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Creating effective student engagement in online courses: What do students find engaging?

Marcia D. Dixon¹

Abstract: While this paper set out to discover what activities and/or interaction channels might be expected to lead to more highly engaged students, what it found was a bit different. After first creating a scale to measure online student engagement, and then surveying 186 students from six campuses in the Midwest, the results indicate that there is no particular activity that will automatically help students to be more engaged in online classes. However, the results also suggest that multiple communication channels may be related to higher engagement and that student-student and instructor-student communication are clearly strongly correlated with higher student engagement with the course, in general. Thus, advice for online instructors is still to use active learning but to be sure to incorporate meaningful and multiple ways of interacting with students and encouraging/requiring students to interact with each other.

Keywords: active learning, online teaching, social presence, student engagement

There are two primary reasons for studying student engagement in online courses. The first is that online courses are here to stay and growing so we need to do them well. The growth of online courses continues to rise dramatically. In fall, 2005 3.2 million university higher education students in the United were taking at least one online course, up from 2.3 million the previous year (Allen and Seamna, 2006). The second reason is that one of the primary components of effective online teaching (or any other teaching, for that matter) is student engagement. Therefore, it is imperative that we learn what engages students in order to offer effective online learning environments.

I. Effective Online Instruction.

Research into effective online instruction offers three conclusions: 1) online instruction can be as effective as traditional instruction; 2) to do so, online courses need cooperative/collaborative (active) learning and 3) strong instructor presence.

A. As effective as traditional.

Several researchers have found that online students can and often do outperform traditional students (Maki and Maki, 2007). Maki and Maki (2007) found that students were often required to do more in online courses than in traditional courses. They also concluded that, to be effective, online instruction required strong methodology and opportunities for students to interact with each other and the instructor. Other researchers have echoed these findings, discovering that

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online students report learning more and spending more time on task (Robertson, Grant, and Jackson, 2005), being more engaged than traditional students according to the NSSE (National Survey of Student Engagement) averages (Robinson and Hullinger, 2008), having higher achievement and performing better (Conolly et al., 2007; Lim, et al., 2008). Like Maki and Maki, Zhao, Lui, Lai, and Tan (2005) reported that students do better with instructor interaction and communication. The potential for online courses to be as or more effective than traditional courses is there. What does it take to accomplish this? Other research indicates the potential may be realized with active learning strategies.

B. Cooperation/collaboration.

One of the recurrent themes in the literature is the effectiveness of using collaborative activities, group discussions, and other forms of student-student interaction. Gayton and McEwen (2007) found rapport and collaboration between students, thought provoking questions, and dynamic interaction among the top instructional processes identified by instructors and students. They believe an interactive and cohesive environment that includes group work, regular assignments, and solid feedback are needed for success. Levy (2008) found collaborative activities along with other interactions such as reading students' posts were valued by students. Graham et al. (2001) states that a "well designed discussion facilitates meaningful cooperation" (p. 2). Collaborative/interactive activities seem to be a necessary component to effective online instruction.

A few articles state that a variety of instructional methods are needed for effective online instruction (Chickering and Ehrmann, 1996; Gaytan and McEwen, 2007). However, only one researcher mentions specific strategies such as moving away from recorded lectures, readings, homework and tests toward more interactive and active learning environments like virtual teams, games, case studies etc. (Johnson and Aragon, 2003). Active learning is also touted as a way to engage students in the online environment (Chickering and Ehrmann, 1996). However, active learning, like collaboration, is a broad term and can encompass everything from students being given the opportunity to "talk about what they are learning" to students using simulation software and designing "radio antenna" (Chickering and Ehrmann, 1996). One area that deserves investigation is the specific types of active learning or collaboration in online courses that students find engaging. Thus, the first two research questions are posited:

RQ₁: What types of active learning in online courses do students report as engaging?

RQ₂: Is there a difference in the active learning activities reported by high engagement versus low engagement students?

C. Instructor presence.

The third conclusion from the literature is that instructors need to be actively involved in the learning of their students (Gayton and McEwen, 2007; Young, 2006). Instructors should be minimally active in discussions (Dennen, et al., 2007; Levy, 2008; Shea, Li, and Pickett, 2006; Young, 2006) and use email appropriately (Dennen, et al, 2007; Gayton and McEwen, 2007, Levy, 2008). Dennen et al. (2007) did find, however, that too much instructor participation in discussion boards etc. can actually decrease student participation.

Social presence of instructors and students is a concern of online researchers. Social presence is the phenomenon that helps translate virtual activities into impressions of "real"

people. Kehrwald (2008) defines social presence as “performative, that is, it was demonstrated by visible activity; posting messages, responding to others, and participating in the activities of the groups” (pp. 94-95). Such activities offer clues about the individual such as histories, personalities, and current circumstances and help online participants experience “other participants as both real in the sense of being a real person (a human being) and present in the sense of being there in (coexisting, inhabiting) the virtual environment.” (p. 95). “Effective design, facilitation, and direction of cognitive and social processes” are the defining activities of teacher presence according to Shea, Li and Pickett (2006). Several researchers feel that social presence, especially on the part of instructors, is a necessary component to effective online instruction (Dennen, et. al, 2007; Goertzen and Kristjansson, 2007; Hughes, 2007; Kehrwald, 2008; Shea, Li and Pickett, 2006).

Emphasis on the social presence of instructors makes sense in light of research finding that students need to feel connected to the instructor and other students in the course (Garrison, Anderson and Archer, 2001; Lewis and Abdul-Hamid, 2006; Russo and Campbell, 2004; Song and Singleton, 2004; Swan, 2002; Swan, Shea et. al., 2000) as well as to the content being studied. In an online course, where the risk of students feeling isolated is of greater concern (Lewis and Abdul-Hamid, 2006; Ortiz-Rodriguez, et al, 2005; Russo and Campbell, 2004; Song and Singleton, 2004), it may be more important that learning include student to student and student to instructor communication.

What communication activities between students and students and instructors are more likely to help students feel connected and engaged with the course? The last two research questions are:

RQ₃: What types of student-student communication are reported by highly engaged students versus students who report less engagement?

RQ₄: What types of student-instructor communication are reported by highly engaged students versus students who report less engagement?

Finally, given the previous conclusions, both instructor-student and student-student communication should be significantly related to the student’s report of overall engagement with the course:

H₁: Reported level of instructor presence will be significantly correlated with student engagement.

H₂: Reported level of student presence will be significantly correlated with student engagement.

II. Methods.

A. Instrumentation.

Because there was no scale to measure online student engagement, the first stage of the project was to develop a measure of student engagement in online courses. Two student engagement instruments and one measure of interaction within online courses were consulted: The Classroom Survey of Student Engagement (CLASSE) (Smallwood, 2006), the Student Course Engagement Questionnaire (SCEQ) (Handelsman, Briggs, Sullivan, and Towler, 2005) and the Rubric for Assessing Interactive Qualities in Distance Courses (RAIQDC) (Roblyer and Wiencke, 2004). Each of these instruments is a strong tool in its own right. None is appropriate for measuring student engagement in online courses. The first two instruments include items

such as “Came to class without having completed readings or assignments” (CLASSE) and “Raising my hand in class” (SCEQ). The RAIQDC, designed for online courses, asks students to rate such items as “By end of course, most students (50-75%) are replying to messages from the instructor . . .” rather than reporting their own experienced engagement with the course, students are asked to report their perceptions of other students’ engagement with the course, a less than optimal way to measure student engagement.

The Student Course Engagement Questionnaire (SCEQ) was chosen as a foundation because its creators contend that student course engagement consists of four factors: skills engagement (staying up on readings, putting forth effort); emotional engagement (making the course interesting, applying it to my life); participation/interaction engagement (having fun, participating actively in small group discussions); and performance engagement (doing well on tests, getting a good grade) (Handelsman, Briggs, Sullivan, and Towler, 2005, p. 187). These factors make not only intuitive sense as indications of a student’s active pursuit of learning in a course, but are grounded in theories of motivation, self, and mastery/performance orientations by students.

Next, a focus group of online instructors were asked what students who were engaged in an online course would “look like” in terms of skills, emotional, participation and performance engagement. The results of the focus group were used to adapt the Handelsman et al. instrument to the online environment. Some items, such as “Listening carefully in class,” and “Taking good notes in class” were replaced with items like “Listening/reading carefully” and “Taking good notes over readings, PowerPoints, or video lectures.”

Reliability of the pilot with 31 online students was strong (0.95) and the scale correlated strongly with two global items on engagement with the course ($r = 0.73$; $p < 0.01$) and two global items of social presence (getting to know other students and your instructor) ($r = 0.38$; $p < 0.05$), thus supporting face validity.

B. Data gathering.

Online instructors on multiple main and regional campuses of two large Midwestern universities were contacted to request they pass along an email/announcement to their students inviting them to complete the online survey of student engagement. Instructors were contacted via a teaching organization, by using the schedule of classes and by contacting teaching centers to ask them to pass along the request. To give instructors more incentive to participate, they were offered aggregate data from their own course if five or more students participated.

Participants. 186 students from six campuses and 38 courses completed surveys. The sample included students from courses in communication, economics, English, nursing, psychology, sociology, and tourism management. Because of the offer to share aggregate data with instructors and to lessen potential student fears about instructors’ abilities to identify individual student responses, no demographic data beyond campus and course were requested.

Scale validation. An exploratory factor analysis was run to validate the scale measurement of the four types of engagement: skills, emotional, participation and performance. As recommended by Allen, Titsworth, and Hunt (2009, p. 180-182), a predetermined number of factors (four) was entered into a principal axis factoring analysis with promax rotation. An item was only considered for a factor if it had a loading of 0.60 or higher on that factor and no secondary loading of 0.40 or higher. The results of the KMO and Bartlett’s Test were appropriate to continue the factor analysis. Nineteen of the thirty items loaded onto the four factors (see

Appendix A for KMO and Bartlett's Test results and pattern matrix of factor loadings). The 19 items yielded a Cronbach alpha of 0.91 and had a significant correlation with the global course engagement item ($r = 0.67$; $p < 0.001$). Therefore, only the remaining 19 items were used in the rest of the analysis See Appendix B for Online Student Engagement Scale).

Besides the scale of engagement and global engagement items, students were also asked three other questions: 1) What assignments, activities, requirements of this course helped/encouraged/required you to really think about and be interested in the content of the course (just list one or two)?; 2) What assignments, activities, requirements of this course helped/encouraged/required you to interact with the instructor (just list one or two)?; 3) What assignments, activities, requirements of this course helped/encouraged/required you to interact with other students (just list one or two)?

Analysis. The answers to the three open-ended questions were then grouped into categories of ways of communicating and/or activities. For instance, activities to engage with course content included quizzes/tests, papers, application of the content, discussion forums, projects, and lectures/connect session. Ways of interacting with other students included forums, group papers or projects, chats and connect sessions, e-mailing, and peer review. Ways of interacting with the instructor included chats and connect sessions, feedback on assignments, e-mail, forums, and lectures. There was a wide variety of activities in each of the three categories. For each student, the first activity they listed was the one coded.

III. Results.

RQ₁: What types of active learning in online courses do students report as engaging?

Students reported a number of types of activities as engaging. These included application activities (having to apply the concepts to case studies or problem solving); discussion forums about the concepts, labs and group projects, research papers, and current events assignments. To confirm that such active learning assignments are more engaging than passive learning assignments, an ANOVA was run to compare the engagement of students reporting Active activities (listed above) with those reporting Passive activities (reading, taking quizzes, watching/looking at PowerPoints or video lectures) and those reporting none (no activity was engaging). Students not answering the question were omitted from the analysis. There was a significant difference in the reported engagement of students reporting Active ($n = 102$; $M = 3.47$; $SD = 0.67$); Passive ($n = 36$; $M = 3.45$; $SD = 0.72$); and No engaging activities ($n = 8$; $M = 32.8$; $SD = 1.0$); $F(2,143) = 3.28$; $p < 0.05$. The Tukey HSD post-hoc comparisons indicate the significant differences occurred between active and none ($p = 0.03$; mean difference = -0.66) and between passive and none ($p = 0.05$; mean difference = -0.64). Therefore, only students who could report some type of activity which motivated them to interact with the content of the course (passive or active) were significantly more engaged than students who did not feel there were any such activities in the course.

RQ₂: Do highly engaged students report different activities than students who report less engagement?

None of the Chi Square tests run to determine if highly engaged students reported significantly different kinds of activities than less engaged students were significant.

The research question was answered in the negative. Highly engaged, those who reported engagement scores above the mean of 3.4, did not report significantly different activities than

students who reported low engagement: Chi-square (df = 10); 11.23; ns. Table 1 shows the chi-square results for activities by level of student engagement.

Table 1. Table for Course Activity by Level of Engagement.

Engagement Level	Course Activity											Total
	Missing	Application	Lecture/ Connect	Webpages/ Forums	None	Other	Papers	Project	Quiz	Readings	Research	
Low	15	12	2	6	5	11	4	4	4	7	6	76
High	9	13	9	14	4	15	8	7	3	6	12	100
Total	24	25	11	20	9	26	12	11	7	13	18	176

RQ₃: Do highly engaged students report different student-student communication activities than students who report less engagement?

The results for this question approached significance Chi-square (df = 7) = 14.03; p = 0.051. Both highly engaged and less engaged students reported similar channels of student-student communication: discussion forums, group work, peer reviews, and chat/connect sessions. However, highly engaged students were twice as likely to report using discussion forums to interact with other students and were the only students who reported web projects and webpages as a means of interaction. Table 2 shows the breakdown of student-student communication by level of engagement.

Table 2. Table for Student-Student Interaction by Level of Engagement.

Engagement Level	Student-Student Interaction Channel								Total
	Missing	Chat/Connect	Group Forum	Projects	None	Other	Peer Revisions	Webpages	
Low	15	3	15	3	20	12	8	0	76
High	16	2	29	5	14	12	12	10	100
Total	31	5	44	8	34	24	20	10	176

RQ₄: Do highly engaged students report different instructor-student communication activities than students who report less engagement? ?

This was not significant: Chi-square (df = 8) = 9.05 ns. Both sets of students reported email, feedback on assignments, connect/chat sessions, lectures and discussion forums as ways they interacted with their instructors. Table 3 breaks down the instructor-student communication by level of student engagement.

A. Follow-up.

Although students were requested to “list one or two” activities or ways they interacted with fellow students or with instructors, many listed “none” (not the same as not answering the question), just one, or several. The fact that some would spontaneously list more than requested

Table 3. Student-Instructor Interaction by Level of Engagement.

Engagement Level	Instructor –Student Interaction Channel									Total
	Missing	Feedback on Assignments	Chat/ Connect	Email	Forums	Lecture	None	Other	Quizzes/Tests	
Low	18	7	3	8	6	6	16	7	5	76
High	17	16	6	18	8	8	9	11	7	100
Total	35	23	9	26	14	14	25	18	12	176

was somewhat surprising. Because of this, a follow-up test to compare the simple number of reported activities with reported engagement was run. Table Four indicates that students spontaneously reporting multiple ways of interacting with students and of communicating with instructors had significantly higher levels of engagement with the course in general than those who reported “None”. The finding suggests that multiple opportunities for communication may be more important than any particular channel. However, given that this was not a proposed research question, more data would need to be gathered to confirm this suggestion.

Table 4. Means for engagement based on number of activities reported.

Number of activities/communication methods reported	Content Activities	Student-Student Interaction	Instructor-Student Interaction
None	3.03	3.24	3.11
One	3.44	3.42	3.47
Two or more	3.51	3.73	3.70
F test	1.60	*3.46	**5.62
	df = 2, 148	df = 2, 143	df = 2, 143

*significant at 0.05; ** significant at 0.01

H₁: Reported level of instructor presence will be significantly correlated with student engagement.

The hypothesis was supported. The mean for engagement was 3.41 (SD = 0.70) while the mean for instructor presence was 2.96 (SD = 1.24); $r = 0.41$, $p < 0.001$.

H₂: Reported level of student presence will be significantly correlated with student engagement.

The second hypothesis was also supported. As stated previously, mean for engagement was 3.41 (SD = 0.70) while the mean for student presence was 1.83, not terribly high on a 5 point scale, (SD = 0.98); $r = 0.42$; $p < 0.001$.

IV. Discussion.

While the findings are somewhat disappointing, a couple of interesting results emerged from this study. First, the finding of no significant difference in student engagement levels between those reporting active vs. passive activities indicates that a myriad of content activities can be used to engage students in online courses. However, active learning assignments, particularly discussion forums and web pages, may serve the secondary purpose of helping to develop students' social presence. Given the research regarding the potential for social isolation (Lewis and Abdul-Hamid, 2006; Ortiz-Rodriguez, et al., 2005; Russo and Campbell, 2004; Song and Singleton,

2004) of the online learner, instructors should consider learning assignments that engage students with the content and with each other. Across many types of courses when students readily identified multiple ways of interacting with other students as well as of communicating with instructors, they reported higher engagement in the course. The importance of this idea is further supported by the significant correlation of student course engagement with both the global item on instructor presence and the global item on student presence. So, instructors should consider assignments in which students interact with each other and the content of the course. Instructors need to create not just opportunities for students to interact, but the requirement that they do so. Students who are working on group projects together, doing peer review of one another's papers, interacting within a discussion forum on a particular topic, are likely to feel more engaged in the course. Simply offering the opportunity i.e., having an open discussion forum where they can (but are not required) to participate, is probably not enough.

Beyond this, the findings indicate instructors also need to provide multiple ways of interacting with students themselves to create their own social presence that the literature confirms is an integral component to a successful online course (Dennen, et al, 2007; Goertzen and Kristjansson, 2007; Hughes, 2007; Kehrwold, 2008; Shea, Li and Pickett, 2006). For instance, instructors need to use several channels: announcements on the homepage of the course delivery system, e-mails to students, discussion forums in which the instructor interacts, and online lectures or connect sessions and chats, to enhance engagement. However as stated earlier, the result that more channels of communication are reported by more highly engaged students cannot be considered with confidence until further testing is completed.

Clearly the path to student engagement, based on this data, is not about the type of activity/assignment but about multiple ways of creating meaningful communication between students and with their instructor – it's all about connections. While the study did not find specific activities that engage students more in an online course, it did yield some interesting insights into teaching online and the importance of social presence of both other students and the instructor.

Beyond the results of the study itself, the introduction of a scale to measure online student engagement is a step forward in our understanding of online teaching. The scale, with further validation, could prove very useful to research into online learning and teaching.

A. Limitations.

Limitations of the study are standard. While the sample is fairly good sized, all of the students are from a Midwestern Universities although the inclusion of both the main and regional campuses allows for varying sizes of campuses and a pool of traditional and nontraditional students. The primary limitation with this study is that in order to get at the information desired, a different methodological design may be indicated. To discover if discussion forums work better than e-mails for students interacting with each other, students using both will need to rate their relative effectiveness regarding course engagement.

B. Implications.

As usual, the study raises as many questions as it answers: confirming the importance of student to student interaction and instructor to student interaction but suggesting that more than one method for such interaction may be important for students to be engaged in the course. However,

findings indicate that particular types of activities are not necessarily more effective in engaging students in the online learning community. However, comparing assignments, which actively engage students with content and with each other against assignments that do not accomplish both of tasks, would be worth pursuing. Clearly, more research is desired and required.

In conclusion, this study emphasizes the importance of developing real connections in online courses. Instructors need to create active learning situations in which students can meaningful apply what they are learning. However, meaningful communication opportunities also need to be integrated into online courses. Such connections really help students to feel engaged with the courses they are taking despite the lack of a physical presence of instructor or other students.

Acknowledgements

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Appendices

Appendix A. Factor analysis Tables Online Student Engagement Scale (OSE).

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.910
Bartlett's Test of Sphericity	3281.745
Approx. Chi-Square	
df	435
Sig.	0.000

Pattern Matrix^a

	Factor			
	1	2	3	4
SE1		0.643		
SE2		0.643		
SE3				0.411
SE4		0.650		
SE5		0.647		
SE6		0.740		
SE7		0.942		
SE8		0.724		
SE9		0.453		
SE10			0.997	
SE11			0.986	
SE12			0.863	

SE13			0.560	
SE14			0.687	
SE15	0.500			
SE16	0.568			
SE17	0.678			
SE18	0.870			
SE19	0.623			
SE20				0.994
SE21				1.000
SE22				0.529
SE23				
SE24	0.886			
SE25			0.394	
SE26	0.907			
SE27	0.569			
SE28				0.427
SE29	0.682			
SE30		0.490		

Extraction Method: Principal Axis Factoring.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Appendix B. Online Student Engagement Scale (OSE).

