs. Also, when possible staff/faculty from
        regionals should attend meetings, workshops, etc., in
        Athens that are appropriate to their job duties. From my
        point of view our campus maintains a pretty good link
        to Athens staff for information and help.*

RQ2:   Are the regional campuses satisfied with the communication
        practices between Ohio University's regional and main
        campuses?
        *It would be nice to get an e-mail once in a while from
        Athens that isn't trying to get me a date or telling
        me that the parking lot is closed for a football game.
        How about art shows and poetry readings. College is
        supposed to open your mind to new experiences and
        develop your personal culture, I have seen crowded
        parking lots plenty.*

I wish I would quit receiving emails for free pizza at places on the Athens campus. It is hardly worth a drive from Ironton, OH to Athens, OH for pizza.

I am in a major program that I cannot finish at the Southern campus. So, I have emailed the corresponding department with my questions and concerns. But I never get an answer, so f**k Athens man, but I have no other options but to go there to fulfill all my educational dreams. Plus, I've never been there; it might not be as bad as I think it will be. Hope this helps.

RQ3:   Are regional campuses satisfied with the communication within their own campus?

First of all, I am attending 3 campuses this quarter: Chillicothe, Lancaster and Zanesville, so it was difficult to answer questions pertaining to 1 campus. In the intermittent 30 years that I've attended Ohio University, I've never felt connected, so I don't believe it is generational problem. It just seems that each branch is its own school. When people ask me where I received my (first) degree, I always feel it's necessary to say OU-C - as if it is a different school.

Frankly, I love going to school at OUS, I make very good grades and take my education very seriously. I am concerned with transferring to the Athens campus for a number of different reasons. The overall atmosphere in Athens is that of "partying", "drinking", "skipping class" and generally "screwing up". I'm concerned that even with the best of intentions and study habits upon attending Athens campus my grades will drop. As well, financially, I am not able to live in Athens, or commute. Another big concern for me, and relative to communication is that of being lost in the masses.

At OUS I have and maintain a very close, personal, and positive relationship with the students, professors and staff, I do not think that this will apply at Athens. Finally, I feel that I am an OUS student (not an Athens student) and I would like to be able to have my graduation ceremony at the Southern Campus, where my friends (students and teachers alike) are present and to be recognized along with other OUS students and faculty as well as the ability to formally display my gratitude to the "OUS people" for all of their support and positive reinforcement. I hope that these concerns and comments will be communicated and represented to Athens, since being an OUS student my voice is not often heard.

RQ4:   Do regional campuses feel there is a competitive relationship between Ohio University's regional and main campuses?
This may be a sensitive area and may not relate to this survey. However, in certain Degree program offerings, OU-S is losing students to Marshall, Shawnee State, etc. when the last two years of a given degree offered in Athens is not fully available on/at OU-S Campus be it Telecommunication/Satellite/ Distance Learning, etc. (e.g. BSW in Social Work). It would be nice if those students could finish through OU system/regional campuses. This could potentially generate more candidates for graduate degrees through OU.

The professors in Athens are no better than the professors on my campus just because they are on the Athens campus. I would put any of my professors in Athens and they would be just as successful as they are here.

Faculty with appropriate degrees and experiences should be able to teach any courses taught by equivalent faculty on the Athens Campus. Regional Faculty should receive regular electronic access to departmental minutes, etc. and be invited to collaborate in departmental decision-making.

Discussion

      The purpose of the current study was to examine branch-campus faculty, staff, and student perceptions of their interaction and relationships with the main campus in the Ohio University system. The first part of the study tested whether or not Deutsch's (1973) competition-cooperation theory could be utilized to understand individual perceptions of the branch/main-campus interactions. The second part of the study then examined specific qualitative data to see how individuals on the Ohio University system branch-campuses actually perceived these interactions through open-ended responses. To help us analyze the information gathered in this study, we will examine the quantitative and qualitative results separately.