1. Making sure to study on a regular basis SKILLS
2. Putting forth effort EMOTIONAL
- ~~3. Doing all the homework SKILLS~~
4. Staying up on the readings SKILLS
5. Looking over class notes between getting online to make sure I understand the material SKILLS
6. Being organized SKILLS
7. Taking good notes over readings, PowerPoints, or video lectures SKILLS
8. Listening/reading carefully SKILLS
- ~~9. Entering the online class multiple times a week PARTICIPATION~~
10. Finding ways to make the course material relevant to my life EMOTIONAL
11. Applying course material to my life EMOTIONAL
12. Finding ways to make the course interesting to me EMOTIONAL
- ~~13. Thinking about the course between times I am online EMOTIONAL q~~
14. Really desiring to learn the material EMOTIONAL
- ~~15. Visiting or calling the instructor with questions about the material and/or assignments PARTICIPATION~~

- ~~16. Emailing or posting questions when I don't understand the material and/or assignments~~
PARTICIPATION
17. Having fun in online chats, discussions or via email with the instructor or other students
PARTICIPATION
18. Participating actively in small-group discussion forums PARTICIPATION
19. Helping fellow students PARTICIPATION
20. Getting a good grade PERFORMANCE
21. Doing well on the tests/quizzes PERFORMANCE
- ~~22. Being confident that I can learn and do well in the class PERFORMANCE~~
- ~~23. Taking advantage of all class resources (i.e., extra links, readings etc.) SKILLS~~
24. Engaging in conversations online (chat, discussions, email) PARTICIPATION
- ~~25. Critically thinking about my own ethics, priorities, beliefs and values in the context of the class EMOTIONAL~~
26. Posting in the discussion forum regularly PARTICIPATION
- ~~27. Emailing the instructor regarding my grade in the class PERFORMANCE~~
- ~~28. Checking my grades online PERFORMANCE~~
29. Getting to know other students in the class PARTICIPATION
- ~~30. Assessing my own learning and progress in the class PERFORMANCE~~

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Knowledge surveys: Students ability to self-assess

Jon Clauss¹ and Kevin Geedey²

Abstract: Active learning theory indicates the importance of helping students take control of their learning, monitor their understanding, and assess learning strategies. Knowledge surveys are intended to improve a student's ability to self-assess and cover the content and the full range of cognitive levels of a course. We explore an interdisciplinary data set of knowledge surveys and exams, asking whether student's ability to self-assess differs at different cognitive (Bloom) levels. Although self assessment accuracy was strongly related to the Bloom level of exam questions, this dependence was not simple. Students had the most difficulty self-assessing at intermediate Bloom levels.

Keywords: metacognition, self-efficacy, Bloom's taxonomy, student learning.

I. Knowledge surveys: Students ability to self-assess.

Recognizing the importance of metacognition, and the teaching techniques that support a metacognitive approach, how can a teacher interested in active learning pedagogies make students more aware of their own strengths and weaknesses as learners? How can we help students assess both their strengths and weaknesses and monitor their progress towards meeting course objectives? And, do students' self-assessment skills vary with the kind of task being assessed? In this article we will present our experience with a tool known as a knowledge survey that we used to address these questions.

We use the term *metacognition* to “[refer] to people’s abilities to predict their performances on various tasks... and to monitor their current levels of mastery and understanding” (National Research Council, 1999, p. 12). Of most interest to us is that, from studies dating back to the 1980’s involving written composition (Scardamalia, Bereiter, and Steinbach, 1984), reading comprehension (Palinscar and Brown, 1984) to mathematical problem solving (Schoenfeld, 1985), metacognitive approaches to teaching “have been shown to increase the degree to which students transfer their learning to new settings and events” (National Research Council, 1999, p. 12). In these and other subject areas, metacognitive strategies have also been shown to improve understanding of the material being taught (White and Frederiksen, 1998).

We present the results of a year-long exploration of the relationship between student self-assessment skills and different cognitive levels. In order to categorize the cognitive levels of our course objectives we have used Bloom’s taxonomy of educational objectives: *knowledge* (recall of facts), *comprehension* (e.g. describing in one’s own words), *application* (applying information, problem solving, etc.), *analysis* (analyzing underlying structure, identifying component parts), *synthesis* (combination of ideas, creation of a unique or original product) and *evaluation* (making decisions, resolving controversies in a broader context Bloom and Krathwohl, 1956, Krathwohl, 2002). Among the questions that we have explored, in this paper

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we address the following: “How accurately are students able to assess their abilities to perform at different Bloom levels?” We predicted that students would have more difficulty accurately self-assessing at higher Bloom levels. That is, as students confront more complex, less clearly-structured tasks like synthesis or evaluation, we conjectured that they would be less likely to “know what they know” and less likely to accurately self-assess.

Bloom’s taxonomy has been criticized both for its perceived emphasis on higher cognitive levels at the cost of factual knowledge (Booker, 2007), and the difficulty in unambiguously categorizing tasks to specific Bloom levels. However, Bloom’s taxonomy has the advantage of being both widely used and widely recognized both in higher education as a teaching and learning tool in disciplines as diverse as feminist philosophy (Cimitile, 2008) and biology (Crowe et al., 2008). In both biology and math, specific applications of Bloom’s taxonomy have been developed for use in discipline specific contexts (Crowe et al., 2008, Smith et al., 1986).

We used knowledge surveys to assess student’s level of confidence with course material. Early versions of knowledge surveys were described by Edward Nuhfer (Nuhfer, 1993) and subsequently developed by Nuhfer (1996), and Knipp (2001). Wirth and Perkins (2005) have used knowledge surveys as both an assessment and course design tool while Bowers, N., Brandon, M., and Hill, C. D. (2005) have explored their use as an indicator of student learning in an introductory biology course. The structure and possible uses of knowledge surveys are extensively described in *The Knowledge Survey: A Tool for All Reasons* (Nuhfer and Knipp, 2003).

Attempting to cover the entire breadth of course material and spanning all levels of the cognitive domain, a knowledge survey “consists of course learning objectives framed as questions that test mastery of particular objectives” (Nuhfer and Knipp, 2003, p59). The survey does not solicit content-based answers; rather, students are asked to rate their level of confidence in attempting to answer the survey questions, indicating whether they:

- (3) could answer this question with full confidence
- (2) could get most of the credit for this question
- (1) could get some partial credit for this question
- (0) could not begin to answer this question right now³

(Examples are available at <http://dmc.augustana.edu/KS/>.) As such, these surveys directly assess student confidence but do not, by themselves, assess the accuracy of a student’s self assessment. Metacognitive approaches “focus on sense-making, self-assessment, and reflection on what worked and what needs improving” (National Research Council, 1999, p.12). Metacognition, in this context, refers to a student’s ability to accurately self-assess and the ability to recognize areas of strength and weakness and act accordingly. Metacognition is related to, but is not necessarily the same as self-efficacy, or self perceived confidence in accomplishing a task. Self-efficacy may be an important factor in explaining effort and investment in a particular task, as individuals are willing to invest more in tasks they believe they will accomplish (Strecher, et al., 1986). Developing effective tools to assess self efficacy is important, since self efficacy may be a significant factor in both vocational reflection and in the desire to pursue more complex tasks (Ebert-May, et al., 1997, Baldwin et al., 1999). Knowledge surveys given at the beginning and end of a unit tend to show strong increases in student self-efficacy from pre to post instruction

³ Unlike surveys described in (E. Nuhfer and Knipp, 2003) and elsewhere, which provide a choice of three responses, we have chosen to provide four.

survey (Wirth and Perkins, 2005, Bowers et al., 2005). However, as Bowers et al. (2005) rightly point out, self-efficacy does not necessarily translate into actual achievement. Students may be confident in their abilities (high self-efficacy) but unable to perform required tasks (low metacognitive ability).

For our study, surveys were administered at the beginning of a course (or unit within the course; details below) and re-administered shortly before an exam covering the surveyed material. We have used our online course management system (moodle) to administer the surveys. This has several advantages, including: allowing students to take the survey at their convenience without sacrificing class time and to revisit it for purposes of review; allowing for easy analysis of the data using spreadsheet and statistical analysis software; and reducing the considerable environmental impact of administering large, multi-page surveys several times during the term. We have found knowledge surveys to be an effective way to help students assess and monitor their current abilities and levels of understanding, as well as document changes in student's level of confidence with course material.

II. Method.

A. Self-Assessment and the Cognitive Level of Exam Questions.

Our primary goal was to determine whether or not the accuracy of student self-assessment (metacognitive ability) via knowledge surveys depends upon the Bloom level of the task. We considered student knowledge survey responses from four courses across two disciplines (Biology: Aquatic Biology, Ecology, and Evolution taught by one instructor; Math: Linear Algebra taught by the other instructor). These courses are all junior-senior level offerings which are typically taken by students majoring in either biology or math respectively. Eighty one different students enrolled in one or more of the four courses that year. In order to compare the results of the knowledge surveys to exam scores, we focused on the surveys that were administered before an exam and the results of the exam covering the same material. Although our knowledge surveys were intended to be comprehensive, they were not intended to function as complete study guides. Therefore, not every question on a unit exam was covered in the survey, and not all survey material was included on the exam. We selected for analysis only paired survey and exam questions, i.e. cases where there was a match between a survey question and a subsequent exam question.

All survey and exam questions were assessed for Bloom level. Each faculty member scored their own surveys and exams and assessed Bloom levels for each question. In order to attempt to achieve inter-rater reliability and minimize the subjectivity inherent in this process, we also engaged a student research assistant (a math and biology double major who did not take any of the classes during the study period) to independently assign Bloom levels to the questions. We then compared the faculty and student assigned Bloom levels. Remarkably, there were relatively few conflicts between the lists. Discrepancies were often reconciled by discussion. In a few cases, the research assistant's lack of familiarity with specific course content hindered her ability to assess the questions. In other cases, faculty had worded a survey or exam question in a way that hindered the assistant's interpretation. In the latter case, such vaguely worded questions were dropped from the analysis. In a number of cases, small wording differences between the exam question and the survey question caused the exam and survey questions to have different Bloom levels. These questions were also dropped from further analysis.

Survey responses were scored on a numeric scale (0, 1, 2 or 3) ranging from 0 (I could not begin to answer this question right now) to 3 (I could answer this question with full confidence). Exam answers were graded following individual course policies. After the courses ended, individual exam answers were rescaled to the same 0-3 scale used for the surveys, i.e. a full credit answer got a 3, a no credit response got a 0, with partial credit responses being scaled between 0 and 3. This created a set of paired survey and exam responses, where we could compare self assessed performance on a question (from the survey) to the subsequent teacher assessed performance (from the exam). While we did not control for differences in grading policies between instructors in the course of this study, the patterns we report below are consistent for both instructors independently.

Because exams tended to contain many questions assessed at the same Bloom level, the data set contained a large amount of replicate measurements per student (i.e. replicate responses per Bloom level per student). This replication was, perhaps not surprisingly, highly uneven across Bloom levels. Lower level knowledge and comprehension questions were quite common, while higher level synthesis and evaluation questions were quite rare. In order to avoid pseudo replication and because of non-response by some students on some questions, we randomly selected at most a single paired survey/exam response per Bloom level per student. As a result, our final sample size was 309 survey/exam result pairs. Because of this uneven replication across Bloom levels, we combined levels 4-6 for analysis.

B. Self-Assessment Ability and Overall Exam Score.

Although not central to our research question, we looked for correlations between high self-assessment ability and overall exam scores. Other authors (Wirth and Perkins, 2005, Bowers et al., 2005) have looked for correlations between knowledge survey and exam score in either an aggregate (Wirth and Perkins 2005) or question by question (Bowers et al., 2005) manner. These studies have found relatively low values of r and/or non-significant results. In order to look at these same self-assessment patterns in a different way, we ask if students who are good self-assessors (accurately predict their own exam performance good or bad) tend to score better on exams. We generated an average absolute value of actual (exam score on question) minus predicted (knowledge survey score on question) for each student, across Bloom levels and performed a least squares regression of that variable on the overall earned exam score.

C. Gains in Self-Efficacy.

Our study was designed to assess metacognitive ability as indicated by the accuracy of student self assessment. However, since previous work on knowledge surveys also shows strong pre to post instruction gains in self-efficacy (Wirth and Perkins, 2005, Bowers et al., 2005), we also report on these trends from our study to facilitate comparison. In this case, however, the author's results from biology and math classes are not directly comparable due to procedural differences in administering pre and post unit surveys, and were therefore analyzed separately. In order to see if students gained self-efficacy over the course of the term, we compared student knowledge survey responses over time using paired T-tests. This approach let us look for self-efficacy gains on a survey question by survey question basis for each student. For this test we excluded students who, for whatever reason, did not take both surveys and we excluded any survey questions that appeared on a single survey only.

In the biology classes, students were given a pre-instruction knowledge survey that had to be filled out (online) by the second class meeting. These results were compared to post-instruction, just prior to unit exam, knowledge survey results. As an example, we analyzed data from 54 questions answered by 38 students in an Evolutionary Biology class (winter 08-09).

Due to the technical nature of the material (including technical vocabulary) students were not given a pre-instruction survey in the Math class. Instead they were given a series of cumulative post-instruction, pre-unit exam surveys. We therefore compare pre-unit exam one response to the student's responses on the same questions before unit exam two and similarly compare survey responses on the second pre-unit exam survey to the pre-final exam survey. We compared responses from pre-unit exam surveys one and two (72 questions, 30 students) and also from the pre-unit exam 2 survey with the pre-final survey, (160 questions, 31 students).

III. Results.

A. Self Assessment and Cognitive Level of Exam Questions.

There was a wide range of possible relationships between survey and exam response. We represented this variation by subtracting the predicted performance (from the survey) from the actual performance (from the exam) for each survey/exam result pair. The difference between survey and exam results was quite variable but were all centered around a median value of zero (actual and predicted values match) (figure 1). At lower Bloom levels, the values observed encompassed the entire possible range of results from +3 (student got a perfect score on the exam question, but had responded on the survey that they could not begin to answer that question) to -3 (student got no exam credit for the question, but had indicated full confidence on the survey). The data for each Bloom level appeared to be symmetrical around zero, which indicated that students were as likely to underestimate as they were to overestimate their exam success on the survey (see Figure 1).

Box and whisker plot of the difference between actual (exam score) and predicted (survey response) scores across Bloom levels. The midline of the box represents the median value. The upper and lower "lids" of the box represent the sills for the middle 50% of the distribution. The "whiskers" on the top and bottom of the box represent the upper and lower quartiles respectively. There is no box for Bloom level one, since the vast majority of the data fall at the median value of 0, which represents a perfect match between the survey and exam result.

We noted an apparent pattern in this data set. That is, students seemed to have a greater mismatch between survey and exam scores at some Bloom levels. To test this hypothesis, we used the absolute value of actual (exam) minus predicted (survey) data to generate a metric of similarity for each survey/exam result pair. This generated a scale from 0-3 for each survey/exam pair. A value of 0 represents a perfect match between survey and exam result, while a 3 represents cases where the student did either much better or much worse on the exam question than predicted by their survey result. Because of the low sample size at higher Bloom levels, we combined levels 4-6 into a single category for this analysis, resulting in sample sizes of 80 for each of Bloom levels 1 and 2, 78 for Bloom level 3 and 71 for Bloom levels 4-6. The value of this metric was strongly dependant on the Bloom level of the question (Kruskal-Wallis Analysis of variance, 3 df, Kruskal Wallis test statistic =35.768, $p < 0.0009$). We observed the largest

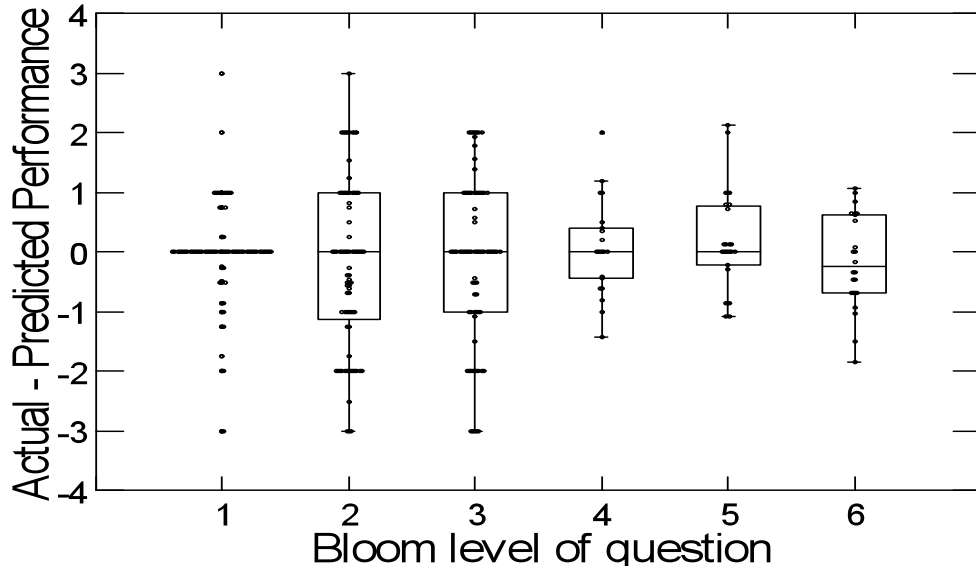


Figure 1. Actual minus predicted performance as a function of the Bloom level of exam questions.

mismatch between survey and exam results at Bloom levels 2 and 3, which are comprehension and application respectively (Figure 2).

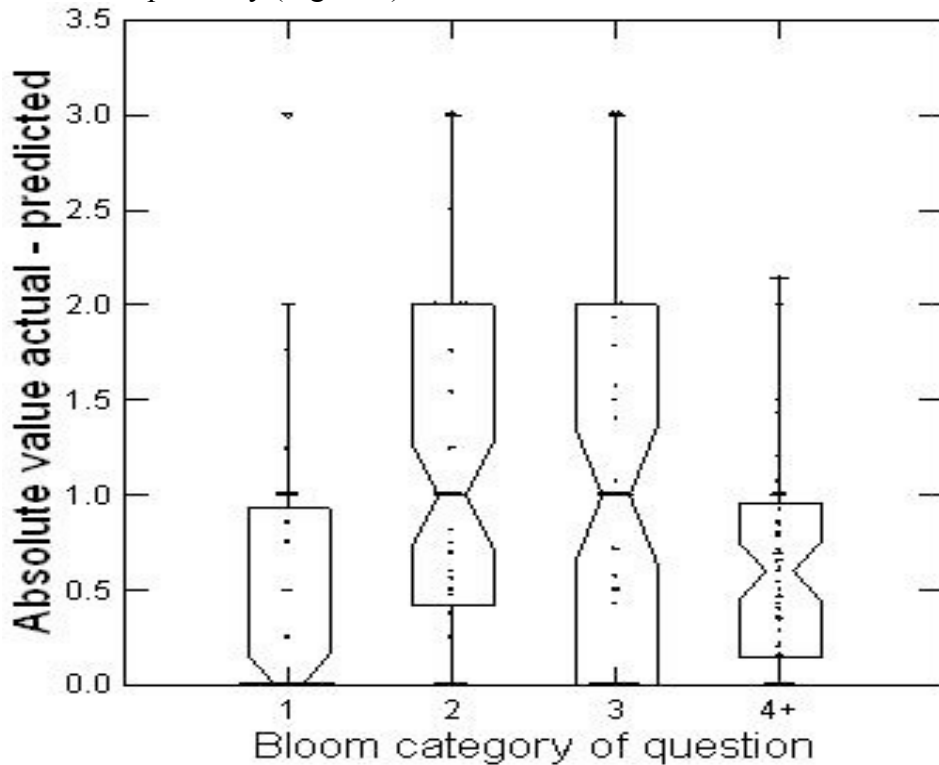


Figure 2. Absolute value of actual minus predicted performance as a function of the Bloom level of exam questions.

Box and whisker plot of the absolute value of the difference between actual (exam score) and predicted (survey response) scores across Bloom levels. Bloom levels 4-6 are combined into a single category. The midline of the box represents the median value. The upper and lower “lids” of the box represent the sills for the middle 50% of the distribution. The “whiskers” on the top and bottom of the box represent the upper and lower quartiles respectively. The “notch” on the box represents the confidence interval of the median.

B. Self-Assessment Ability and Overall Exam Score.

We assessed if students who were more accurate in their survey predictions (lower absolute value of actual minus predicted) tended to do better on the exams overall. We generated an average absolute value of actual minus predicted for each student, across Bloom levels (Figure 3), and performed a least squares regression of that variable on earned exam score (adjusted $r^2=0.143$, $f=9.98$, $p<0.003$). Given the low value of r^2 , this metric explains little of the variation in exam scores.

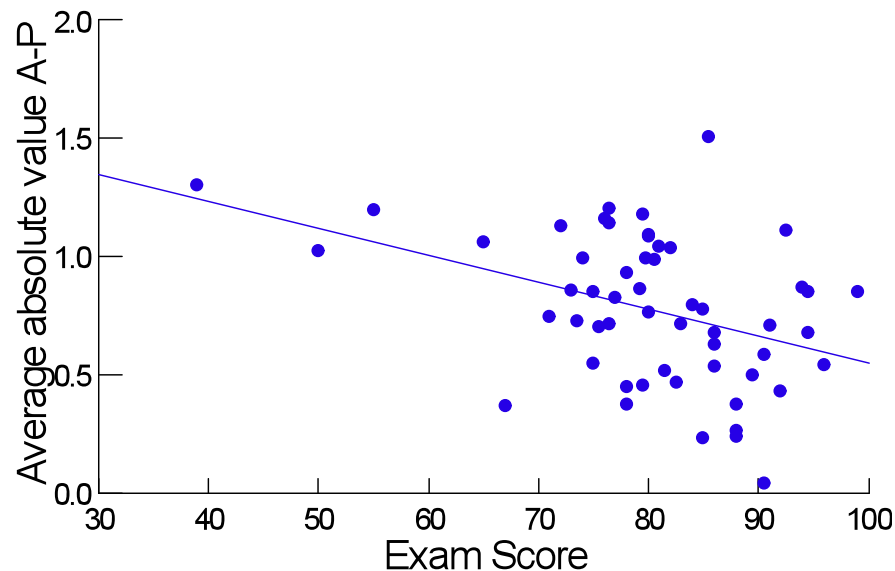


Figure 3. Relationship between self-assessment accuracy and exam score.

Mean absolute value of actual minus predicted for each student (averaged across Bloom levels) as a function of exam score. Line is estimated best linear function using Systat12 software.

C. Gains in Self-Efficacy.

In order to see if students gained self-efficacy over the course of the term, we compared student knowledge survey responses over time using paired T-tests. In the biology class, students showed dramatic increases in self-efficacy for every survey question from pre to post instruction. Median survey response values ranged from 0 to 2 for all questions in the pre-instruction survey and from 2 to 3 in the post instruction survey. Gains in self-efficacy were highly statistically significant with p values range from <0.003 to $<1 \times 10^{-20}$.

The Math class, which did not use pre-instruction surveys, necessarily showed a different pattern of self-efficacy gain. Comparing responses from pre-unit exam surveys one and two, median values ranged from 1-3 in pre-unit exam survey one from and 2-3 in pre-unit exam survey two. We found statistically significant ($p < 0.05$) increases in self-efficacy in 34 (or 47.2%) of the questions. Comparing pre-unit exam survey two with the pre-final survey, Median values in the pre-final exam survey ranged from 1.5 to 3 (with the vast majority being 3). In this contrast we found statistically significant ($p < 0.05$) increases in self-efficacy in 73 (or 45.6%) of the questions.

IV. Discussion.

We had naively predicted that a student's ability to self assess, as measured by correctly predicting their success on exams via knowledge survey questions, would decrease as the Bloom level of the question increased. That is, we predicted that students would certainly know whether or not they knew the definitions of terms and other lower Bloom level tasks, but we believed students would not "know what they knew" with more open-ended questions representing higher Bloom level tasks. Although our data do show a strong relationship between Bloom level of question and prediction accuracy, our data do not support the hypothesis that increasing Bloom level leads, in a simple way, to decreased student ability to self-assess. What we did find was that students were better self assessors at low (knowledge) and high Bloom levels (analysis, synthesis, evaluation), and poorer self assessors at intermediate levels (comprehension, application; see Figure 2). This pattern may be caused by several factors, some rooted in learning and others in teaching practice, none of which were directly addressed in this study. Comprehension and application tasks may be poorly understood or poorly diagnosed by students; that is, students may not understand how an application question differs from one that simply demands a straightforward recall of facts. Reduced self-assessment ability at these Bloom levels might also be due to poor modeling or practice of these tasks in class, or uneven evaluation of these tasks by the instructor. We may, subconsciously, grade these categories harder since we might view higher level Bloom questions as difficult and cut students some slack with partial credit, while at the same time feeling that students "really ought to know" comprehension and application type questions. However, these hypotheses run afoul of the fact that our data show that students were equally likely to underestimate success or overestimate at these Bloom levels (figure 1). If we were just strict graders on comprehension and application questions, for example, students might have been expected to overestimate their success.

Our results on the overall correlation between self-assessment and exam scores are in line with other published results (Bowers et al., 2005). We found no evidence that variation in self-assessment ability, as assessed by our knowledge surveys, explains a significant amount of the variation in exam scores. Others have argued that knowledge surveys, by themselves, may be a poor indicator of learning and may be a poor stand-alone assessment (Bowers et al., 2005). We do not feel that our data make the case for or against knowledge surveys as a direct learning assessment tool. However, we do not regard the current literature as definitive. If the knowledge surveys serve as a prompt to students that they have more work to do before they take an exam, then we would not expect a strong correlation between survey results and exam results. Students with excellent self-assessment skills who do poorly on the survey may end up doing better on the exam because the survey served as a wake-up call, just as intended. On the other hand, students may consider the survey as one more task demanded of them which, once gotten out of the way,

can be forgotten. If students are actually using the surveys as a learning tool, then there is every reason to expect that student mastery of course material will change between the self assessment and the faculty assessment and therefore raw survey results ought not explain much variation in exam scores. In short, a simple correlation with exam scores misses the whole goal of the surveys as a metacognitive tool for students.

Our results are also in line with other published work on the gains that students experience in self-efficacy as indicated in pre vs. post instruction knowledge surveys (Bowers et al., 2005). In the biology class, students demonstrated dramatic increases in their confidence following instruction for all survey questions. This is not surprising since the college level material covered in these classes will be unfamiliar to students at the beginning of class. The results from the math class are different, but also show significant increases in self confidence over the term. Because the math survey were all post instruction, it was much harder to demonstrate significant increases in self-efficacy. If the median survey response to question is high on the first survey, then there is nowhere to go to demonstrate increased confidence. Under these circumstances it is remarkable that a large number of these questions showed significant increases in self confidence. This suggests that students in this class continue to build on their knowledge base and continue to gain confidence as course concepts are continually applied.

Our data raise an important question that this study does not answer: How do students actually use the surveys? Anecdotally, students report that they like having access to the surveys, and that they regard them as useful study guides. Indeed, in subsequent courses we have found that students who have used them often request a knowledge survey, especially as they prepare for an exam, if one has not been provided to the class. It is clear that the surveys foster metacognition—students’ “abilities to predict their performances on various tasks... and monitor their current levels of mastery and understanding” (National Research Council, 1999, p. 12). What, however, does the act of filling out the survey give a student? Do they really help identify problem areas? Do students follow-up on the self knowledge they gain from the survey? In other words, do the surveys help students learn how to learn? Furthermore, does this particular act of metacognition “increase the degree to which students transfer their learning to new settings and events” (National Research Council, 1999, p. 12)? To date, we know of no studies that address these questions or that document the effect of knowledge surveys on student learning.

While we have no documented evidence of the effects of knowledge surveys on student learning, we have, nonetheless, found them to be effective and useful tools for a number of reasons. For the students, the simple act of asking them to assess their abilities does encourage, if not force, metacognition on their part. It also allows the students to be exposed to a much larger collection of questions, at all Bloom levels, than could be presented on any single assignment, project or exam. We also believe that it has increased interaction both between students and faculty and among students since once they have identified specific areas of weakness they are more likely to seek help in those areas either from the teacher or from their peers (combating the “I don’t even know what question to ask” syndrome). Students frequently tell us that they like using the surveys. It has been reported that they are “a good reality check” and that “they tell me what I need to work on.” Again, anecdotally, we believe that the surveys help promote responsible student behavior by providing students with a guide to the kinds of questions we expect them to be able to answer in a unit and throughout the course. It is true that initially students are often daunted by what appears to be “busy work” in filling out the surveys. Because of that, in order to help provide motivation we have attached nominal credit to survey completion throughout the course. Eventually, though, we found that when we were late in posting a

knowledge survey, students would ask for the survey to be posted as soon as possible. Overall it has been our impression that students perceive the surveys as a useful study guide.

For the instructors, one of the most obvious and significant benefits of using knowledge surveys has been that, in constructing them, we have been forced to pay more attention to the frequency at which we challenge students with tasks of various Bloom levels. We have had to design classroom experiences that integrate higher Bloom level tasks into the fabric of our classes with intentionality. We have also had to confront the challenge of designing tasks that assess students' mastery of higher level tasks in a meaningful way. For one of us, the act of constructing the survey forced us to recognize the fact that several higher level skills that we would have reported as important in our course were actually rarely assessed. As in the study by Wirth and Perkins (2005) mentioned above we have found them to be a very helpful course design tool.

There are also, of course, mechanical challenges to creating, administering and processing a knowledge survey. It is a daunting task to create one for a class the first time, particularly if it is a relatively new course for the instructor. As mentioned above, recognizing the lack of activities that address higher level tasks often requires rethinking the fundamental design of the course or at least major aspects of it. On a lighter note, we have found out the hard way the importance of having a stable, durable medium for administering and processing the surveys. While there are obvious advantages to using course management software when available and feasible, it can pose problems in an environment where the electronic tools, or the platforms for delivering them, are less stable and durable. We have found it to be a good idea to plan well ahead and work closely with our Instructional Technology department in designing and creating the surveys for use online.

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Beyond the classroom: a case study of first-year student perceptions of required student-faculty conferences

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Abstract: Instructors of first-year students must understand that many of the frustrations they encounter with this demographic are a normal part of a transition process. Not only are first-year students asked to adjust to new academic demands, they also must learn how to live independently in a new environment. An effective way to facilitate academic development is to require conferences that: 1) address the student as a person within the first-year context, and 2) focus on course content and academic development. The former is initially prioritized over the latter to meet the specific needs of first-year students. In the fall semester of 2009, the author conducted a case study with three sections of Critical Writing, an interdisciplinary general education critical thinking and writing course. Students met with the instructor throughout the semester, and at the end of the course, they completed a 25-question in-class anonymous, multiple-choice survey to gauge their perceptions of the impact of required conferences on their academic experiences. The data show that students very clearly perceived the conferences as helpful for their learning and overall experience of the course.

Keywords: freshmen, first-year students, required conferences; student-faculty interaction, retention, transition, best practices, general education, office hours, engagement.

I. Introduction.

Often, when I tell new academic colleagues what I do and what I love – “I teach first-year general education” – I am met with groaning, exasperation, and frustration. They cringe, shrink back into themselves and commend me for having the patience to deal with students at the introductory level. Then, typically, they launch into dissertations about how unprepared first-year students are, how freshmen don’t or can’t read, how they demonstrate all the signs of academic apathy: tardiness, sleeping in class, cell phones, incomplete homework, poor grades. They stare in disbelief when I say that I truly love teaching freshmen, that I find it a highly rewarding experience filled with opportunities, and that really, when it comes down to it, I find it an honor and privilege.

First-year students are unique in that, although they have expectations about what their college experiences will be like – a blend of mythologies from the media, their friends, and their own desires – many of them have little to no experience with college life and are flabbergasted by the reality of their first year. As instructors of first-year students, we are able to help usher these students into our institutions, these foreign lands where many of them are on their own for the first time. We are able to witness their transformation from high-school teenagers to college students exploring their new lives. At the same time, we have to be careful – much of the

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discourse around first-year students is filled with all too romantic notions of transformation. We also need to be realistic about the unique challenges these students present. Students new to a university environment have a diversity of academic and non-academic obstacles to overcome, particularly in their first semester.

I have been teaching first-year writing in various capacities for the past nine years. To help address the specific needs of first-year students, I require two conferences during the semester and structure them into my syllabus and grading scale. My experience with Writing Center pedagogy has informed my desire to work one-on-one with students, but more anecdotally, in the years I have required conferences, I have found that, if I make a personal connection with students early on in the semester, they are more likely to return to office hours when they need help with course content. My two conferences are semi-structured. The first acts as an icebreaker, the second as personalized academic support.

In the fall semester of 2009, I conducted a case study with three sections of Critical Writing, an interdisciplinary general education critical thinking and writing course. Students met with me throughout the semester, and at the end of the course, they completed a 25-question in-class anonymous, multiple-choice survey to gauge their perceptions of the impact of required conferences on their experiences. The data show that my students very clearly perceived the conferences as helpful for their learning and overall experience of the course. Required conferences can be effective in any discipline and, although this paper specifically discusses first-year students, may be implemented at any level.

II. What we know.

Over and over the research shows that students find it meaningful to build relationships with faculty. Richard Light (2001), in *Making the Most Out of College*, reports that students “point out repeatedly that getting constructive, somewhat personalized advice might be the single most underestimated feature of a great college experience” and how “certain faculty members make a special difference in their lives” (p.5). In one of his studies, Light also found that four-fifths of students reported that the specific, critical moment that profoundly changed them happened outside the classroom (p.8). Similarly, the first principle in Chickering and Gamson’s (1987) highly referenced “Seven principles for good practice in undergraduate education” is contact between students and faculty. As these authors argue, “frequent student-faculty contact in and out of class is an important factor in student motivation and involvement. Knowing a few faculty members well enhances students’ intellectual commitment and encourages them to think about their own values and plans” (Chickering and Gamson, 1987).

Student-faculty interaction is most often manifest through academically common practices: collaboration on research projects, independent studies/special projects, departmental or university committees, student organizations, advisement, and office hours. For example, the National Survey of Student Engagement (NSSE) findings support high levels of student-faculty interaction. “Working with a professor on a research project or serving with faculty members on a college committee or community organization lets students see first-hand how experts identify and solve practical problems. Through such interactions teachers become role models, mentors, and guides for continuous, life-long learning” (NSSE, 2008).

Although such avenues are well traveled and can positively impact students, these interactions typically engage a certain type of student, one who is already prepared and committed to high academic engagement. Traditional practices of student-faculty interaction are

often seen as rewards and are actively sought after by high-achieving, engaged students. They are largely voluntary.

Requiring conferences for all students is an attempt to provide the opportunity for increased student-faculty interaction to all enrolled in the course, to mandate engagement for everyone. In the conferences, the students who sit in the back and avoid eye contact are required to chat about the class, their experiences, and what they need to improve the conditions for their learning. In an interview, John N. Gardner (2003), highlights mandatory interventions. He says:

“I think we’ve gotten too focused on treating them as independent adults and letting them sink or swim on their own...but the older I got, the more I realized that my students...were more likely to be successful if I made them do certain things. Once the students did them, they found out that they were helpful, and then they pursued them voluntarily. One of the things we’ve learned from the instrument *Your First College Year*...is that students recognize they need help and they report all kinds of stress, but do they go get the help? No, they don’t. A best practice would be to mandate student participation in more of these interventions” (p. 12).

Light (2001) reports that students who seem to grow most significantly in the higher education experience include interacting with faculty as one contributing factor; however, they also report that this interaction is difficult because it doesn’t always come naturally (p. 10).

I’d bet most faculty hold office hours, but I’d also bet that overall, the number of students who attend are low – or at least until it’s nearly too late and the student’s learning (and grade) is in jeopardy. Seeking out faculty for help can be especially challenging for first-year students who might expect faculty to be unavailable, who might be intimidated by their professors, who might have poor time management skills and therefore do not make the effort of attending office hours, who might be overwhelmed with their transition into college life.

Tim Clydesdale (2007), author of *The First Year Out: Understanding American Teens After High School*, found that "most of the mainstream American teens [he] spoke with neither liberated themselves intellectually nor broadened themselves socially during their first year out." Rather, he discovered that what teens really focus on during their first year is basic daily life survival on their own, i.e. how to negotiate new friends, money, time management, dorm life. In other words, rather than experiencing the mind-blowing, life-changing class that reorients the student’s whole world view to an informed, academic one – the kind of experience we see in movies like *Wonder Boys* – students are occupied with worries about finishing their homework and getting to class on time when they need to replace the pre-paid cafeteria ID card they lost, not wanting to call home to tell their parents they need help, and all of this in the midst of a new group of friends, mere strangers.

This reality for first-year students is reflected in Upcraft and Gardner’s (1989) definition of freshman success. They “believe freshman succeed when then they make progress toward fulfilling their educational and personal goals: 1) developing academic and intellectual competence; 2) establishing and maintaining interpersonal relationships, 3) developing an identity, 4) deciding on a career and life-style; 5) maintaining personal health and wellness; and 6) developing an integrated philosophy of life” (p.2). Telling is the fact that all but the first of Upcraft and Gardner’s goals focus on psycho-social personal growth of first-year students.

It is also worthy to tangentially note that student perceptions of such interactions can increase retention (O’Gara et al., 2009). Students who have that extra support feel more connected to the university and are motivated to do what it takes to remain in the institution.

Jaswal et al. (2008) note that “retention research shows that the earlier a student is connected to the social and academic systems of the college the greater their academic achievement and thus their commitment to graduating” (p. 55). Retention of freshmen not only benefits the students themselves, but also, from an administrative standpoint, benefits the entire institution.

III. Case Study.

As noted above, in the fall semester of 2009, I conducted a small case study with my three sections of Critical Writing, a critical thinking and writing course in the University Studies interdisciplinary general education core curriculum at North Carolina Agricultural and Technical State University (A&T). North Carolina Agricultural & Technical State University is a historically black university in Greensboro, NC known for our civil rights legacy, particularly for our A&T four – the four freshmen who refused to get up from the Woolworth’s whites-only lunch counter. Currently, our first-year students are 91% African American, 52% female, and largely from North Carolina at 78%. The average age of our first-year students is 20-years-old (Wabash, 2009). Although A&T first-year students fit the standard prototype for “freshmen,” (18-years-old, just out of high school, full-time students who reside on campus, attending a four year university), it should be noted that nationwide, “The student landscape is dotted with almost as many profiles as there are students, and our thinking about first year students should reflect their diversity...The average age is slightly over 25 (Ishler, 2005, p.17). Overall, first year students are diverse in age, class, race, ethnicity, sexual orientation, preparedness, etc. Our course objectives include critical writing and reading skills, effective communication, research, use of technology, assessment, and collaboration. As a required part of the curriculum, students meet with me twice during the semester for one-on-one meetings, the first at the very beginning of the course, and the second anytime thereafter. To gauge student perceptions of the impact of these meetings on their learning, I gave students an in-class anonymous multiple-choice survey, consisting of 25-questions.

A. Conference One.

The first required conference is a simple, friendly get-to-know-you meeting (unless the student wants to work on course content), and happens within the first two weeks of the semester. I bring a sign-up sheet to class and pass it around so students can sign up for a fifteen-minute conference. In this conference, I do not prioritize academic issues because I really just want to get to know my students. My objectives, made explicit, for the first conference are:

- To build trust with students by getting to know them on a personal level and allowing them to get to know me too (not only as faculty, but also as a “real” person);
- To be sure my students know where my office is and to tell them on a one-on-one level that I can and should be used as a resource;
- To be sure students understand the objectives of the course and to answer any questions they might have early on.

Although we as instructors, of course, want our students to develop in academic course content and process, it is critical that we recognize the fact that academics might be the last thing on their minds *and* that this is a normal part of transforming into college students. As professionals, we can help alleviate some of the burden of their transition and ultimately facilitate academic success.

A study done by Palmer et al. (2009) shows that many first-year students feel as if they don't belong at the university because they reside in a liminal "betwixt space" (between their home-space and the university-space) and that a variety of complex social-interpersonal interactions influence how well they transition more fully into the university space. One thing we can do as instructors is demystify the institution by giving the institution a human face, a kind of mentor or in-between figure to help them bridge the gap. Shanley and Johnston (2008) state that for first-semester college students, success is found not only in their organizational abilities and time management skills, but also in *knowing their professors* [my emphasis].

From my conversations during these meetings, I have discovered that first-year students typically expect two types of college professors: The hard-edged, unforgiving, stern professor, an immovable stone wall of knowledge and high expectations or the sloppy liberal-minded professor who doesn't take attendance, is slack with assignments, has fun and engaging lectures, and leaves class satisfied at her/his own brilliance. Both of these kinds of stereotypical professors do not demonstrate the care that freshmen need and ultimately desire. Both prioritize easy teaching and their own careers, and both unfortunately fail to demonstrate real concern for student learning and tend to represent a cold institution that sees students as numbers.

So, during the initial required conference, I offer them a different kind of professor. I start with personal, but not prying, questions about their college experiences so far. I ask questions like: How are you? How's the transition to college? From where did you move? What do your friends and family think about you being in college? What is your roommate like? What is your dorm like? What is the hardest thing you're dealing with now, and how can I help? Do you have a major? What classes are you really excited about?