Quantitative Results Discussion

      Deutsch (1973) originally proposed competition-cooperation theory to explain the impact that competitive and cooperative messages have on organizational communication. Specifically, "competitive climates beget deceitful, coercive, threatening, suspicious communication, while cooperative climates beget supportive and empathetic communication, trust, and openness" (Doerfel & Fitzgerald, 2004, p. 554). In the current study, we hypothesized that branch-campus participants who viewed their campus' interactions with the main-campus as cooperative would be more satisfied with their interactions, have stronger beliefs of university cohesion, have a more positive attitude towards the main campus, and more likely believe that the six campuses (5 branch and 1 main) were truly "one-university." Overall, our findings supported this hypothesis through the correlational analysis seen in Table 2. Conversely, the second hypothesis predicted that branch-campus participants who viewed their campus' interactions with the main-campus as competitive would be less satisfied with their interactions, have weaker beliefs of university cohesion, have a less positive attitude towards the main campus, and less likely to believe that the six campuses were truly "one-university." Overall, our findings supported this hypothesis as well (see the correlational analysis in Table 2).

      Based on these results we can further understand why some

individuals at branch-campuses feel discouraged by or alienated from their main campuses. As an individual's perception that her or his main campus is directly competing with the branch campus increases, the need to compete for resources and the attainment of specific goals occurs. As Pfeffer and Salancik (1978) note, the more competitive a branch perceives the main campus to be, the more likely they are start viewing the relationship with the main campus as innately negative. Furthermore, when an individual sees the relationship between a branch and main campus as competitive, there is an increase in deceitful, coercive, threatening, and suspicious communication (Doerfel & Fitzgerald, 2004, p. 554). The converse is also true. In essence, if campuses in a multi-site system are to effectively communicate, both the branch campuses and the main campus must attempt to establish a relationship built on cooperation.

Qualitative Results Discussion

Most of the comments contributed by faculty, staff, and students on the branch campuses were either negative or critical about the main campus. Numerous concerns of the branch campuses, which were not the focus of this study, were also recognized and analyzed. Many branch campus members feel that Athens looks down on them, treats them like children, or holds back classes or degree programs to force branch students to attend the main campus. Communication from the main campus to the branch campuses can also stand to improve in several areas, and suggestions were made to improve the communication process between the campuses.

Nontraditional students voiced their concerns about being misunderstood by the main campus, and they cited specific examples of how they were being subjugated and apparently punished for being nontraditional students. As the regional campuses were partly created in order to service nontraditional students in underrepresented areas, the nontraditional students' concerns and comments provide a valuable insight into their viewpoint.

Competition can be seen between the main campus and the branch campuses in how comments were made about how the main campus would seem to prefer students transferring to "other

universities" rather than complete their degrees at a branch campus. Faculty, staff, and students of branch campuses also felt there was a lack of respect in the communication from the main campus. This finding is similar to the lack of respect from individuals on main campuses towards branch campus members previously discussed in the literature (Esterberg & Wooding, 2008; Padilla, 2009; Wolfe & Strange, 2003).

Overall, the individuals who participated within this study clearly believed that there is a disconnect that is occurring between the branch campuses and the main campus at Ohio University. While the university purports to be one-university with six campuses (Lockhart, 2009), there is a clear disconnect that is occurring. While this disconnect may be an inevitable part of the branch/main-campus relationship as has been theorized (Kalikow, 2009), the particular disconnect at Ohio University could be an indication of a much wider and systemic problem at Ohio University.

Limitations

The first major limitation to this study involves the use of an internet-based survey as a tool for gathering data. While the internet is a great way for gathering data, it is plausible that the individuals who opted to participate in the study were more likely to have grievances about the branch/main-campus relationship. If there was an actual difference between the population at Ohio University's branch campuses and the sample drawn in this study, the results of this study could be limited. Unfortunately, there is no way to ascertain the difference between the sample and population within this study, so we recommend caution when attempting to politicize the results from this study.

A second limitation arose with regard to problems with the dissemination of the original survey. Several campuses sent the message to their students, faculty, and staff diligently, but other campuses either sent the e-mail late, attached it into the body of another e-mail, or included a faulty URL link. The chain of command at each campus regarding the sending of the campus-wide e-mails also differed at each location, as contacting the person that could

grant permission to send such messages many times did not follow the formal structure normally associated with such institutions. Communication problems involving the university e-mail system also inhibited progress, and the lack of strong participation at the Lancaster and Zanesville campuses limited the number of respondents for our study.