I believe it is fair that while I ask students to disclose some personal information about themselves that I also share personal information about myself throughout the conference, although I am very intentional about not making the conference about me, my lessons, and my advice. This first conference is devoted to making sure my students feel that they have a voice, and that it will be heard. To close, I wrap it up by reiterating the objectives of the conference and ask if they have any questions about the course. And finally, I casually sum up our conversation to let my students know I have been listening and to help me solidify some of the individual details in my own mind.

B. Conference Two.

Students schedule the second conference themselves at any time during the rest of the semester. I have found that after my first conference, it is fairly easy to get most students to return. In fact, many of them come regularly both to work on assignments and to just say hi when they're in the building. Because the students themselves schedule these conferences, they tend to be spread out through the semester, so I do not have to set aside such a large amount of time at once. And, to help alleviate some of the time demand, I encourage students to simply come to my office hours, when I have time set aside for them anyway. The second conference tends to be around 30-minutes, like a typical Writing Center session.

For the second conference, my objectives are different. Rather than a personal conference just to get to know students, I focus on academic skills and strongly encourage them to bring in a course project to work on. (But, I do give them credit anyway if they just want to talk about something else.). In these conferences, I can explain things we discussed in class in a more tailored way to suit individual students. I can "personalize instruction" by having a more

interactive dialogue with them. I can ask more direct questions, allow more time for them to process, and focus our discussion more directly to their learning style. For example, if I know someone is a visual learner, we can sketch out an image, a diagram, or a graph together to elucidate concepts or make connections. Or, I can draw upon their specific interests, interests I began to learn about in the first conference, and use examples/analogies that make more sense to them as individuals. Most students find one-on-one help extremely enlightening; I can't describe how fun it is to witness students' light bulbs turn on, and how excited they become when they understand something in a new way.

C. Findings.

I have required conferences for years, assuming they made a difference, hoping the time I invested was actually worth it; however, until this past fall, I did not collect data. Although my case study is small, with only 52 participants, the findings are encouraging. Survey questions 1-3 provided logistical information: 78.8% met with me two or more times, with 34.5% meeting more than the requirement. During the conferences, students reported that they mostly worked on writing (88.5%), but also ranking high were their personal difficulties and/or student life (75%) and overall academic performance (73%). 48% reported discussing academic motivation, while 32% said they worked on general study skills. 78.9% of the conferences lasted between 10-30 minutes.

The rest of the survey data is included in the following table, but it is interesting to highlight some important content of the students' perception of the conferences. 92% of students believed the conferences helped them feel I cared about them as individuals. 71% believed the conferences helped them with reading and writing skills, so much so that 82% believed the course should continue to require conferences for this course. 88.4% agreed that, generally, first year courses should require at least one conference. These numbers are obviously high, which highlights the fact that over half agreed that they might not have met with me had the conferences *not* been mandatory. Students very clearly perceived the helpfulness of the conferences for their learning and overall experience of the course.

Table 1. Survey results for questions 4-25

Survey Question	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I feel that the required conferences were worth my time.	73.1%	21.2%	5.8%	0%	0%
In general, it is important to me that I know my instructors care about me as an individual.	78.8%	15.4%	5.8%	0%	0%
The conferences helped me feel my instructor cares about me as an individual.	67.3%	25%	4, 7.7%	0%	0%
The conferences helped me develop my writing skills.	25%	46.2%	19.2%	9.6%	0%
The conferences helped me develop my reading skills.	25%	46.2%	19.2%	9.6%	0%
The conferences helped me develop my study skills.	13.5%	26.9%	44.2%	15.4%	0%
The conferences helped me feel more comfortable participating in class than I otherwise would've felt.	15.4%	32.7%	40.4%	7.7%	3.8%
The conferences motivated me to stay on task and do my coursework.	26.9%	53.8%	13.5%	5.8%	0%
The conferences helped me understand course content I did not understand in class.	30.8%	34.6%	23.1%	9.6%	1.9%
The conferences helped me learn about other resources.	26.9%	36.5%	26.9%	9.6%	0%
The conferences helped me feel as though I am part of the A&T community.	11.5%	25%	46.2%	13.5%	1.9%
The amount of time I spent on homework for this course increased because of the conferences.	11.5%	30.8%	34.6%	19.2%	3.8%

During my conferences, I was able to ask questions that I would not have been able to ask during class time.	46.2%	38.5%	11.5%	3.8%	0%
The level of my engagement in the course materials increased because of my conferences.	17.3%	46.2%	28.8%	7.7%	0%
The conferences made me more comfortable approaching my other instructors in other courses.	21.2%	38.5%	26.9%	13.5%	0%
The conferences made me feel a sense of belonging at A&T.	11.5%	26.9%	51.9%	5.8%	3.8%
Student conferences in this course should continue to be required.	55.8%	26.9%	13.5%	1.9%	1.9%
My conferences made it more likely that I stay at A&T for another year.	23.1%	25%	23.1%	25%	3.8%
If conferences were not a requirement of the course, I might NOT Have met with my instructor.	21.2%	32.7%	19.2%	19.2%	7.7%
In general, first-year courses should require <i>at least</i> one conference.	59.6%	28.8%	4, 7.7%	1.9%	0%
I feel as though the conferences were an important part of my learning in this course.	28.8%	44.2%	15.4%	9.6%	0%
Overall, my conferences improved my experience at A&T.	19.2%	32.7%	36.5%	5.8%	3.8%

*Data was collected on 12/1/2009 from Beth Kaufka's fall 2009 sections of UNST 110 Critical Writing 014, 034, 036 from 52 respondents.

The degree to which my case study is generalizable is certainly questionable, largely due to my small sample size and my particular personality. Furthermore, this study only assesses students' perceptions of learning; the next step, then, is to investigate the correlation between student perceptions and actual student learning, in addition to other student-related issues such as engagement and retention. Note, however, that although this study itself may not be generalizable, the survey findings are consistent with the literature on engagement and retention, as cited in the literature discussed in this article. Either way, faculty should feel optimistic about this method of interacting with students, in addition to the more traditional avenues such as collaboration on research projects and serving on committees – and faculty should be encouraged to design more thorough studies of the impact of required student-faculty conferences on learning.

IV. Implementation Trouble Spots.

I'll be the first to admit required conferences are necessarily time-consuming, particularly the first round. Think about it. Let's say you have 25 students in a class, and you teach three sections of the course for a total of 75 students. Let's say you spend fifteen minutes with each student, this comes to nearly 19 hours without factoring in any breaks, any meetings that run over fifteen minutes, students forgetting to come, getting lost on their way to your office, or standing you up altogether. Depending on what you want your schedule to look like during the scheduled conferences, this can take an entire week or even two. You might factor in some kind of consequence for students who miss their first conference. I let students reschedule, but for only partial credit. I recommend you run through familiar lesson plans and schedule light grading during your week of scheduled conferences, in addition to scheduling around committee work; I've never had to cancel a class for conferences.

Another significant challenge with time comes from the fact that, after their first conference, after you demonstrate your capacity for support, many students will use your office hours. (Some of us tend to relish our un-used office hours as a time to get work done. There are certainly times that I do!). And outside of office hours, you'll find that your students pop in "just to say hi." You can also expect to write more letters of recommendation for internships, jobs, scholarships, and study abroad programs. This can be at once both an honor and a burden. (I have been a reference for nine students already this semester, and we are just half way through.)

One way to help manage time is to give your conferences some shape by defining your goals. You will probably have larger, overarching goals like helping students develop into self-regulated, self-motivated learners. But it is helpful to have specific conference goals, and to state those goals up front with students so they understand the intentions of the meeting. Do you want to focus only on course goals, for instance: clarifying the very first major assignment and helping students get started? Or do you want to provide motivation and inspiration? Encouragement? Consider, also, structure and amount of preparation. Do you want students to come with a completed assignment to discuss? Will you have a time limit, and how will you stick to it? Do you want to have a kind of script to ensure all students get the same kind of information and attention from you? Or, do you want to just roll with it and see where the conversations lead you? Whatever way, it is helpful to both you and your students to be clear about your objectives.

It is also critical that, despite how much you care about your students, you maintain high academic standards and hold them accountable to course policies. When students make bad choices, they must suffer through the consequences. If you are doing these conferences in an effective way, they actually help students understand that you will hold them accountable for their actions, and they will not resent you for doing so. In fact, effective conferences can mediate the burden because students should know your expectations of them. One of my students wrote in her end-of-semester reflection essay:

“The meetings gave me a better understanding of your expectations [my emphasis] and my mistakes. This only allowed us to build a connection with you as our teacher and in my opinion it showed me that you were a concerned teacher who was willing to listen to our problems, assist us, motivate us, and point us in the right direction. I guess this is why I looked forward to coming to class, because you were the first teacher to show support.”

And, these conferences help mitigate the accusation that “you just don’t like me” when there is a consequence for a poor academic choice. In fact, I have never had a student lodge that complaint with me.

V. Conclusion.

As discussed above, the research clearly shows that students value personal relationships with faculty, that good teaching and high quality interactions with faculty promote growth, and the more contact students have with their teachers, the better. In general, good undergraduate education teaching practice encourages high levels of student-faculty interaction. Required one-on-one student-faculty conferences can be an effective way to positively affect student learning.

Required conferences ultimately become very memorable moments for students. For me, they are critically important for setting the tone for the class and helping students feel cared about in a way that enhances their learning. They often tell me about this directly, and many of them write about it in their end of the semester reflections. They write in surprise that I *actually care about them*. I am always both happy and saddened that this conference means so much to them – happy that I have helped them in their overall experience of their first year, and saddened that they don’t feel cared about (or respected) in many of their other courses.

The data here suggest that required conferences help students get off to a good start, help facilitate in them an awareness of what kind of students they are, their learning styles, the particular challenges they have overcome or are still dealing with. I can help them understand themselves by listening to them and telling them what I think they are communicating: *It sounds*

like you are an auditory learner; It sounds like you're saying that you miss home; It sounds like you're saying you would be willing to get some tutoring. It is also nice that students can learn about you, too, which helps facilitate a relationship of mutual respect. I tell them about my children, about the kind of student I was/am, about my learning style and the subject areas and skills that I find difficult, how I overcome my own obstacles with writer's block, procrastination, time management, and stress.

Part of our job as first-year instructors is to put a real human face on our institutions. We have the responsibility of demystifying the university while simultaneously creating a feeling of respect for higher education and creating a realistic version of what it takes to be successful. This is all nice and good, but really, when I am honest with myself, my motivation is a selfish one. The impact on student learning is secondary to the kind of joy I experience getting to know a new group of unique, interesting, and fun students each and every semester. It helps take the work out of my work.

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Academic literacy: The importance and impact of writing across the curriculum – a case study

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Abstract: The paper provides case studies of how four faculty members who teach in undergraduate and graduate programs at the Indiana University School of Informatics promote academic literacy throughout the curriculum. The paper describes the writing assignments in several courses, the objectives of these assignments in enhancing the writing skills of students, the pedagogical approaches used by the faculty members and a discussion of the results. Suggestions for assessing student writing will also be provided.

Keywords: writing, academic literacy, informatics, health informatics, legal informatics, health information administration, new media, case study.

Effective writing is a skill that is grounded in the cognitive domain. It involves learning, comprehension, application and synthesis of new knowledge. From a faculty member's perspective, writing well entails more than adhering to writing conventions. Writing also encompasses creative inspiration, problem-solving, reflection and revision that results in a completed manuscript. From a student's perspective, writing may instead be a laborious and even dreaded exercise of attempting to place thoughts on paper while developing mastery over the rules of writing, such as spelling, citation format and grammar.

Over the past several years, it has become apparent to the faculty at Indiana University School of Informatics, Indiana University Purdue University Indianapolis (IUPUI) that students entering the undergraduate programs of Media Arts and Science, Informatics and Health Information Administration as well as the Health Informatics graduate program lack the necessary writing skills needed to become successful communicators both during their studies and after graduation. The authors teach in undergraduate, both undergraduate and graduate programs and purely graduate programs, providing a broad perspective on an issue that crosses all disciplines and educational levels. The concern for the writing abilities of students has become more focused with IUPUI's adoption of the Principles of Undergraduate Learning (PULs). The first PUL, Core Communication and Quantitative Skills, encompasses the ability to "express ideas and facts to others effectively in a variety of formats, particularly written, oral, and visual formats."

Whatever the reasons may be, the bottom line is that the majority of students do not possess the skills necessary to effectively communicate in a written format that will enable them to become successful upon graduation. There is a significant need for students at all levels not only to be good written communicators, but also to understand the importance of good writing skills. In addition, an important facet of written communication is being able to critically assess the writing of others, particularly at the graduate level as well as in professional programs.

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As educators, the key question becomes: How can faculty members teach their students to become effective writers and communicators in the short amount of time that there is to interact with and influence them? The environment in which today's college students communicate is primarily one of texting and email messages. One of the main problems with these communication methods is that they may rely on the use of abbreviations and informal language. Punctuation, capitalization, spelling, organization and flow may be forgotten in favor of bits and bytes. Also, because of the immediacy of these communication methods, there is little in the way of reflection of either what is received or what is being sent. Preparing students to communicate in the real world of work is a challenge for educators in higher education. Faculty members must balance the provision of content while modeling professional communication skills using efficient tools. However, writing skills must be addressed if faculty members are to adequately prepare students for jobs that involve more than minimal levels of responsibility.

The following article has three goals. The first goal is to familiarize the reader with the experiences of four faculty members at Indiana University School of Informatics, IUPUI, in trying to bring students to an acceptable level of writing skill before students complete their degree programs. This will be illustrated through case studies. Second, as part of these case studies, examples of assignments and other approaches that were used to aid the students in developing a higher level of writing ability will be discussed. Finally, this article will provide some suggestions, based on the experiences discussed in each case study, on how written skills could be assessed in undergraduate and graduate courses, including both online and face-to-face courses.

I. Literature Review.

A study by the American Institutes of Research (Baer, Cook, and Baldi, 2006) surveyed the literacy skills of college graduates of two- and four-year programs, with the results indicating that over half of the students who responded lacked basic skills, such as understanding and executing simple instructions or balancing a checkbook. Students face the responsibility of developing their writing skills, specifically in the area of academic writing. However, it is clear that many students have difficulty with writing for a number of different reasons (Bartlett, 2003; Odell and Swersey, 2003). Another issue is how we measure excellence in writing (Dwyer, Millett, and Payne, 2006; Hacker, Dunlosky, and Graesser, 1998; Zamel and Spack, 1998; Zamel, 1987).

Concerns about effective writing among undergraduate and graduate students in higher education have been well documented. On the other hand, MacArthur (1996) thought that computers could support writing by students with learning disabilities by placing special emphasis on applications that went beyond word processing. He found that the basic processes of transcription and sentence generation, including spelling checkers, speech synthesis, word prediction, and grammar and style checkers provided ample support for writing abilities.

Stein, Dixon, and Isaacson (1994) suggest that "many writing disabilities may derive from too little time allocated to writing instruction or from writing instruction inadequately designed around the learning needs of many students" (p. 392). Their study reviewed the characteristics of students with learning difficulties and provided recommendations for teaching writing effectively to a broad range of students. The effective techniques cited in their study are: the concept of big ideas, strategies, scaffolding, and review.

Trionfo (2003) suggests that the problems experienced by students in writing effectively are attributable, in part, to their difficulties in executing and regulating the processes which underlie proficient composing, planning and revisions of their work. Another important element in achieving excellence in writing is the reflective process – the ability to critique one’s own work as well as the work of peers. As outlined by McGuire, Lay and Peters, this reflective aspect of writing is particularly important in the curriculum of professional programs as a method of teaching problem-solving (McGuire, Lay, and Peters, 2009). Holtzman and colleagues (2005), in an article about assessing the writing skills of dental students, noted that “the ability to communicate effectively has been recognized as a hallmark for membership in the learned professions.” (Holtzman, Elliot, Biber, and Sanders, 2005, p. 285).

Another study found that the formal attention given to writing practice outside of the content covered was apparent in higher education. Cho and Schunn (2007) reported that the National Commission on Writing in American Schools and Colleges (2003) supported this claim. They cited the practice of peer review of student writing, indicating that peer reviews can help instructors spend more time on other aspects of teaching by reducing the instructors workload associated with writing activities (Cho and Schunn, 2005; Rada, Michailidis, and Wang, 1994). Using several innovative approaches in order to address writing practices among undergraduate and graduate students was implemented by four faculty members at IUPUI. Their work is discussed in the following sections.

II. Case Study 1.

A. Background.

The first case describes the expectations of a Clinical Assistant Professor in the Health Information Administration (HIA) program regarding the writing skills of students. This program and its related certificates are only available at the undergraduate level. This faculty member acknowledges the fact that written communications skills for the undergraduate student in HIA must be clear and concise. Upon graduation, HIA students will be responsible for interpreting and explaining health information, especially for medical records.

B. Objective.

To encourage students to be better writers, the faculty member created three writing assignments as part of M325 Healthcare Information Standards and Requirements to give students the opportunity to develop good writing skills and to build on the knowledge and feedback from previous writing assignments in this and other courses. The Research Paper was the final writing assignment. Students were asked to explore a healthcare topic of their choice and research how the topic relates to health information. The assignments are outlined in Table 1.

C. Pedagogical Approach.

For the academic years of 2007 and 2008, HIA undergraduate students were given three writing assignments. The three assignments were given in sequential order beginning with a straightforward assessment of the student’s ability to complete an American Psychological Association (APA) bibliography and questions regarding APA writing style. This assignment

Table 1. Research paper.

Writing Assignments	Point Value
APA Citation Exercises	25
Literature Review	50
Research Paper	100

was followed by the Literature Review assignment, which required the student to take the knowledge learned from the American Psychological Association (APA) Citation Exercises and incorporate that knowledge into a Literature Review on a healthcare topic of their choice. This assignment was decisively not a formal writing assignment but did require the student to begin writing in a more professional and clear style. The assessment was on the student's ability to write in complete sentences and paragraphs and apply previously learned knowledge regarding APA citation formatting. The final and most complicated assignment was intended to give the students an opportunity to do a full research paper on a healthcare topic of their choice and to demonstrate the skills that were learned from assignments 1 and 2. The research paper contained detailed instructions on the content of each individual section of the paper, the number of resources required for the paper, the writing format of the paper and a complete bibliography and in-text citations. The proposed outline for the research paper is as follows:

- I. Title Page
- II. Table of Contents
- III. Introduction
- IV. Review of Related Literature
- V. Discussion
- VI. Conclusion
- VII. Recommendations (if appropriate)
- VIII. Half-title page for Bibliography
- IX. Bibliography

D. Results.

A total of 78 Health Information Administration students completed the writing assignments during the fall semesters of 2007 and 2008. The objectives of the assignments were to give each student an opportunity to learn from writing mistakes made on a previous assignment, correct those mistakes on the next assignment and consequently improve the student's writing skills over the course of the semester. The data revealed the following; 30% of the students in 2007 showed a significant improvement in their writing skills based on grades while 42% of the students showed a significant improvement in their writing skills in the year of 2008. The statistics indicate that well over 50% of the students in each class improved their writing skills over the course of the semesters.

III. Case Study 2.

A. Background.

The next case describes the work of another faculty member at IUPUI's School of Informatics. She teaches a number of courses in both the undergraduate Informatics and Media Arts and Sciences program. Her courses are all offered online and are primarily related to law and legal informatics. These courses are required for the legal informatics area of concentration within the undergraduate Informatics program.

B. Objective.

Aware of faculty concerns as well as her own experience teaching in undergraduate programs, all of the faculty member's courses require students to participate in weekly written discussion forums as well as to complete a comprehensive final project at the end of the semester. The weekly discussion forums are one important approach that the faculty member uses to build community in her online courses, but they are also the method that the faculty member uses to be sure that students are actively participating in the course throughout the semester. The final project is similar to a take-home examination and requires comprehensive responses to 10-12 essay questions based on real-world scenarios.

C. Pedagogical Approach.

For Fall 2009, the faculty member taught two online courses in the School of Informatics. One course, Foundations in Legal Informatics, was being taught for the fifth time. A newly developed and approved course, Electronic Discovery, was taught for the first time. OnCourse (an online teaching and learning interface) was used to deliver the course content. Both courses were arranged as weekly modules. At the end of each week, students were required to use the discussion forum feature of OnCourse to respond to a series of written questions about the module, the reading assignment, supplemental material and the podcast (called a Fireside Chat). Questions also included an opportunity for students to report any experience they had with the topic of the module, how the topic related to their future careers and any other interesting or surprising issues raised in the module or the reading assignment.

An example of discussion forum questions from one module of Foundations in Legal Informatics is included as Appendix 1. Because of the nature of the questions, the amount of writing that students need to do to respond to the questions is extensive. At the end of each week, the faculty member would read the responses to the discussion forum. She would then provide a podcast summarizing the responses to the discussion forum questions, highlighting particularly those responses that presented unique perspectives, comprehensive treatment of the question or especially noteworthy comments. Students were identified by first name in the podcast, which contributed to the sense of the community in the courses as well as provided individual feedback to students on their responses. Participation in the weekly discussion forums is also identified on the syllabus and other course information as corresponding to PULs 1A: Core Communication – Written, Oral and Visual Skills, 2: Critical Thinking and 3: Integration and Application of Knowledge.

The second requirement of the faculty member's online courses is a comprehensive Final Project, which is essentially a take-home final examination. Students are given access to the final project questions several weeks before the due date, which is the end of the semester. The final project is based on a real-world scenario. For example, in the Electronic Discovery course, students were asked to imagine that they are experts in electronic discovery and have been hired

by a law firm. They were asked to respond to a series of questions from a senior partner about the implications of electronic discovery for the law firm as well as for two of the law firm's clients, which are major multinational corporations. The syllabus and other course material indicates that the Final Project corresponds to PULs 1A: Core Communication – Written, Oral and Visual Skills, 1C: Core Communication – Information Resources Skills and 3: Integration and Application of Knowledge. Examples of some of the questions from the Final Project in Electronic Discovery are provided in Appendix 2.

D. Results.

There is a direct correlation in the faculty member's online courses between regular participation in the weekly discussion forums and the final course grade. Student engagement in online courses is one predictor of student success, so this connection is not surprising. In fact, students have reported that the combination of weekly discussion forums and podcasts created a sense of community that nearly replicated what would be found in a traditional face-to-face course. For purposes of this paper, another benefit of the discussion forums is that students are writing every week and are then receiving feedback on their responses. Because of the nature of the discussion forum questions, the amount that students are required to write each week can be substantial. The questions are varied to discern student experience with the topic of the module, their comprehension of the material, their ability to apply the material to various scenarios, their likelihood of using the material in their future careers and whether there were issues in the module that they found surprising or interesting. It is particularly interesting to see which students will be the "first responders" to each weekly discussion forum and to observe when student responses become more robust as the semester progresses.

Likewise, the comprehensive Final Project also means that students must apply what they learned throughout the semester to a real-world situation. By the end of the semester, students who have participated regularly in the weekly discussion forums will already have done a considerable amount of writing. There also appears to be a correlation between regular versus inconsistent participation in weekly discussion forums and high and low scores on the Final Project. This is somewhat to be expected, since a student who is engaged in the course is likely to be motivated to do well on both the weekly and the final course requirements. However, it could also indicate that students who have reached a certain level of comfort by having to write each week are not as intimidated by the prospect of a comprehensive, essay-style assignment.

IV. Case Study 3.

A. Background.

The third case study focuses on writing skills in both undergraduate and graduate students. The course selected was titled Research and Design Methods, which was offered between the fall of 2005 through the spring of 2007. In this course, students were expected to conduct informal research and write on a topic of their choice.

B. Objective.

For this course, a qualitative approach was used as a framework to enhance the student’s writing skills. Students were asked to identify a research topic in their field and to conduct informal investigation based on their research statement or hypothesis. A list of research titles is presented in Table 2.

Table 2. Research topic proposal list.

Gender	Academic Status	Research Title
F	Undergraduate	The Technology Behind K Zone
F	Undergraduate	Adobe Premier Pro 1.5 vs. Sonic Foundry Vegas Video
F	Undergraduate	GIF vs. JPEG: Which is the Better Format on the Web?
F	Undergraduate	3D Studio Max vs. Maya
M	Undergraduate	The Videogame’s Composer
M	Undergraduate	Video Game Design Should Go Back to the Basics
M	Undergraduate	The Video Game: Three Dimensions
M	Undergraduate	Interactive Software Applications: Education for Health Patients
M	Undergraduate	Programming Flash vs. HTML- A Comparison
M	Undergraduate	I Want My MP3 (I Think)
M	Undergraduate	Game Design Development
M	Undergraduate	The Challenges of Using and Displaying Japanese Text
M	Undergraduate	Defining WWII DVD Documentary Standards
M	Undergraduate	Flash Animation: An Overview of the Design Process
M	Undergraduate	WWJP: What Would Jesus Play?
M	Undergraduate	The Future of 2-D Animation in an Increasingly 3-D World
M	Undergraduate	An Evolution in Console Controllers
M	Undergraduate	From Table Top to Desktop: The Evolution of Role-playing Games
M	Undergraduate	Interactive Cinema
M	Undergraduate	Sound and Its Affect in the Medical and Psychological Area
M	Undergraduate	Video Games: A New Form of Substance Abuse?
F	Graduate	A Survey of Archaeology in the Digital Age
M	Graduate	Realism in Animated Pedagogical Agents: Not Yet Realized
M	Graduate	An Instrument to Aid and Assess the Learning of Introductory Video Game Design

Students learned to identify research issues in the field of Media Arts and Science, articulate clear thesis and research statements, explore available scholarly literature, conduct an exhaustive literature review in the topic of interest, and adhere to the APA style of writing. The course included student peer-reviews of each other’s work as well as instructor feedback. Toward the end of the semester, students gave formal presentations of their work.

C. Pedagogical Approach.

The pedagogical approach for these classes consisted of the logical steps toward writing a good research paper. In order for each student to achieve acceptable results the instructional theories of ‘Learned by Doing’ and constructivism were utilized. Students were able to build on and construct new knowledge about the research process as it pertained to their style of writing

Within the first two weeks of the course, students were asked to submit a topic proposal describing their areas of research interest. Students were instructed to include a sample reference

list of 10-15 references. The topic proposal provided the instructor with a glimpse of intended research and gave an illuminating view of each student's current writing skill-level.

Students were then given examples of excellent and poorly written thesis and research statements. Students were asked to write five examples of hypothesis and/or research statements based on their proposed research topic. In order to engage students in this process, a participatory approach consisting of student peer-reviews was a weekly activity throughout the semester. Once student research statements had been approved, students were instructed on how to develop an outline for their research papers. The proposed outline for their research papers consisted of the following:

- I. Introduction
- II. Literature Review
- III. Methods
- IV. Findings
- V. Summary
- VI. References
- VII. Appendices
- VIII. Abstract

Students produced several drafts for each section of the research outline during the semester. Student peer-reviews and instructor feedback were given for each draft submission. In order to review papers effectively, students were given written instructions on the review process, along with a scoring rubric (see Appendix 3).

Students were required to create and deliver a PowerPoint presentation as a succinct review of their research efforts. Students were given 15 minutes and expected to present no less than fifteen slides. The final slide in their presentation was to list three "unresolved issues" in the area of research they had selected then ask for questions and comments from their audience.

D. Results.

Between the fall of 2005 and the spring of 2007, a total of 24 students (3 consecutive semester classes) completed a research paper in the field of media arts and science. Papers were completed by ten students (eight undergraduate and two graduate students in the fall of 2005, seven students (seven undergraduate students (in the fall of 2006, and seven students (six undergraduate and one graduate student) in the fall of 2007).

Students produced papers of varying lengths based on their efforts in conducting qualitative inquiry and literature reviews on their topics of interest. All papers adhered to the APA Style of writing. Although students were instructed to engage in the writing process and make this one of their best works, issues of spelling, grammar, punctuation, and clarity surfaced repeatedly. Students conducted peer-reviews of each other's work and received detailed feedback from the instructor. Overall, student scores improved steadily from draft-to-draft submissions. Using this meticulous review process, students were able to reflect and learn from their mistakes. This process contributed to and reflected an increase in writing skills and learning outcomes for students based on their final research paper submissions.

V. Case Study 4.

A. Background.

The final case study presents the work of a faculty member in the School of Informatics Health Informatics program. This faculty member's focus was on the approach of academic literacy as an act of participation and that learning happens in communities of practice. The course titled, "The Social Impact of Information Technology" had students apply not only writing skills learned in previous courses but also connect writing to critical reading/evaluation of scientific manuscripts.

B. Objective.

For this course, students are encouraged to write a research paper on a topic of their choosing related to the impact of the information technology on the society. Faculty recognizes that writing is a complex process that involves a series of recursive activities and not linear: Students reexamine their thesis, consider and reconsider additional points or arguments, and reshape and reconstruct repeatedly rather than move through the writing process in discrete stages. Consequently, the faculty creates research writing-reading groups, in an attempt to address the four core criteria for student writing—critical thinking, use of language, structuring, and argument. Furthermore, as part of academic literacy, instructors not only need to develop students' academic writing, yet they also need to prepare them for externally mandated large-scale document critical evaluation, including online documents. The rationale of peer assessment of academic writing is providing the learner opportunities to develop tacit rather than explicit knowledge about the meaning of the core criteria and how they are applied rather than focusing on internalization of explicit rules or standards for academic writing (Elander, Harrington, Norton, Robinson, and Reddy, 2006).

C. Pedagogical Approach.

The pedagogical approach for the academic years of 2007 and 2008 in this course consisted of seminars designed to stimulate and direct thoughts around the student's selected topics related to legal and ethical impacts of information technology and technology advances and also topics related to socio-economic. The students read selected readings on those topics as well as independent readings. Students participated in group research projects: assess societal issues related to information technology and technology advances in their work field, formulate a research project, review research literature, write a report, and present the project in class. Critical reading, thinking, and writing are applied through this process. At the end of the semester, each student completed the evaluation criteria on two other students' papers. The outline of their evaluation criteria consisted of the following areas:

- I. Title
- II. Problem
- III. Purpose
- IV. Literature Review
- V. Methodology
- VI. Hypotheses/questions

- VII. Results
- VIII. Interpretation of results and conclusion
- IX. Project Phase
- X. Overall

D. Results.

A total of 36 students completed the evaluation criteria during the 2007, 2008 and 2009 academic year. The intention of this assignment was to give each student an opportunity to apply critical reading, writing, and thinking into their research paper. Also, it gave them an opportunity to receive feedback from their peers as well. A spreadsheet was created to see the differences between the 2007 and 2009 reviewers and students. The spreadsheet consisted of six different tabs with the reviewer number, student number, and areas from the evaluation criteria assignment. The tabs include Overall, 2007, 2008, 2009 Reviewer's Average, Student Average, and Overall Average. The data from these sections reveals that the project phase and methodology were graded the heaviest in the overall average section. Overall, the area that received the lowest score on the evaluation was the project phase. The Title, Problem, and Overall areas received the highest score throughout the entire evaluation. A major concern about this assignment's outcome is that several students have high grades with inadequate feedback while only a few gave low grades with valuable feedback. It appears the reviewers who gave, on average, students lower scores on their evaluations received higher on their own papers.

In 2009, it can be seen that Students # 1, 7, and 12 gave other students the lowest score on their final grades and also received the highest grades on their papers (Figure 1). In turn, Students # 2, 3, and 11 gave the highest scores on reviews and received the lowest final paper grades. This assignment is the most effective when students put in more time and effort into each other's papers. The strong connection between reading and writing supports these data since good writers are typically careful readers, as reported in *Academic Literacy: A Statement of Competencies Expected of Students Entering California's Public Colleges and Universities, 2002*. Strong writers can better evaluate another person's writing because they are aware of proper writing forms; knowing how to create a clear thesis with strong supporting elements makes it easier to identify one.

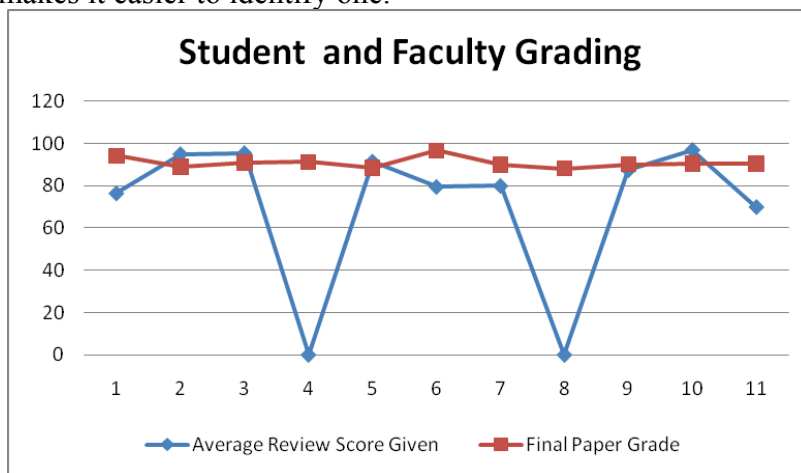


Figure 1. Peer review scores.

VI. Conclusion.

The paper provided case studies of how four faculty members who teach in undergraduate and graduate programs at the Indiana University School of Informatics promote academic literacy throughout the curriculum. The paper described the writing assignments from several graduate and undergraduate online and face-to-face courses, the objectives of these assignments in enhancing the writing skills of students, the pedagogical approaches used by the faculty members and a discussion of the results. These assignments included research papers, weekly discussion forums, “learning by doing” and comprehensive final projects. Several suggestions for assessing student writing were also provided, including review by peers, evaluation at various stages of the assignment, self-reflection and feedback through weekly podcasts.

Appendices

Appendix 1. Sample discussion forum questions.

- Have you used the Internet for research? When you search the Internet, are you generally satisfied with the information you retrieve? Do you have any special search strategies?
- What is your favorite search engine and why? Do you generally use more than one search engine?
- What are some of the issues in using the Internet for legal research? How could you assure yourself that the information you retrieved was valid? What are some of the characteristics of the Internet that argue for or against using it for legal research?
- Do you use any of the other features of the Internet such as listservs, newsgroups, IRC, IM or FTP? If so, please describe.
- Of the many ways that law firms use the Internet, which seem the most valuable to you?
- In terms of law firm websites, what are some of the ethical issues involved? Why is it important for lawyer advertising to be strictly regulated? Have you seen advertising that you believe "crosses the line" of what should be considered ethical conduct? How have the Internet and email exacerbated the issues with law firm advertising?
- What are some of the ethical considerations with email? Do you think that the ABA's opinion on the confidentiality of email is sufficient to protect clients? What other suggestions would you have about securing information about client matters that is sent via email?
- Any other interesting points about Module 9 or the reading assignment.

Appendix 2. Examples of questions from final project.

Pretend that you were hired as the electronic discovery expert in a law firm. The law firm has just been retained by a major multinational corporation for a legal matter that will involve a large number of people who all will have a great deal of electronically stored and paper information. This is a complex case that will have high visibility in the media. The senior partner of the law firm has been in practice for a number of years - and this age of digital evidence is new to him. You are eager to show why the law firm needs an electronic discovery expert on staff. He has asked for a thorough explanation of the following topics:

1. Discuss several of the major legal cases that address issues related to electronic discovery. Naturally, the Zubulake case should be included. How have these cases shaped our understanding of electronic discovery and how should our law firm proceed?
2. What were the revisions to the Federal Rules of Civil Procedure and how will they impact the case? What are the risks? What are the law firm's responsibilities under the FRCP? What are the client's responsibilities? What is the timing of activities related to the electronic discovery process? How will the costs be covered? How does the FRCP interact with other legal doctrines on what we can present at trial?
3. What are the similarities and differences between electronic discovery and computer forensics? To what extent might computer forensics be utilized in the case? What are the computer forensics technologies that we should use? What are the best practices? What criteria should we use to hire a computer forensics expert? Search the web for a vendor that offers computer forensics services/expertise. How does this vendor compare against these criteria? What more would we need to know about the vendor before using it for our client's case?
4. Define each stage of the electronic discovery process. What is included in this stage? Why is this stage important? What are the considerations for our law firm? For the client? Discuss the available technologies for each stage of an electronic discovery process. How does each kind of technology address what needs to be done? How does the technology save costs, reduce risks, reduce the opportunity for human error, etc.? Discuss the EDRM as the current standard for electronic discovery. Search the web for a vendor that offers electronic discovery services/expertise. What stage or stages within the EDRM does this vendor focus on for its products and services?
5. We are planning for the required "meet and confer" conference. What should we be prepared to do at that conference? What do we want to accomplish? What will we request? What issues might be raised? How might we respond to requests from the opposing party that involve legacy systems, various file formats, backup systems or would require costly or burdensome efforts? How could we narrow the scope of discovery requests?

Appendix 3. Peer-Review Scoring Rubric.

Question	Excellent	Good	Fair	Poor	Missing
Does the topic proposal describe the area of intended research effectively?	5	4	3	2	1
Is the importance and/or significance of the research problem identified?	5	4	3	2	1

If you gave a score of 4 or 5, explain its strengths

If you gave a score of 3 or below, explain its weaknesses. Inform the author where clarification or re-writes may be necessary.

In the author's draft, point out trends or themes you feel would be appropriate for their research. (List at least three areas)

Does the author make a convincing argument for the need to study this topic? (Indicate yes or no and explain your response.)

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Pedagogical documentation and collaborative dialogue as tools of inquiry for pre-service teachers in early childhood education: An exploratory narrative

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Abstract: The purpose of this paper was to examine how pedagogical documentation and collaborative dialogue served as tools of inquiry for a group of undergraduate Early Childhood Education pre-service teachers at a Midwestern university. The research was a collaborative effort of several faculty members who formed a Scholarship of Teaching and Learning group. A reflective, inquiry approach to this research uncovered several potential themes. This article, specifically, examined the relationships that occurred with collaborative dialogue and pedagogical documentation and how it enabled the pre-service teachers to understand the learning processes more fully, the benefits to utilizing collaborative dialogue and pedagogical documentation, and the misconceptions that emerged.

Keywords: collaboration, reflection, pedagogy, inquiry-based learning, documentation.

This study was a reflective, inquiry investigation on the importance of pedagogical documentation and dialogue that occurred in an Early Childhood Education (ECE) program over a period of three years. More specifically, the study focused on how weekly teaching team meetings with undergraduate pre-service ECE teachers contributed to documentation as a tool of inquiry, what the role of dialogue and sharing of perspectives were, and how they, in turn, facilitated the pre-service teachers' learning and/or teaching. This study was conducted by a SOTL research group, who agreed to embark on a collaborative research project designed to investigate some aspect of their own teaching and classroom practice. A weekly meeting known as the ATTM (All Teaching-Team Meeting) allowed us to focus on this investigation as it gathered everyone teaching in the preschool labs for sharing and discussing current documentation pieces. The reasons for utilizing these meetings were several: a) we, as faculty, were involved in the ATTMs at some level; thus, it was a shared venture; b) all of us held a common belief that teaching was advanced through reflective inquiry; thus, this was an excellent opportunity to study reflective practices among pre-service teachers; c) we all shared the belief that the results of this inquiry should be made public, available for critical review and accessible for exchange and use by other teacher educators; and d) we wanted to find out more about why the pre-service teachers did not recognize the value of documentation and dialogue.

Therefore, the purpose of this study was to investigate the impact of collaborative dialogue and pedagogical documentation as tools of inquiry with pre-service early childhood

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teachers enrolled in their student teaching experience. This study was guided by the following questions: 1) How do the weekly teaching team meetings contribute to documentation as a tool of inquiry? 2) What is the role of dialogue and the sharing of perspectives? 3) Specifically, how does the process of dialoguing and sharing perspectives facilitate student's learning and/or teaching? In what ways?

I. Theoretical Framework.

This study was guided by a social constructivist, inquiry-based learning, Reggio Emilia-inspired thinking. Social constructivism views learning as a social process and posits that all knowledge is constructed in a social and cultural context (Vygotsky, 1978). Inquiry-based learning means to seek answers by questioning oneself and/or others. Learning occurs through the use of socially constructed inquiries made by individuals and by proposing these questions and seeking answers to further one's ideas and thoughts. Being Reggio-inspired, to us, meant utilizing the ideals and principles of the Reggio Emilia approach but within our own set culture and way of teaching and learning. This meant that we emphasize and utilize critical and reflective thought and attitude toward what we do and why we do it. We interpret what we do and why we do it by involving ourselves and others in conversation, debate, and reflection on individual and collective understandings. We value the importance and relationships of all parties involved: children, parents, and teachers.

Part of our curriculum focused on utilizing pedagogical documentation and collaborative dialogue as tools of inquiry. Pedagogical documentation, used widely within Reggio-inspired settings, provides evidence of children and teachers' learning and thinking. According to Rinaldi (2006), pedagogical documentation, in the education field, is the process of gathering evidence of children's learning through observations, work samples and conversation transcripts; children's and teachers' reflections are then analyzed, interpreted and shared through such means as dialogue.