Future Research

From the results of this study, there is evidence that further research could be conducted:

1. Determine if the size of the Ohio University branch campuses is a determining factor for types and the extent of services provided by the main campus.
2. Assess specific working relationships between the main and regional campuses of Ohio University.
3. Determine how students, faculty, and staff at the Ohio University main campus perceive the regional campuses and their relationship with them.

Conclusion

The current study attempted to identify a major problem in the management and functioning of branch campuses that result because of perceptions of cooperation and competition with a main campus. Overall, this study found that branch campus participants' perceptions of the main campus' cooperativeness or competitiveness directly impacted how they interacted with and experienced the main campus. Furthermore, the study qualitatively illustrated some of the problems Ohio University's branch campuses have with their main campus. As a whole, there is little research that empirically attempts to analyze the experience of individuals in this unique organizational context. We hope that this study will cause others to join in the scientific analysis of branch campuses.

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Table 1
University Cohesiveness Scale

Items	Factor Loading
1. All of the campuses truly function as One University.	.78
2. The communication and involvement between all campuses of Ohio University is satisfactory.	.70
3. My interaction with the main campus in Athens has been positive.	.74
4. I feel a sense of community with the main campus in Athens.	.71
5. I feel the university community in Athens views my regional campus in a positive light.	.69
6. I participate in activities at the main campus in Athens.	.59
7. The students, faculty, & staff of my regional campus view the main campus in Athens in a positive light.	.58
8. I feel the main campus in Athens makes an effort to invite/publicize student events and activities to students and faculty at the regional campus I attend.	.63

Table 2
Cooperative & Competitive Organizational Behavior
        Relationships

	Cooperative Organizational Behaviors		Competitive Organizational Behaviors	
	r-value	*p*-value	*r*-value	*p*-value
Communication Satisfaction	.37	.001	-.38	.001
University Cohesion	.62	.001	-.33	.001
Attitude about the Main Campus	.45	.001	-.49	.001
Belief in the One-University Brand	.33	.001	-.28	.001

Biographical Information
        Jason S. Wrench, Department of Communication and Media, SUNY New Paltz; Shannon M. Brogan, Department of Liberal Arts, Kentucky State University; Tisa Brown, St. Clairsville, OH; Charles Pennington, III, Columbus, OH.
        Jason S. Wrench and Shannon Brogan were assistant professors in the School of Communication Studies at Ohio University-Eastern and Chillicothe respectively when this project was initiated.
        Tisa Brown and Charles Pennington initiated this study as part of their degree requirement in Organizational Communication under the direction of Jason Wrench.
        Correspondence concerning this article should be addressed to Jason Wrench, Communication and Media, 1 Hawk Drive, SUNY New Paltz, New Paltz, NY, 12561. E-mail: wrenchj@newpaltz.edu

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Literature's Role in Shaping our Nation

Daniel Carper
University of Cincinnati—Raymond Walters

Literature is often thought to be a reflection of the society from which it came. However, some literature, more than just a product of its society, serves as a catalyst which drives political and social changes within the nation that produced it. These special texts possess the unique ability to reveal truths and serve as rallying cries for significant causes. Nowhere else in the world is this more apparent than in the United States of America. Throughout our nation's history, there have been several great literary creations which have shaken the very foundation of our society and forever shaped our national identity.

Thomas Paine's *Common Sense* galvanized the colonial revolutionary spirit. Alexander Hamilton, James Madison, and John Jay authored the *Federalist Papers* which formed the single greatest argument for the adoption of the Constitution and, to this day, still provide interpretive guidance to those who wish to better understand the law of our land. Harriet Beecher Stowe evoked such great feelings with *Uncle Tom's Cabin* that this single novel is often regarded as being a primary cause of the Civil War itself. Thomas Dixon Jr.'s *The Clansman* significantly contributed to the tone of racism in America at the turn of the 20th century. The Food and Drug Administration (FDA) owes its existence to the work of Upton Sinclair and his harrowing depiction of the Chicago meat packing industry in his novel *The Jungle*. *Native Son*, written by Richard Wright, addressed the social inequalities of African Americans and altered forever the dialogue on the subject of race in America. The environmental movement in the United States is forever linked with Rachel Carson's *Silent Spring* and its somber revelations. In order to best explore these essential works and analyze the ways in which they have shaped our nation, it is most effective to consider them in a chronological order.