Pedagogical documentation is not only a way of making children's learning visible, it also helps to make our thoughts, ideas, and interpretations of learning visible. Documentation serves as a historical record of past events and provides us with ideas for future experiences as well as a means for sharing evidence with family members or others. Examples of our documentation included, but were not limited to, daily journals, anecdotal notes, field notes, observations, conversation logs, journals, panels, and portfolios. Individuals need to make choices about documentation such as selecting items that show promise for future interpretation (Scheinfeld, Haigh, and Scheinfeld, 2008).

According to Fleet, Patterson, and Robertson (2006), pedagogical documentation is also a strategy that allows us to better understand children, to develop meaningful curriculum, to lead an inquiry, and to develop insights into their own learning. Using pedagogical documentation of individual and group learning provides opportunities for reflection and reinvention, components essential to professional growth and development. When we document children's learning, we consider and reflect on what the children may be thinking, doing, and/or learning and then apply these insights to their unique manner of teaching them. Documentation provides qualitative evidence of the children's current thinking and learning and leads to the development of new possible strategies to assist children in reaching the next learning steps. It can assist decision-making about whether children need additional support systems (Dahlberg, Moss, and Pence,

1999). Further, documentation provides us with evidence to promote active learning experiences, demonstrate effectiveness of teaching strategies, support diverse learners, assess children's progress, meet accountability requirements, involve families in their children's education, and encourage teachers to self-reflect and grow as a professional (Helm, Beneke, and Steinheimer, 1997).

As an essential component of pedagogical documentation, dialogue requires us to confront, question, and understand one another's ideas through the exploration of a variety of documentation pieces. According to Bohm (1996), dialogue elicits questions, values, emotions, ideas, and beliefs in a joint quest for meaning. Language, relationships, thinking, and contexts are interactive and interconnected. Guidici, Rinaldi, and Krechevsky (2001) and Rinaldi (2006), state that documentation should be structured to foster exchange and dialogue. Giacomini (2007) reiterated this point indicating that when we engage in dialogue, we must be willing to take risks, knowing that questions and differing ideas may emerge. Additionally, we must engage in dialogue with each other, with the children, and with the parents and families to further our curriculum as we all play an active role in the development of the curriculum. This process is referred to as a "negotiated" curriculum (Rinaldi, 2006; Kantor and Whaley, 1998). During the process, learning and development by each participant is socially mediated by the other group members. We are able to make sense of experiences and order their thoughts by contributing to the dialogue and using their increased understanding to transform curriculum.

Our program values and utilizes dialogue so that we may interact productively, exchange ideas, work on problems, revise thinking, share understanding, and accommodate when differences arise. According to Rinaldi (2006), "Dialogue engages discussion and the comparison of ideas, it permits us to analyze and to formulate hypotheses and predictions, and thus to consolidate our thinking" (p. 58).

II. Historical Background.

Since fall 2004, our student teachers (pre-service teachers) teaching within the program attended a weekly meeting, known as the All-Teaching-Team Meeting (ATTM). A discussion format began by utilizing the Project Zero format, which focuses on sharing some form of documentation with others (Project Zero and Reggio Children, 2003). After some time, the preschool administrative team felt the format was too confining and didn't allow for open-ended comments and ideas. After a visit to the St. Louis Reggio Collaborative Conference in January 2007, the preschool administrative team decided to utilize a dialogue process that would provide pre-service teachers with a unique opportunity to discuss their documentation pieces during the weekly meetings. The process, known as the *World Cafe Approach*, enabled us to have creative conversations while sitting café-style around small tables (Brown, Isaacs, and World Café Community, 2005). After a limited time, we moved to a new table and the conversation continued. One member of the initial group remained at the table to host the new conversation and helped to build linkages between the different strands of information.

According to Brown, Isaac, and World Café Community (2005), the principles of the *World Café Approach* are to clarify the purpose, create a hospitable space, explore questions that matter, encourage everyone's contributions, connect diverse perspectives, and listen for insights and share discoveries. The preschool administrative team saw an additional need for a questioning component as an addition to this overall process. In these meetings the pre-service

teachers presented and discussed children's learning experiences and investigations occurring within individual classrooms. Further, the team observed that pre-service teachers were not contributing to the meetings to the extent anticipated during this time period. The pre-service teachers also seemed to not recognize the value of documentation and dialogue and were not prepared when they were to present their documentation pieces. It was during this time that we agreed to embark on a collaborative research project designed to investigate some aspect of our own teaching and classroom practice as it relates to documentation, dialogue, and reflection. The questions needed to focus on analyzing and reviewing each presenting group's documentation pieces.

III. Methods.

A. Context.

This study utilized a qualitative, reflective inquiry approach, one that systematically collects and interprets data on a periodic basis. We needed to be reflective inquirers in order to gain a deeper understanding of the content, to gain a better understanding of the scientific process, and to improve their skills by reflecting back on what we do and say (Loh, Reiser, Radinsky, Edelson, Gomez, and Marshall, 2001). This type of approach was firmly grounded in the socio-constructivist approach as it enabled us to be engaged in the application of the principles being studied. As reflective inquirers, we carefully recorded the activities of the investigation, monitored the process being made in the investigation, and communicated the process and results to others. This approach was specifically used to better understand pre-service early education teachers' perceptions and thoughts on collaborative dialogue and pedagogical documentation.

The study was conducted over a two-year period, between 2007 and 2009, at a university laboratory center serving 112 children, toddlers through kindergarten. The center's philosophy is Reggio-inspired and inquiry-based, placing value on teachers as researchers who use reflective inquiry as a means to examine and make sense of their experiences and encounters with children. Inherent in this philosophy is the assumption that pedagogical documentation and dialogue can help us engage in collaborative efforts to further learning and gain insights into practice, thus strengthening the theory to practice link.

B. Participants.

Approximately 100 pre-service teachers, who were student teaching within the five-semester time period, were asked to participate in the study by first completing an informed consent document, approved by the university's Institutional Research Board. Participation in the study did not have any bearing on grades or evaluations. During the five semesters the research took place, approximately 20 pre-service teachers student taught within the laboratory settings. There were approximately 3-4 pre-service teachers within each lab, and each lab was identified as a "teaching team". Over 95% of the participants were female and the remaining 5% were men.

C. Procedures.

In order to gain purposeful data for the research questions posed, six data collection methods and procedures were utilized: videotaping and audio-taping, weekly student reflections, teaching team reflections, interviews, and student final reflections (Bogdan and Biklen, 1998; Clandinin and Connelly, 1994; and Creswell, 1994).

Pre-service teachers were asked to write down their small group's thoughts and ideas on a piece of paper each week, write their answers to two reflective questions each week, write their teaching team answers to another reflective summary consisting of four questions two weeks after their teaching team presented, and write a final reflective paper responding to six questions focusing on the overall learning that took place during the semester. Randomly selected pre-service teachers also completed a semi-structured interview that consisted of a minimum of eight questions. All meetings were audio- and videotaped. These strategies are described in detail below.

Videotaping and Audio-taping. During each ATTM, the conversations at each table were audio-taped and videotaped. Approximately 28 ATTM's (meetings) each lasting one hour were analyzed. The audio-recordings were compared to notes taken to ensure complete transcription (face validity reasons).

Weekly Student Reflections. The pre-service teachers were also asked to answer a few questions regarding the overall process and to indicate whether any curricular changes were made due to the weekly meeting's content. Specific questions included: (1) *How did last week's discussion impact or assist your learning and/or teaching this week? and,* (2) *What 3 key concepts/discoveries will you take back from today's discussion that you intend to apply in your role as a professional?*

Each week the information was gathered and typed by one of our research group members for the presenting team to peruse. The teaching team then reflected upon what was discussed the following week and determined what changes would be made within the environment and/or the curriculum.

Teaching Team Reflections. Teaching team reflection papers were completed two weeks after the teaching team presented. That information was also typed up by one of our research group members. Specific questions included: (1) *How did your lab change the classroom environment or curriculum after presenting at the ATTM?* (2) *What are you currently doing that reflects back to the ATTM discussion?* (3) *Did you discuss your insights with your teaching team? If so, what new information emerged? and,* (4) *How did the ATTM impact your personal philosophy on teaching and/or learning?*

Interviews. Semi-structured interviews with randomly selected pre-service teachers were conducted by our group for three of the five semesters; each lasted a minimum of 1 hour in length. The interview questions asked pre-service teachers about their current ideas and thoughts on the value of documentation and dialogue and whether their learning and/or teaching had changed due to the ATTM content and process. Additional probing questions were asked in order to elicit pre-service teachers' responses or for clarification purposes. The interview questions and answers were transcribed and provided to the SoTL members. Specific questions included: (1) *What is documentation?* (2) *In what context do you plan to use documentation and how?* (3) *How has the process of talking with others in the Friday morning meetings helped you and/or your classmates?* (4) *How did the process of dialoguing with your peers and sharing perspectives facilitate your teaching? In what way?* (5) *What do you perceive and understand*

about the concept of reflective practice? (6) In what context do you plan to engage in reflective practice? and, (7) How would you do that? What strategies would you use?

Student Final Reflections. At the end of each semester, the pre-service teachers completed a final reflection. These responses were typed and distributed to the SOTL members for further analysis. Specific questions included: (1) *How (or in what ways) have our Friday morning meetings helped you in using documentation?* (2) *How has talking with others about documentation during our Friday morning meetings helped you?* (3) *In what ways has it helped you to see things differently?* (4) *How has the sharing process we have engaged in on Friday mornings been beneficial?* (5) *How did the process of dialoguing and sharing perspectives facilitate your learning? In what ways? and, (6) How did the process of dialoguing and sharing perspectives facilitate your teaching? In what way(s)?*

IV. Findings.

The study results were triangulated using multiple sources of data to confirm the findings within this study (Berg, 2008; MacLean and Mohr, 1999; and Campbell and Fiske, 1959). After the data was read thoroughly by our research group, inter-rater reliability analysis was conducted by finding commonalities among everyone's ideas. From there, two of us reviewed and analyzed the weekly notes while the other two members reviewed and analyzed the teaching team reflections and final student reflections a minimum of three times each. Commonalities were again found and interwoven with one another. There was 90% inter-reliability between researchers' ideas and themes. The interviews were used as a validity and reliability tool, noting that students' responses were similar overall and contained responses that replicated the reflections and notes. Several themes emerged.

A. Themes.

Upon reviewing the data, we collectively found several core themes. Four main themes emerged: (1) Understanding Documentation as a Process, (2) Awareness of Others' Ideas, (3) Articulating Ideas, and (4) Developing Curriculum Ideas. These themes were supported by ideas the pre-service teachers wrote about in their reflective summaries and discussed during the interviews along with other supporting notes. Although the questions were different between the interviews and reflective summaries, there was a consistent trend of the themes that emerged.

Understanding Documentation as a Process. The majority of pre-service teachers' responses that emerged about documentation were favorable stating such things as: "It has encouraged me to use very critical thinking and evaluation when looking at photographs and dialogue." "Being able to explain and defend what you were doing and why. If you want to teach something, you have to be willing to defend it." "Documentation is the process of recording observations and dialogue." "It helped me to look at my teaching and all the ways you can document. Being able to open to let the children teach you and learn themselves." "Documentation is about recording experiences. It describes what happened, how it happened and what was learned through the experience. There are many forms of documentation." And, "I realized that everything can be broken down and given ways to enhance."

One insight that we found occurred when we asked our pre-service teachers the question, "How (in what ways) have our Friday morning meetings helped you in doing documentation?"

and the pre-service teachers responded that the meetings hadn't helped in learning about documentation. One student said, "I don't feel that we discussed documentation during our Friday morning meetings." "The Friday morning meetings have been about where we can take our projects, not really about documenting anything." Yet another said, "I don't specifically remember discussing documentation."

This caused us to wonder, "Do our pre-service teachers really know what documentation and the process of documentation is?" "Is their understanding of documentation too narrow? Do they understand that the process of documentation also includes discussing and questioning the documented work?"

First, do the pre-service teachers really know what documentation means? Based on the comments throughout the reflections, some pre-service teachers stated they did not understand what documentation was by stating such things as, "This has not helped me with documentation." "I don't specifically remember working on documentation." "These meetings have not specifically helped with documentation." However, these same pre-service teachers articulated their knowledge of documentation by stating, "It (the meetings) helped me take a step back and look at things in a different way" or, "It (the meetings) taught me to look at what the child was doing and to look at the child's perspective." Another student stated, "It (the meetings) helped us to better understand the children in the classroom." Some of the things that pre-service teachers stated which showed the benefit of documentation were, "It allowed me to see different ways of documenting." "These meetings have encouraged me to look what the children are doing and to really listen to what they are saying." "It showed me that documenting a child's work is important and everybody can learn from it."

We also wondered if the pre-service teachers understood the words, "doing documentation" as the work of observations, conversations, and taking pictures in addition to discussing the possible meanings in their pre-service teachers' work and the children's work. Students mentioned they didn't understand or complete documentation, yet were able to describe what documentation was. For example, one student stated, "I never talked about documentation. I talked about the children and what I saw." Yet another student, "We didn't talk about documentation but I know I learned a lot about what we could do for activities in the classroom from what we presented."

Different responses also caused us to ask the question, "Could we have asked the question in a different way? Perhaps by asking, "How have the meetings increased your understanding of the documentation process or how have the meetings helped you to use documentation in lesson planning?" pre-service teachers would have answered differently, showing their understanding of the process of documentation.

Based on our reflections on this outcome, we felt that pre-service teachers were beginning to understand how the meetings contributed to documentation as a tool of inquiry as they provided initial comments and ideas that focused specifically on that issue.

We also arrived at two possible conclusions as to why the pre-service teachers were not answering the questions as we had hoped. We were uncomfortable with the notion that pre-service teachers did not fully understand the process of documentation and realized that the pre-service teachers were showing their understanding of specific components related to documentation instead. Yet, if we believe that knowledge is co-constructed and is a process, then we needed to acknowledge that the knowledge can be partial and incomplete at times. Second, it caused us to consider our own teaching. Perhaps we needed to be more explicit in our own

explanations and more intentional by drawing attention to specific processes and naming them again for the pre-service teachers. Further, we needed to be more aware of individuals' experiences by discussing what was done in the documentation process and deconstructing with the pre-service teachers what it was that we just did. The findings also demonstrated, however how sharing documentation improved such things as being more aware of others' ideas, articulating one's ideas to others' and making curricular changes.

Awareness of Others' Ideas. Some of the core benefits that were continually expressed by the students were the ability to be aware of each other's perspectives and to be aware of their own perspective. One student expressed: "Other people can see things that we could never think of or they interpret things differently than intended." Other students stated, "I think sharing everybody's view helped understand different perspectives. I learned what others were thinking compared to what I thought. It also helped me to be open and look at all the angles." "The other students helped me think through what I was doing and made me more aware of why and what I was doing in the classroom." "I think that talking to other students and seeing what was/wasn't going well in their classroom helped us to reflect on ours and hearing other people's insights allowed us to further our investigation."

Additionally, a student mentioned how it impacted her learning by stating, "It helped to look at things in a different light. I value everyone's opinions because most likely it isn't one I thought of yet. This all benefits me because I get to share my opinions and ideas as well." Other students felt the children's perspectives were equally important by stating, "We need to think carefully about the intentions of the children." "When children are engaged in fantasy play, it is important to step back and listen to the conversations. By doing this the teachers will gain a better understanding of their thought processes. This type of imaginary play can lead the teacher into what the interests that child possesses." "Knowing what the children want to do is important because then they become interested and engaged in what we are teaching them." "I want to ask the children what their ideas are so that I can expand and challenge them to higher levels of learning." And, "The children opened up more and were able to express their thoughts and concerns to me, more so than in the very beginning of the semester."

Based on our reflections and analysis, these responses provided evidence that students saw the value in what others may offer them to improve their teaching and/or learning. These multiple perspectives showed the importance of dialoguing with others and getting unique perspectives to be aware of and further one's curriculum and overall teaching. Specifically, the pre-service teachers not only saw one another as a potential resource but the children as an added resource when questions needed to be answered.

Articulating Ideas. One of the initial goals for the weekly discussions was to have pre-service teachers actively engage with one another in a dialogue that impacted not only them but other pre-service teachers. We wanted them to see the value of talking with one another about their work and the impacts it could potentially make to their future decision making. One of the benefits that emerged from these discussions was the professional growth that the pre-service teachers reported. This professional growth included increasing their confidence levels in public speaking and sharing their ideas with others. For example, one student stated, "The meetings have enabled me to be more comfortable speaking in front of others and to offer my work for criticism." Other students stated, "This helps me to establish my independence and responsibilities as a teacher." "I think that it may help me be able to share my ideas with

colleagues in the future.” “Talking with others has helped me see how important it is to talk with professionals in the field.”

Based on our reflections and analysis, the impact of sharing ideas and instilling the desire for collaborative dialogue with one another confirms that learning and development occurred. The reflections indicated that the pre-service teachers engaging in dialogue interacted productively, exchanged ideas, worked on problems, revised thinking, and shared one another’s understanding, components of collaborative dialogue. Essentially, the pre-service teachers demonstrated the value of collaborative dialogue with others, particularly other professionals, and how it changed their overall ideas and thoughts.

Developing Curriculum Ideas. Another theme that emerged was that pre-service teachers identified the importance of collaborative dialogue for curriculum development, changes and ideas. For example, within the initial reflections on a given day, 18 of the 20 pre-service teachers mentioned how the discussion had impacted their curriculum methods and/or ideas. One student specifically stated, “When you’re working on your long-term investigation sometimes I got stuck. Talking with others is a great way to brainstorm with other teachers. I can take those ideas and build off of them.” Other students said, “When we got stumped on what new direction to go, the weekly discussion really helped to give us new ideas.” “Last week we got a lot of different ideas as to how to enhance the children’s interest in buildings and structures. We did implement a lot of these ideas into the classroom.” “We have to be careful about what we do in the classroom. Talking about it really helped with our decision-making.” “Our project went in a completely different way than what we were thinking. Talking with others really helped us to see where we could go with these.” And, “I had a few ideas on what we could do in the classroom but after talking with others, it really opened my eyes to what could be done.”

Students also demonstrated how their classroom environment and teaching strategies changed. “I can see why we need to take a step back and look at what we are doing in the classroom. We need to think about how we set-up the activities to make them engaging and inviting.” And, “The dialogue was helpful in pushing our investigation and sometimes managing behaviors in the class. They gave us ideas of what to do next...baby pictures, baby books, etc. and showed us how to get everyone involved the environment.”

Evidence from these examples confirmed that when teachers engaged in dialogue with others, they furthered their curriculum as they all took an active role in the development of the curriculum. If educators wanted to acknowledge the ever changing needs of their classroom, collaborative dialogue needed to occur so that future adaptations could be made.

B. Self-Reflections of SOTL Research Group Members.

We reflected on the overall experience and research, noting specifically how our teaching methods changed as well as what we learned from the research overall. One member stated, “I need to slow down to be sure students have the time to process the documentation they have. I also find real value in multiple perspectives as well as dialogue and reflection.” Another member stated, “...it was clear that we needed to be more explicit about what pedagogical documentation is when we talk about it with students. It seemed that many students had indicated early on in their reflections that they weren’t using documentation, when they really were. They were reflecting, conversing, sharing perspectives, and developing new insights into children, how to plan for children’s needs and interests, and what it means to be a teacher. But, it made me

wonder how well and to what extent we were making clear what it means to engage in the documentation process.” Yet another member stated that “The process has opened my eyes to what teaching and learning is all about. We often times think that students understand and grasp onto terms and ideas easily, when in reality, they need modeling and time to fully comprehend and move forth. I have taken these ideas into my other classes, knowing that I will need to provide the students with concrete examples and provide modeling for multiple, yet specific terms and ideas, if I want them to fully comprehend what I am saying and doing.”

C. Limitations of an exploratory, reflective inquiry.

The findings of this study suggest that further systematic analysis is needed for this exploratory, reflective inquiry investigation. Such analysis should include more in-depth interviews and being more aware of our teaching strategies when instilling new terms and ideas.

Implementing more in-depth interviews could be implemented in order to understand individualistic views, beliefs, and ideas and to further question when certain ideas emerge. Additionally, we decided we would be more explicit in explaining the purpose of pedagogical documentation, showing pre-service teachers different forms of documentation pieces and the manners in which dialogue can instill critical thinking and reflection, leading to new possible ideas.

V. Conclusion.

In concluding, we found that although the pre-service teachers valued pedagogical documentation and collaborative dialogue as tools of inquiry, they may not have understood fully what documentation means as a process, thus leading to misconceptions and misunderstandings.

We believe that the pre-service teachers’ learning is in a transformative process of learning and teaching. In order to facilitate this learning, we must emphasize and utilize the importance of talking with one another to exchange ideas, work on problems, revise thinking, share understanding, accommodate when differences arise and create documentation pieces to make learning visible.

These findings are particularly significant for teachers as it provides evidence on the importance of communicating with one another on such things as curricular issues and professional development. Just as medical doctors and business owners consult with one another when a question or situation arises, so should we as educators. This type of collaborative dialogue enables us to further and/or change our ideas to fit the differing needs of the classroom overall. We must engage in dialogue with each other, with the children, and with the parents and families to further our curriculum as we all play an active role in the development of the curriculum. This way, we are able to make sense of experiences and use the dialogue to increase our understanding to transform curriculum.

Additionally, documenting one’s learning and the children’s learning serves as an assessment tool that allows us to better understand children, to develop meaningful curriculum, to lead an inquiry, and to develop insights with their own learning that is occurring. Using pedagogical documentation of individual and group learning provides opportunities for reflection and reinvention, components to professional development. When we document children’s

learning, we are able to think and reflect on what the children may be thinking, doing, and/or learning and then apply these insights to our unique manner of teaching young children.

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Teaching research to teachers: A self-study of course design, student outcomes, and instructor learning

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Abstract: This description of a teaching self-study focuses on a graduate research course for classroom teachers in which two issues central to improving teaching practice were addressed. First, it details the process of examining course design and curriculum in search of the most effective strategies for training classroom teachers to do research. Second, it explores what can be learned about the teaching process by methodically examining student feedback, course outcomes, and instructor learning during three course iterations. The results of the study include a description of the teacher-as-researcher course design, a summary of student feedback and outcomes, and a report of instructor learning that grew out of engaging in the self-study process.

Keywords: action research, self-study, reflective practice, adult development, qualitative methodologies.

What methods are most useful in training classroom teachers to engage in action research? Two years ago, I was assigned to design and teach a graduate-level practitioner research course. I found this assignment to be exciting but somewhat intimidating. In designing the course, my plan was to discover and incorporate “best practice” for training teacher-scholars to access and understand academic research. Other key aims of the course were to empower students by teaching core research skills that could be applied in their own educational settings (Parsons and Brown, 2002), to model the scholarship of teaching by using action research and reflection in my own classroom (Mertler and Charles, 2005), and to share study outcomes with professional colleagues. Since classroom research has recently moved to the forefront of potential strategies for school improvement (Darling-Hammond, 1999; Savoie-Zajc, L., and Deschamps-Bednarz, N.; 2007), I felt the full weight of my instructional responsibility.

The constructivist design that evolved during the course of the study is grounded in sociocultural adult learning theory (Vygotsky, 1997). Self-study frameworks (Kosnik, Beck, Freese, and Samaras, 2006) were used to inform reflective instructor inquiry. Student outcomes were reviewed using qualitative research methods (Coffey and Atkinson, 1996) to address the following research questions:

- Course Design: What course design and teaching/learning strategies are effective in training teacher researchers?
- Instructor Learning: What patterns of instructor learning emerge from a methodical examination of instructor inquiry, reflection, and student feedback in a self-study of a teacher-as-researcher course?
- Student Outcomes: What patterns/understandings will emerge from a methodical examination of student products and reflections during a self-study of a teacher-as-researcher course?

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I. Literature Review.

To inform the design of this course, relevant literature was reviewed. Though related studies were useful, (Hughes, 2006; Johnston, Bendau, and Covert, 2003; Radencich, 1998), locating a step-by-step model for teaching research to teachers proved to be difficult. Instead, the search for knowledge about best teaching practices and optimal course design in the training of teacher researchers led to a review of literature in the areas of adult development (Kohlberg, 1969; Levinson, 1979; Sheehy, 1995; Trotter, 2006), professional development (Zech, Gause-Vega, Bray, Secules, and Goldman, 2000; Hansman, 2001; Stark, 2006), and action research methodology (Gray and Campbell-Evans, 2003; Mertler, 2006) during the initial design phase of the course.

Questions about how to study the teaching/learning process in which my students and I were engaged required additional literature review in research methodologies, including self-study (Samaras and Freese, 2006), reflective practice (Cole and Knowles, 1998, 2000), qualitative analysis (Bogdan and Biklen, 1998; Coffey and Atkinson, 1996), and meaning making from experience (Lather, 1991). My constructivist assumption (Lincoln and Guba, 1985) that as learners, we would collectively construct our unique learning experience together also shaped this study.

A. Adult Development and Learning.

A review of current theories of adult development and learning informed the initial structure and assignment design for the course (Hayes and Flannery, 2000; Kohlberg, 1969; Levinson, 1979; Sheehy, 1995; Trotter, 2006). This literature validated the importance of interactive learning activities and acknowledged the importance of the social construction of knowledge (Vygotsky, 1997). Cognitive functional theory (Brundage and Mackeracker, 1980; Daloz, 1986; Smith, 1982) suggested the incorporation of open-ended project design and inquiry-based process (Valli, VanZee, Rennert-Ariev, Mikeska, Catlett-Muhammad, and Roy, 2006). Research also supported student creation of final projects that were doable, but challenging enough to push them out of their current comfort zone (Kegan, 1982; Vygotsky, 1997). Teaching priorities and course direction also relied on components of real-life experience (Lather, 1991) and personal meaning making (Schwandt, 1994).

B. Self-Study Framework.

To understand the collective learning process in which my students and I were engaged, during the first semester of the course I began to observe, document, and reflect on our ongoing experience (Glesne, 1999). The self-study literature provided a framework for this documentation of our collective learning process. In *Self-study of Teaching Practices* (2006), Samaras and Freese write, "Self-study researchers continuously examine their practice and are committed to practice what they preach" (p. 33). Their framework outlines three purposes: "first, personal renewal (e.g. Freese, 2006; Feldman, 2006); second, professional renewal (e.g. Ham and Davey, 2006; Mitchell, 2006); and third, program renewal (e.g., McVarish and Rust, 2006; Kosnik and Beck, 2006)" (p. 14).

II. Methodology.

This self-study was informed by five central characteristics summarized by Samaras and Freese (2006) in *Self-Study of Teaching Practices*: self-study involves elements of situated inquiry, is an ongoing process, produces knowledge, and is informed by multiple theoretical views and methodologies. Self-study is also dualistic and paradoxical in nature and involves the individual and the collective, the personal and interpersonal, and the public and private.

A. Situated Inquiry.

The study began with personal inquiry and was motivated by questions from my unique context. The inquiry was self-initiated and drew upon my authority as a practitioner (Pinnegar cited in Samaras and Freese, 2006, p. 40). The self-study framework positioned me as an inquirer and a learner, enabling me to answer questions about my practice. It also enabled me to improve my own teaching (Bollough and Pinnegar cited in Samaras and Freese, 2006, p. 42).

B. Process and Knowledge.

By engaging in this self-study, I initiated a process of growth. I also began "a change journey in a hermeneutic spiral of questioning, discovery, challenge, hope and change" (Samaras and Freese, 2006, p. 43) for the purpose of developing knowledge about my own teaching.

C. Multiple Theoretical Stances and Methods.

Self-study scholarship utilizes multiple theoretical views and stances. Self-study also utilizes "multiple and diverse qualitative methods" (Samaras, Hicks, and Berger cited in Samaras and Freese, 2006, p. 47). It is rooted in a postmodern perspective and is by nature nonlinear (Wilcox, Watson, and Paterson cited in Samaras and Freese, 2006, p. 47). Multiple views and methodologies that informed various components of this study included inquiry (Glesne, 1999; Samaras and Freese, 2006), adult development (Trotter, 2006; Vygotsky, 1997), action research (Mertler, 2006), and qualitative methodologies (Lichtman, 2006).

D. Data Collection.

Hoban (2004) discusses the importance of data in the self-study process. In this self-study, data was collected and analyzed in three categories: Effectiveness of Course Design, Student Outcomes, and Instructor Learning. The types of data analyzed in this study are summarized below.

E. Study Participants.

The data-gathering for the study occurred over three course iterations. During that time, there were a total of 42 classroom teachers enrolled in the *Teacher as Researcher* course. Study participants included 14 men and 28 women, ranging in age from 25–52, with individual classroom experience ranging from 2 to 26 years. As the self-study researcher, my experience

includes 25 years in rural, urban, and suburban settings as teacher and administrator, a PhD in Educational Leadership, and five years of teaching at the university level.



Figure 1. Multiple data collection strands.

F. Methodology and Data Collection in Course Design Strand.

Course syllabi, assignments, and other instructor-designed materials were analyzed using document analysis methods (Freebody, 2003; Hodder, 1994). During the first semester, course design elements were informed by the review of literature and the instructor's experience (Lather, 1991). Instructor reflection and student feedback informed ongoing course changes and refinements throughout the three semesters of the study. The course syllabi, course calendar, course assignments, and rubrics were examined for connections to existing literature. A self-study framework (Kosnik, Beck, Freese, and Samaras, 2006), reflection (Cole and Knowles, 1998), and meaning making (Schwandt, 1994) were used as to examine initial course design and to shape ongoing instructor decision-making as the course evolved.

G. Methodology and Data Collection in Student Outcomes Strand.

Student products including article reviews, literature reviews, and research proposals were examined using course rubrics as quality measures of student understanding during the three-semester duration of the study. A pre/post student survey was used as a measure of prior research experience and to document shifts in student attitudes concerning research comfort levels as the course proceeded. Student reflections and final course commentaries were reviewed and emerging themes were identified using open thematic coding procedures (Coffey and Atkinson, 1996; Freebody, 2003).

H. Methodology and Data Collection in Instructor Learning Strand.

Reflective teaching notes were used to document instructor thinking and decision-making during the developmental phase of the course (Richardson, 1994). During the three semesters of the self-study, instructor observations and reflections, course evaluations, and student reflections were reviewed using thematic coding procedures. Emerging themes and patterns were identified and described. Concept maps (Samaras, 2002) were also used to summarize patterns found during the content analysis of study documents.

III. Study Outcomes.

A. Course Design Themes.

The five teaching-learning components that emerged as most relevant and useful in the design of this course are summarized in Figure 2.



Figure 2. Course design themes.

B. Research Immersion.

The understanding that immersion in authentic literature is a key component for developing teacher researchers was originally drawn from my previous immersion in formal research literature as a doctoral student. The importance of research immersion was corroborated in this study through content analyses of instructor reflections and student feedback documents. Following is an example of a typical student feedback statement on the value of this strategy:

I especially liked the way you had us plunge right into reading research. You did it with a lot of guidance and support that really made it a lot less intimidating . . . after reading the first few articles . . . I actually found myself enjoying the process. (J. A.)

The use of authentic immersion strategies began on the first day of class with an assignment to retrieve a refereed journal article after a training session by a campus research librarian. Additional assignments to retrieve refereed journal articles continued throughout the semester. Information gleaned from these articles was used to develop the literature review sections of the research proposals.

C. Research Literacy.

Student pre-survey feedback revealed that a majority of course members were unfamiliar with research terms and statistical symbols. Because of this unfamiliarity, students struggled to understand the language, symbols, and tables they encountered in research studies. Teaching basic vocabulary, comprehension (Hattie, Biggs, and Purdie, 1996), and structural analysis helped students develop research literacy. Once students were familiar with research terms and format, they became adept at identifying key components of research studies as they worked in collaborative learning groups (McDevitt and Ormrod, 2007; Rosenshine and Meister, 1992).

This course helped tremendously in allowing me to competently present . . . to the school board. Just using such terms such as: citations and quantitative and qualitative, added significance to our presentation. Also, the data collection and analysis required for grants is less mind-boggling and more meaningful now that I understand such terms as range and standard deviation. (L. K.)

D. Authentic Process of Research Design.

A professor who had a positive impact on me taught me the importance of asking compelling research questions that inform my own practice. This understanding shaped my work with teacher researchers. As we ventured into research design, I asked students to select an area of

personal interest or an engaging classroom problem to solve. These questions proved highly motivating as students designed research proposals.

E. Research Concepts Taught.

To equip students with basic tools for research design, the course provided a foundation in qualitative and quantitative research processes, formulation of research questions, research design, data-gathering instrument design, and data analysis. Critical connections were made as students found illustrative examples of these principles in the research articles they collected for their literature reviews. A strand of the course also reviewed basic statistical principles with a strong focus on understanding *how* and *why* a process was used in the research design, and less focus on computation of statistical formulae. One student commented,

The idea that I could conduct action research in my classroom without the dryness and non-personal involvement of traditional research was very enlightening. Another treasure trove was the huge data base of research articles and the concept of peer reviews. (L. K.)

F. Incremental Learning: Baby Steps.

One of the major obstacles that emerged in the design of this course was the issue of student aversion to and fear surrounding research and data-gathering processes. And, since this was a required master's course, students with a wide variety of backgrounds and discipline-area strengths were represented in the group. Because the majority of students had limited experience with research, course assignments were carefully scaffolded (Rosenshine and Meister, 1992; Vygotsky, 1997) using small, incremental steps. Group work, individualized research projects, and extensive instructor feedback helped address the diversity of learning needs. Student feedback supported the importance of scaffolding the assignments. One student commented, "Doing the proposal in 'Baby Steps', made it much easier to digest. Each individual assignment was a means to our end goal . . . therefore I was invested in each assignment." (R. D.)

Table 1. Incremental course steps.

1. Immersion in the Literature: Retrieval of 10+ research articles across the semester.
2. Identification of Research Interest Area: Exercise designed to narrow research interests.
3. Formal Literature Review: Summarizing 10+ research articles.
4. Article Reviews (2): Exercise designed to help students identify standard research format and evaluate validity and reliability of articles retrieved.
5. Research Literacy Activities: How to speak "Statistics," scanning "p" and "t" tables, etc.
6. Ongoing Reflection Topics: (1) Research Comfort Level, (2) Research Question, (3) Observation, (4) Research Design, (5) Data-Gathering Instruments, (6) Final Learning.
7. Research Proposal: Culminating Project.

G. Teacher and Student Reflection.

Because this course utilized distance technology, students were geographically separated from their colleagues and instructor. This lack of face-to-face contact necessitated the creation of a

teaching strategy to facilitate in-depth feedback as students completed their proposals. Personal inquiry and student feedback shaped the design of a series of short reflections that incrementally guided students through the research process. Reflections one to two pages in length were assigned on the following topics: Research Comfort Level, Research Question Design, Observation, Research Design, Data-Gathering Instruments, and Final Learning (See Table 1, #6). Students reported that the reflections served as useful puzzle pieces for them as they assembled their final proposals.

IV. Student Outcomes.

A. Student Survey.

During the first semester I taught this course, I was surprised by the initial level of student aversion to research, but I was pleased to note a shift in student attitude toward research by the end of the course. To better understand the nature of the observed shift, I designed a Pre/Post Research Attitudes Survey. Using the instrument below, students were asked to rate themselves on a 3-point scale, indicating low, medium, or high comfort levels with research terms and processes at the beginning and at the end of the course.

Classroom teachers enrolled in the course ranged in teaching experience (two to more than twenty-five years), teaching discipline, and institutional assignment. The pre/post survey helped me determine in addition which students possessed a background in statistics, or had previously conducted research. Students with research backgrounds were encouraged to share their knowledge in collegial discussions with their peers and to provide assistance or support of colleagues during proposal development where appropriate. Table 2 illustrates the pre/post survey used for this course.

Table 2. Pre/post survey.

Questions:	Strongly Agree 1	Agree 2	Disagree 3
1. I am comfortable working with statistics.			
2. I have previously designed and/or conducted a research project.			
3. I am familiar with the process of action research.			
4. I have previously conducted action research.			
5. I conduct action research in my classroom.			
6. I have previously designed a research survey.			
7. I read the research literature in my field.			
8. I do Internet research in my field.			
9. I have specific ideas about how I'd like to improve my educational practice.			
10. These terms are familiar to me: chi square, two-tailed t test, qualitative research.			
11. I am familiar with APA format.			
12. I presently have the skills necessary to conduct educational research.			
13. I looked forward to taking this class.			
14. I know how to write a research proposal.			
15. I have used observation to gather information about my educational practice.			

16. I enjoy conducting research.			
17. I enjoy doing statistical analysis.			
18. I enjoy completing research proposals.			
19. I frequently reflect on my educational practice.			
20. I have previously gathered data to answer a research question.			

Student survey outcomes for the Spring 2009 semester are summarized below. They indicate an overall shift from a medium to low level of research comfort (41.06 out of a maximum high of 60.00), to medium to high level of research comfort (28.86 out of the optimum low of 20). Overall, students averaged a one level shift toward research comfort in 12.2 indicators out of 20. Similar shifts occurred during the additional semesters of the study, with an average of 13.3 shifts per student during the Summer 2009 semester, and 11.9 shifts per student during the Fall 2009 semester. The average number of incremental shifts per student during the three-semester self-study was 12.4 one level shifts toward research comfort out of 20 indicators.

Table 3. Sample student survey summary, Spring 2009.

Student:	Pre-survey	Post-survey	Change Score: Incremental Shifts (1 to 2, 2 to 3 on a 20 question survey)
A	45	23	22
B	40	35	5
C	42	35	7
D	38	29	9
E	43	28	15
F	49	32	17
G	25	26	-1
H	43	27	16
I	39	29	10
J	28	20	8
K	43	25	18
L	46	27	19
M	32	28	4
N	53	36	17
O	50	33	17
Class Average	41.06 (out of 60 max) Indicates a medium high "pre" level of research discomfort	28.86 (ideal score of 20) Indicates a medium low "post" level of research discomfort	12.2 Changes per student on a scale of 20 questions

B. Student Reflection Themes.

The assignment of six short reflections and one final overview reflection during the course greatly informed my teaching. Student reflections provided useful feedback on individual student progress and understanding. They also provided me with ongoing feedback which allowed me to better shape the course to fit student needs. Final course reflections completed by the forty-two study participants were reviewed and coded as an overall measure of effective course strategies and student outcomes. The top five most useful course outcomes identified by the students

during the three-semester study were skill in implementing action research processes, the usefulness of a scaffolded assignment structure, better connections between research and practice, professional empowerment, and the importance of a supportive learning environment.



Figure 3: Student reflection themes.

I also found the review of individual reflective comments to be useful in refining and motivating my teaching practice. One student wrote,

I know this [course] will help me immensely, not only in my classroom, but in other facets of my professional life . . . the natural curiosity piqued by the myriad possible questions to be answered through action research makes me want to be a better teacher by knowing my students better by gathering data to help them. (N. J)

V. Instructor Reflection and Learning.

Teaching research to teachers was a powerful professional learning experience. The following graphic represents critical instructor learning themes that emerged from this self-study.

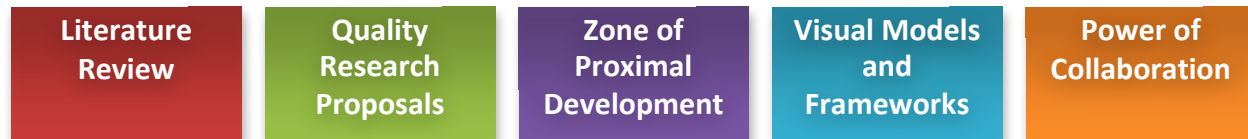


Figure 4. Instructor learning themes.

A. Literature Review is Critical.

Requiring students to conduct formal literature reviews was a key course requirement that extended student knowledge in their fields of interest and built research literacy skills. Training by an on-campus librarian helped provide students with basic search skills. But the most powerful learning took place as students searched the literature to answer their own research questions. During the semester, I conducted mini training sessions on how to negotiate relevant databases, identify key researchers in their fields of interest, judge the quality of a research article, and summarize their findings. Students responded positively to this training.

I found it amazing when completing my literature review that there was already so much official research conducted in each area. It gave me some great ideas on different ways to conduct the research in my classroom and also strategies to use during my teaching in the classroom. By completing the literature review, it made me much more aware of the information that is available to teachers that can be very beneficial to our students. (A.P.)

B. Quality Research Proposals.

Using course rubrics as a quality measure, 100% of the students taking the course met proposal requirements and 70% of the students exceeded proposal requirements. The rubric in table 4 illustrates grading criteria for course research proposals.

Table 4. Proposal scoring rubric.