John Adams once said that "without the pen of the author of 'Common Sense,' the sword of Washington would have been raised in

vain" (qtd. in Lepore 168). Such high praise from President Adams reveals just how much we, as a nation, owe to the Englishman Paine for writing *Common Sense*. First published in January 1776, this pamphlet helped alter the way that Americans viewed their conflict with Britain. Paine's writings guided the American revolt away from the various acts and proclamations which had originally mobilized the colonists and instead brought a fiery indictment upon the very system which could produce such grievances, stating "that nothing can settle our affairs so expeditiously as an open and determined declaration for independance [sic]" (Paine 38). *Common Sense* sold over 100,000 copies within the first few months that it was published and it bears no coincidence that support for independence drastically increased during that same time period. Paine's pamphlet has had long lasting effects on our society apart from the revolution as well. For instance, Ronald Reagan was quoting directly from *Common Sense* when he exclaimed that "we have it in our power to begin the world over again" (Reagan) as he delivered his acceptance speech at the 1980 Republican National Convention. Our current leader, Barack Obama, also frequently evoked Paine during his successful 2008 presidential campaign (Nichols).

As instrumental as Thomas Paine and *Common Sense* were to our nation's struggle for independence, Alexander Hamilton, James Madison, and John Jay's contribution in the form of the *Federalist Papers*, written under the pseudonym Publius between 1787 and 1788, shines above all other early American literature. The weight that this series of eighty-five essays carries provided a strong argument for the ratification of our Federal Constitution. Thomas Jefferson referred to the *Federalist Papers* as "the best commentary on the principles of government that was ever written" (Taylor 1). In addition to their immediate effect, tipping the scales in favor of ratification, these papers have proven to be essential tools guiding the interpretation the document they so thoroughly endorse. Prominent Chief Justice John Marshall's argument for judicial review in the *Marbury v. Madison* decision specifically cited the seventy-eighth essay of the *Federalist Papers* which implies the right of the judicial branch to wield such a power (Taylor 2). The references to these masterful writings have far

outlived their authors. In the 1999 impeachment trial of President Bill Clinton, both Republicans and Democrats cited specific essays from the *Federalist Papers* in their arguments. For example, Federalist No. 70, which considers the possibility of removing a corrupt president, was widely cited in favor of his impeachment (Taylor 3). The prominence of these essays has shaped our view of the law of our land from the moment they were written and will continue to guide constitutional interpretation far into the future.

Just as the *Federalist Papers* were instrumental to the founding of our Constitution, another piece of American literature found itself at the heart of the document's greatest challenge, the Civil War. Harriet Beecher Stowe's *Uncle Tom's Cabin*, published as a book in 1852, contributed so much to the popular movement against slavery that it is often cited as one of the principal causes of the American Civil War ("Harriet Beecher Stowe"). What made this piece of literature so impactful was not that it presented a new idea (abolitionist literature had been around since before our nation's birth), but that it caused Northern readers to feel a strong personal and emotional connection to the slaves depicted in the novel. Professor Barbara Hochman asserts in her essay, "Uncle Tom's Cabin in the National Era," that the primary success of Stowe's novel was its ability to allow the reader to see slavery "with new eyes" (144). Hochman continues to write that the novel "reshaped the conventional images of fugitive slaves that dominated the news reports, political commentaries, and poetry of the abolitionist press" (144-145). The impact was remarkable; the book had widespread readership in the North, while facing stolid criticism in the South. In fact, *Uncle Tom's Cabin* was so polarizing that Professor Alan Brinkley wrote that "few books in the American history have had so great an impact on the course of public events" (336).

The success of *Uncle Tom's Cabin* has also molded our nation in ways that are not quite so obvious as well. Stowe's writing utilized a popular form of literature called the sentimental novel as a vehicle to convey her social message. This is considered the archetype of the social protest novels of the twentieth century. This literary form was the model used by Upton Sinclair to create *The Jungle* as well as Rachel Carson when she penned *Silent Spring* (Weinstein 13). Both of

these works left their own significant individual impact on our nation's history. Stowe's work, which had incensed the South as much as it had inspired the North, also spawned a noteworthy literary rebuttal from Thomas Dixon Jr.

In considering this rebuttal, it is important to note that not all literature that has shaped America has done so in a positive manner. Thomas Dixon Jr.'s 1905 novel *The Clansman*, the second work of a trilogy, is a work of historical fiction which sought to tell "the true story" of the South. He was inspired to write this novel when he witnessed a theatrical adaptation of *Uncle Tom's Cabin* while he was on a lecture tour in the North. Going as far as to feature a character from Stowe's novel in the first book of this trilogy, Dixon painted free black men as mere animals capable of violence and hinted that the only remedy to the situation that the South found itself in after the Civil War was the formation of the Ku Klux Klan (KKK) and the implementation of segregating Jim Crow laws.

In 1915, D.W. Griffith adapted *The Clansman* into a movie titled *The Birth of a Nation*, considered to be one of the first "blockbuster" movies in American history. The romantic representation of the Ku Klux Klan also resulted in the group's reformation that same year. William J. Simmons, the founder of this new KKK, specifically cited *The Clansman* as his inspiration to do so ("Ku Klux Klan"). In addition, this novel set an obstructionist tone to American politics. South Carolina Senator Benjamin Tillman, making a speech on the Senate floor in 1906, staunchly defended lynching by paraphrasing a portion of *The Clansman* (Magowan). President Woodrow Wilson, a good friend and old classmate of Dixon, had contributed to the aforementioned *The Birth of a Nation* by offering his own views on the reconstruction of the South, which were included in the movie. After viewing the completed film in the White House with Dixon, Wilson stated that the film was "history written in lightning" (Armour 14). The lightning that is Dixon's book reinvigorated the view that, as Wilson himself states, Reconstruction was the North perpetrating "a veritable overthrow of civilization in the South . . . in their determination to 'put the White South under the heel of the Black South'" (qtd. in Ambrosius 690). By reaffirming this Southern Jim

Crow ideology to the public, Thomas Dixon Jr. contributed to a bad tone for race relations early in the twentieth century.

Thomas Dixon Jr. was not the only author from the turn of the twentieth century to leave his mark upon the American identity. The second writer to do so, Upton Sinclair, began his novel with lofty goals in mind. Upon arriving at a hotel near the heart of the Chicago stockyards in 1904, Upton exclaimed "Hello! I'm Upton Sinclair!... And I've come here to write the *Uncle Tom's Cabin* of the Labor Movement!" (Arthur 43). Sinclair set out to accomplish this task by describing the appalling conditions of the Chicago meatpacking industry as seen through the miserable lives of some Lithuanian immigrants. The fruit of his labor was the 1906 novel *The Jungle* which became the driving force behind two important movements in the United States. The first and most immediate of the changes which this book caused was the emergence of what is known as the modern regulatory state. President Theodore Roosevelt read the book and, within half a year of its publication, signed the Meat Inspection Act and the Pure Food and Drug Act into law (Unti). The Pure Food and Drug Act gave birth to what we know today as the Food and Drug Administration. The other important contribution was in the area of "muckraking" or investigative journalism. The precedent this book set still inspires the investigative reporters of modern times. It is interesting to note that while Upton Sinclair's book did have a great impact on America, his ultimate goal of advancing socialism was not achieved. People were more focused on the unsanitary conditions of the meatpacking industry; ignoring the squalid lives of the immigrants as depicted throughout his novel. Upton once said that in writing *The Jungle* he had aimed for his reader's hearts but hit their stomachs instead (Fetherling).

As significant a role as *Uncle Tom's Cabin* played in sparking the Civil War and freeing African slaves in the United States, it was another writer with another substantial book written almost one hundred years later which helped to open America's eyes to the systematic oppression of African Americans in this country. Richard Wright's *Native Son*, published in 1940, did just that. *Native Son* represented a new attitude in black literature. The book was a violent

story about Bigger Thomas, a twenty year old African American living in the Chicago ghetto. Bigger, Wright argues, fulfilled society's expectations of him when he accidently kills a white woman and then purposefully kills his black girlfriend. At the end of the story, Wright suggests that Bigger Thomas is just one of many African Americans who are capable of snapping under these circumstances and that it is the societal pressures placed upon them which are the cause. Leonard Cassuto, Professor of English at Fordham University, states that "by calling attention to the frightening conditions facing black people on both sides of the Mason-Dixon line, Wright's book also helped clear the way for the emergence of Martin Luther King Jr., the Southern Christian Leadership Conference, and the myriad others who fought segregation in the United States in the 1950s and 60s." This book is unquestionably one of the primary works of literature which has augmented our national identity, as evidenced by the groundwork it laid in support of the American civil rights movement.

Just as the civil rights movement owes much to Richard Wright and his novel, environmentalism is forever indebted to Rachel Carson for her magnum opus, *Silent Spring*. In this book, Carson took a stance against the insecticide DDT and claimed its harm to the environment was a growing threat to "large numbers of animals and, perhaps, people" (Brinkley, 867). The book met with stiff criticism from chemical companies which produced DDT and other insecticides, but Carson and her book were vindicated in the end. According to the Natural Resources Defense Council (NRDC), President John F. Kennedy asked the President's Science Advisory Committee to explore the factuality of Carson's claims; the report generated by the committee confirmed the controversial claims that *Silent Spring* had made. The NRDC went on to state that *Silent Spring* changed the entire debate on pesticides from "*whether* pesticides were dangerous to *which* pesticides were dangerous." Thus, this established one of *Silent Spring*'s most important legacies. Chemical manufacturers now carried the burden of proof when it came to the safety of their products. The second important mark *Silent Spring* left upon our nation is the reaffirmation that one person can make a difference with the written word, even in a world dominated by other forms of media.

In Rachel Carson's own words, she was able to make people consider that "man is a part of nature, and his war against nature is inevitably a war against himself. [We are] challenged as mankind has never been challenged before to prove our maturity and our mastery, not of nature, but of ourselves" ("The Story of *Silent Spring*").

From the cradle of our revolution to the bitter struggle for civil rights, many literary works have blazed the path of our nation's development. These authors had a unique ability to galvanize entire movements with their insightful writings and change the course of American history. Literature was the spark that ignited our struggle for independence. It was the convincing argument for the law of our land. A novel written by one little lady managed to bring sectional tensions to a boil and trigger the Civil War. Literature was the throne upon which Jim Crow sat, spreading social injustice across the United States; yet it was also the spark which ignited the civil rights movement. Great literature led to the establishment of the FDA and ensured the safety of our environment for future generations. Its value to our nation is immeasurable and its potential to continue to shape our nation is limitless.

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Biographical Information:
     Daniel Carper is a second year student at University of
Cincinnati – Raymond Walters College. His fields of interest include
history and literature. This paper was written under the guidance of
Rita Kumar, Associate Professor of English at University of Cincinnati
– Raymond Walters College. Daniel will be entering his second full
year in the pursuit of a BA in history in autumn 2009.

carperds@uc.edu
6072 Ash Hill Court
West Chester, OH 45069

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4. Kent State University—Geauga
5. Kent State University—Salem
6. Kent State University—Stark
7. Kent State University—Trumbull
8. Kent State University—Tuscarawas
9. Miami University—Hamilton
10. Miami University—Middletown
11. Ohio State University—Lima
12. Ohio State University—Mansfield
13. Ohio State University—Marion
14. Ohio State University—Newark
15. Ohio State University ATI—Wooster
16. Ohio University—Chillicothe
17. Ohio University—Eastern
18. Ohio University—Lancaster
19. Ohio University—Southern
20. Ohio University—Zanesville
21. University of Akron—Wayne
22. University of Cincinnati—Clermont
23. University of Cincinnati—Raymond Walters
24. Wright State University—Lake