	Not Met	Partially Met	Met	Points Possible	Points Earned
Cover Page: In APA Format	Two or more criteria for APA format are missing	One criterion for APA format is missing	Cover page is formatted and complete	5	
Introduction	Introduction is missing two or more subheadings, and/or discussion is incomplete.	Introduction is missing one subheading, and/or is partially incomplete.	Introduction includes all subheadings, is well-written and complete.	20	
Review of Related Literature (10+ sources)	Review is missing 3 or more sources. Discussion is incomplete.	Review is missing 1 or more sources. Discussion is partially complete.	Review includes 6+ sources. Discussion is well-written and complete.	30	
Proposed Data Collection/ Methodology	Proposed Data Collection/ Methodology is incomplete.	Proposed Data Collection/ Methodology is partially complete.	Data Collection/ Methodology is logical and complete.	25	
Proposed Data Analysis	Data Collection/ Proposed Data Analysis description is insubstantial.	Data Collection/ Proposed Data Analysis description is fairly substantial.	Data Collection/ Proposed Data Analysis is logical and substantial.	25	
Reflection	Reflection is insubstantial.	Reflection is fairly substantial.	Reflection is well-written and substantial.	30	
References	6 or less Journal References	6–10 Journal References	10+Refereed Journal References	15	
Format/Writing Conventions	APA Format/Writing Conventions are significantly below expectations.	Format/Writing Conventions are below expectations.	Format/Writing Conventions are at or above expected level.	15	
Total:				165	

C. Zone of Proximal Development.

Teaching in the Zone of Proximal Development (Vygotsky, 1997), that difficult, itchy place where students are challenged but not overwhelmed, was a strategy students responded positively to. Although course work load was heavy, and proposal development was challenging, students frequently expressed “aha” excitement after completing their literature reviews and their formal proposals.

It was the “roll up your sleeves and wipe the sweat off your brow” type of dirty work that was forced upon me through countless hours of researching and looking at abstracts and articles that really made me understand what I was looking for in evaluating what I was finding. (L. L.)

D. Visual Models and Frameworks.

During the course of the study, I found that students understood complex ideas more easily when those ideas were reduced to a framework, concept map, or graphic. Students reported that the simple graphic below was a powerful tool in clarifying the design of their proposed research. I also found concept maps and graphics to be useful in reporting study outcomes (Samaras, 2002).

(1) What is your research question?	(2) What information do you need to answer it?
(3) How will you analyze this information?	(4) What is your expected outcome?

E. Collaboration.

Theoretical frameworks of sociocultural and adult development theory (McDevitt and Ormrod, 2005; Vygotsky, 1997) suggested learning experiences in this course that included frequent interaction and processing in small groups (Glickman, Gordon, and Ross-Gordon, 2009; Hansman, 2001). Student feedback positively reinforced the usefulness of collaborative learning in this:

At our site, we would discuss what we were looking up and we would share information and things we had come across in our searching. I liked that collaboration and help.
(D. H.)

VI. Discussion.

A. Course Design Implications.

This study suggests that immersion in authentic research literature, teaching frameworks of formal research design, the scaffolding of assignments, and short, frequent, interactive reflections are useful elements of course design in the training of teacher researchers. A three-semester review of course design and course outcomes of a teacher-as-researcher course provided contextual examples of classroom teachers who could successfully access, read, and review formal refereed journal articles. The successful completion of quality research proposals by course participants demonstrates that with precise training, classroom teachers can design research for their individual organizational settings.

B. Student Feedback Implications.

Student feedback identified the following themes/strategies as useful outcomes of the course: increased skill in and interest in implementing action research in their settings, the usefulness of scaffolded assignment structure, stronger connections between their practice and current

research, feelings of professional empowerment, and increased understanding of the importance of a supportive learning environment. An instructor-designed survey conducted during three course semesters provided contextual evidence that teacher attitudes and fears about research can shift in a positive direction through the use of effective course design and incremental, supportive teaching/learning processes.

C. Instructor Learning Implications.

The study identified the following teaching strategies as useful in the teaching of research skills: completing a literature review, assigning short, scaffolded reflections, working in the Zone of Proximal Development (Vygotsky, 1997), recognizing different levels of student readiness, and working collaboratively.

D. Usefulness of Self-Study Methodology.

Analyzing data and documenting my own teaching practice reinforced the importance of instructor self-study as a tool for personal and professional renewal and for the improvement of teaching practice (Samaras and Freese, 2006). Focused inquiry strengthened my ability to understand student needs and design strategies to teach specific skills. Reasoned, thoughtful, inquiry, a review of related literature, and analysis of course documents, student products, reflections, and feedback yielded useful information that shaped and improved successive lessons and courses. During this study, my teaching reflections became more specific and informative, moving me more deeply into the cycle of improvement. As an instructor, I found self-study to be a useful tool in renewing teaching practice and refining course design.

E. Course Design Refinements.

Course refinements made during this period as a result of self-study include the addition of five short chapters from a statistics text (Salkind, 2008); reviewing statistical basics: measures of central tendency, correlation coefficients, and validity, reliability, and probability; the addition of a training session in research retrieval by an on-campus librarian; an increased number of interactive learning discussions with each successive semester; the elimination of a text; and the elimination of one case study from the final.

F. Unexpected Outcomes.

An unexpected course outcome was the expansion of student research projects from individual classroom settings into whole-school and district settings. Presently, one of my former students is completing a district-sponsored study of the outcomes of online writing assessment, while another former student is conducting a national survey on the use of the block scheduling in high school settings, which will be used by his district and school board to inform their final decision-making process.

G. Implications for Practice.

The experience of teaching this course taught me a great deal about the capacity of educators. Though a majority of classroom teachers taking this course expressed aversion to reading and designing research at the beginning of the course, it was exhilarating to see the shift in teacher desire, understanding, and capacity by the end of the course. The light that came on as teachers dug deeply into formal research literature is a light that needs to be lit in every school and in every classroom. The field of education is shifting. The stakes are high in classrooms, and an emphasis on accountability demands that students achieve at a higher level. The reflections and conversations I had with my students during these courses reinforced for me the importance of training practicing teachers to engage in research-based practice to help accomplish this goal.

As I taught this research course, I was surprised that many practicing teachers had not previously retrieved professional literature from online sources; we were delighted, as we worked together, to find how rewarding and useful this process was. The students in my courses were university students with access to the extensive databases of a university library. However, though many states now have research databases for teachers, the quality of these databases needs to be examined. Perhaps partnerships between universities and public school districts could explore joint access to these data sources.

If, as we discovered in our research course, classroom teachers *can* access and utilize formal research and design and carry out research studies, it may be possible to reinvent educational research by more frequently involving *practitioners* and *professors* in collaborative, reflective, educational practice—thus strengthening the creative bridge between universities and schools, and between educational theory and practice.

H. Implications for University Instruction.

As instructors, using self-study and research-based teaching strategies requires us to survey relevant literature, examine current best practices, and draw on personal experience, knowledge, and understanding to enhance university course design. It is by living the experience of teaching, paying attention, designing ongoing assessment, asking for student feedback, taking time to reflect, and moving repeatedly through this spiraling, cyclic process, that teaching improves.

I. Future Research Directions.

I've communicated with many class members about their post-course experiences, offering independent study credit and collaborative support for students wanting to complete their proposed research in their professional settings; however, I have not yet designed a study to formally examine shifts in teacher practice as a result of course training. This will, perhaps, be the focus of a future study. Other related research directions include studies on how practicing teachers implement action research, how they use research literature to inform their instructional practice, and further, what impact these changes have on student achievement and teacher effectiveness and satisfaction.

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A case study of cooperative learning and communication pedagogy: Does working in teams make a difference?

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Abstract: Cooperative learning has increasingly become a popular form of active pedagogy employed in academic institutions. This case study explores the relationship between cooperative learning and academic performance in higher education, specifically in the field of communication. Findings from a questionnaire administered to undergraduate students in a communication research course indicate that involvement in cooperative learning is a strong predictor of a student's academic performance. A significant positive relationship was found between the degree to which grades are important to a student and his or her active participation in cooperative learning. Further, the importance of grades and sense of achievement are strong predictors of performance on readiness assessment tests.

Keywords: cooperative learning, active learning, team-based learning, group achievement, communication pedagogy.

I. Introduction.

One of the greatest and inevitable challenges educators face is determining the most effective teaching strategies for their students. Understanding and assessing student involvement in learning can help teachers design the most effective curriculum and determine how students best learn. In addition, instructors must consider which skills will be most practical for students entering a workforce where building relationships and productivity go hand-in-hand. To meet the demand, many educators are using active learning pedagogies, such as cooperative or team-based learning. Active learning in the context of higher education is often a social and informal process where ideas are casually exchanged through student involvement and intellectual and interpersonal activities (Menges and Weimer, 1996). Bonwell and Eison (1991) conceptualize active learning as a process involving students not only “doing” things, but analyzing what they are doing.

Cooperative learning is one of the most commonly used forms of active pedagogy. Taking place through an individual's interaction with his or her environment and peers, cooperative learning is largely based on the idea that students learn through social contexts (Adams and Hamm, 1994). While cooperative learning has been found to be an effective pedagogical tool in a broad range of subjects, limited research explores this form of active pedagogy as it pertains to higher education, and specifically the communication field. This study contributes to ongoing research in active learning pedagogy through a case study examining the

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relationship between student involvement in cooperative learning and academic achievement in an undergraduate communication research methods course.

II. Background.

A. Benefits of Cooperative Learning.

Cooperative learning became a commonly used form of active pedagogy in the 1980's, and continues to be a valuable tool for learning in academic institutions today (Johnson, Johnson, and Smith, 2007), as it provides benefits for both students and instructors (Shimazoe and Aldrich, 2010). Slavin (1996) described cooperative learning as teaching methods in which students work together in small groups to help one another learn academic content. Johnson, Johnson, and Smith (1991) outlined several central elements comprising cooperative learning including positive interdependence, individual accountability, face-to-face promotive interaction, appropriate use of collaborative skills, and group processing, as will be discussed further. Studies on cooperative learning have indicated its positive relationship with student achievement and attitudes about learning (Slavin, 1989; Johnson and Johnson, 1989; Johnson et al., 2007). Cooperative learning has also been found to enhance social and intellectual development (Cohen, 1984; Burton, 1987) and help students build interpersonal skills while promoting a sense of achievement, productivity, and psychological well-being (Nilson, 1998). Further, researchers reported, "...students worked significantly harder for and learned more from the cooperative learning components than from the traditional lecture and text-based components" of courses studied (Carlsmith and Cooper, 2002, p. 132).

One possible explanation for cooperative learning's success is that effective learning often occurs through an individual's interaction with his or her environment, and language is the means by which learning and meaning are made conscious to the student. Interaction with others enables students to make sense of what they are learning as they become responsible for articulating and discussing class content with their peers (Adams and Hamm, 1994). Rushatz (1992) suggested that, "Cooperative learning strategies strive to create group situations that will foster support and feedback systems while developing decision making, problem solving, and moreover, general social interaction skills" (p. 5). Webb (1985) found that students exhibited signs of higher understanding when they were responsible for teaching concepts to their classmates and when their classmates taught concepts to them. Moreover, group members were more inclined to help other members learn concepts when the entire group's grade depended on each student's understanding of the subject. Team-based learning also provides opportunities for discussion and clarification of ideas (Gokhale, 1995). Interaction with peers offers students the chance to learn from one another's scholarship, skills, and experiences. Further, group discussions may force students to confront counter-arguments, encourage them to think beyond their own perspectives, and help improve respect for diversity (Cooper, Robinson, and McKinney, 1993; Slavin, 1983).

Several decades of empirical research have documented the effectiveness of cooperative learning in higher education. Johnson and Johnson (1986) found that cooperative teams achieve greater levels of thought and retain information longer than students who work on an individual basis. This form of active learning provides students with the opportunity to not only engage in discussion, but also become critical thinkers (Totten, Sills, Digby, and Russ, 1991). Totten et al. (1991) provided support that cooperative learning not only helps achieve higher retention, but

also encouraged students to become more motivated to take greater responsibility for their own learning and participate in class discussions. Similarly, Gokhale (1995) examined the efficacy of team-based learning on test achievement at the collegiate level, and findings indicated that students who studied in a group performed better on tests. In addition, those who worked in teams scored higher on a test assessing critical thinking when compared with students who studied individually.

B. Elements of Cooperative Learning.

Johnson, Johnson, and Smith (1991) suggested that cooperative learning is more than simply “working in groups,” and should include the following: 1) positive interdependence where team members are reliant on one another to achieve a common goal, and the entire group suffers the consequences if one member fails to do his or her work; 2) individual accountability where each member of the group is held accountable for doing his or her share of the work; 3) face-to-face promotive interaction where, although some of the group work may be done on an individual basis, most of the tasks are performed through an interactive process in which each group member provides feedback, challenges one another, and teaches and encourages his or her group mates; 4) appropriate use of collaborative skills where students are provided with the opportunity to develop and implement trust-building, leadership, decision-making, communication, and conflict management skills; and 5) group processing in which team members establish group goals, the assessment of their performance as a team occurs periodically, and they often identify changes that need to be made in order for the group to function more effectively.

According to Johnson and Ahlgren (1976) and Johnson et al. (2007), group dynamics play an important role in effective collaboration, and positive interdependence or cooperation is key to a group’s ability to accomplish a common goal, while “competitively structured groups” can be a hindrance. “*Positive interdependence* exists when individuals perceive that they can reach their goals if and only if the other individuals with whom they are cooperatively linked also reach their goals and, therefore, promote each other’s efforts to achieve the goals” (Johnson et al., 2007, p. 16). However, as Onwuegbuzie, Collins, and Jiao (2009) point out, individual accountability is key to the success of the overall group and helps to prevent “social loafing,” or reduced individual effort resulting from too much dependence on other group members (p. 272).

C. Feedback, Evaluation, and Motivational Systems.

Reward structures, evaluation, and feedback are also important in guiding individual and group performance in the classroom and can help to gauge whether progress is actually being made through cooperative learning. Meyers (1997) suggested that many different forms of assessment should be implemented into small group activities, including the evaluation of presentations, assignments, and projects. Feedback from both the instructor as well as immediate feedback from the group are important forms of evaluation (Rushatz, 1992; Webb, 1985). However, Carlsmith and Cooper (2002) argued that the effectiveness of peer review may be limited if a sense of competition is held by students toward one another and adversely affects honest feedback. Additionally, students may hold the fear that their peers will find out how they rated them. To counter such a fear, removing students from their groups when filling out peer reviews likely elicits more honest responses. Another factor, which may dissuade competition and

promote cooperation, is to use a “criterion-referenced grading system” to evaluate group work rather than grading on a curve (Nilson, 1998).

D. An Integrated Approach.

Interactivity among students and teacher-student interactions are still integral to the classroom environment, particularly for feedback and guidance (Astin, 1993). The shift of the responsibility of learning onto the student can be an adjustment in the classroom, especially when students no longer see teachers as authority figures (Johnson et al., 1991; Nilson, 1998; Rhem, 1992). As Nilson (1998) states, “Introducing greater cooperation in the classroom requires role shifts for both students and instructors” (p. 110). With this new dynamic, instructors who may be more accustomed to the “banking” system of education (Freire, 1970), must adjust to the idea of relinquishing some control, while maintaining control over the direction of their students’ learning. In light of the discomfort that may result from shifting more learning responsibility onto the student, it is important for instructors to know that they can assume a successful integrated approach by combining cooperative learning and other established teaching strategies (Millis, 1990; Treisman, 1986).

E. Research Question and Hypotheses.

Although a great deal of work has explored active learning pedagogy in a variety of disciplines, this study specifically explores the efficacy of cooperative learning in the communication field. Examining how cooperative learning relates to student performance in a college level communication course raised the research question:

RQ: What is the relationship between student involvement in cooperative learning and academic performance in a communication research methods course?

Prior research on active learning has supported the effectiveness of cooperative learning on test achievement (e.g., Felder and Brent, 1994). Findings on team-based learning suggest that this pedagogical method is successful in promoting both problem-solving and critical-thinking skills. Students who perceive grades as important in a class are also expected to perform better academically than those who attribute less importance to grades. Further, an essential element of cooperative learning is one’s contribution to help achieve the group’s goal (Johnson et al., 1991; 2007). This form of active pedagogy is centered on the notion of teamwork and group orientation, interdependence, and success. Those who view accomplishment and the attainment of satisfaction through the group are predicted to be greater participants in the cooperative learning process. For these reasons, the following hypotheses are tested:

H1: Student involvement in cooperative learning is positively associated with academic performance.

H2: The importance of grades to a student is positively associated with academic performance.

H3: The importance of group success to a student is positively associated with involvement in cooperative learning.

III. Method.

A. Participants.

Twenty-four undergraduate students in a communication research course were recruited at a large Northeastern University, with implied consent obtained prior to their participation in the study. The objective of the course was to introduce to students social science research methods employed in the field of communication, including surveys, experiments, and content analysis. The sample was comprised of 40.2% males and 59.8% females, with ages ranging from 18 to 22 years ($M = 19.23$, $SD = 0.97$). Participants consisted of 87.5% Whites, 5.5% Asians, 3.2% African Americans, 2.1% Hispanics, 1.2% American Indians, and 2.5% with no indication of race.

B. Procedure.

At the start of the semester, the instructor designated groups comprised of four to six students for the purpose of completing a class research project and a series of readiness assessment tests (RATs). These groups remained consistent throughout the semester. On the day that the survey was administered, all 24 students who were enrolled in the course were required to sit with their assigned group members upon arrival. Each member in a group was assigned a number code and required to write down the codes of their group members on a separate piece of paper for reference. Students were then asked to disperse themselves in the classroom and sit apart from their group members. Each student individually completed a set of questions, which evaluated each group member's performance in a series of group exercises. Participants were told that responses would remain confidential and would not be shown to the instructor or their peers. After completion of questionnaires, all surveys were turned in to the researchers, and the students were instructed to discard the sheets listing the student codes to assure the anonymity of their group members.

C. Measures.

Participation in cooperative learning and student perception of learning. The independent variable in this study was involvement in cooperative learning. One of the primary requirements for the research methods course entailed student cooperation in groups on a research project throughout the semester. Over the course of four months, students were expected to complete a variety of research exercises related to their project during and outside of class in order to accomplish the following tasks: propose research questions, design a methodology to answer these questions, collect and analyze data, and discuss findings and conclusions. Based on the focus of group work in the course, the survey consisted of 13 items assessing a student's active participation in cooperative learning. Responses were made on a Likert-percentage scale from 0(never) to 100(always). Based on the literature and the elements that Johnson et al. (1991) suggested to take place in the cooperative learning process, this study assessed cooperative learning as it is comprised of seven components: group processing, motivation, competition, dependability, accountability, interactivity, and use of collaborative skills. Group processing was measured by a student's ability to help accomplish a group's goal and provide constructive feedback to others in the group. Motivation was measured by a student's desire to take part in the group activity. Competition was assessed by how much the

student cared about doing better than other students. Dependability was measured by the degree to which others depend on a student and vice versa to help achieve the group's goal. In addition, it incorporates the extent to which a group member comes to class prepared for the activity. Accountability was assessed by the extent to which a student does his or her share of the group work and if he or she appears to have learned all of the material involved in the project. Interactivity was measured by the degree to which a group member cooperates with others in a team, the extent to which the group and the student learn from each other, and how much one contributes his or her ideas to the group. Lastly, the use of collaborative skills was assessed by one's contribution of his or her skills to the group. In addition to measuring students' involvement in cooperative learning, the importance of four factors was also assessed: the degree to which sense of achievement, grades, peer acceptance, and group success are important to the student. Responses were made on a Likert-scale from 1(not important) to 7(very important).

Academic performance. The dependent variable in this study was academic performance. Academic performance was assessed by the student's individual scores on a series of RATs, group scores on RATs, and final grade in the class. Tests were scored and provided by the instructor of the course.

RATs. RATs are short, closed-book quizzes consisting of about 12 multiple-choice questions on a particular topic covered in class. Assigned readings from the textbook and a study guide are provided to students before the topic is covered. Quizzes are administered at the beginning of class and a total of six quizzes are given throughout a four-month period or semester. The quizzes are first taken individually and turned into the instructor. Then, students complete the same quiz with their assigned group members. After taking the quiz as a group, the answer sheet is turned into the instructor and graded. Each group will be given up to five minutes to appeal for incorrect answers. If the instructor accepts the appeal, both the group and individual scores will be changed accordingly.

Final grade. The student's final grade in the class was calculated as follows: individual RATs, group RATs, a final project, mid-semester assignments related to the project, and in-class exercises, each accounting for 20% of the final course grade.

IV. Results.

Based on the conceptual definition of cooperative learning and the grouping of the seven components previously discussed (group processing, motivation, competition, dependability, accountability, interactivity, and use of collaborative skills), the 13 items measuring involvement in cooperative learning were subjected to a reliability analysis. One item, which measured the degree to which the particular group member depended on the peer evaluator to accomplish the group goal, was excluded from further analysis because it was not internally consistent with the other items. Therefore, a mean index of the 12 items was constructed to represent the cooperative learning score for each student (Cronbach's $\alpha = 0.98$). Academic performance had three separate components: individual performance on the six RATs ($M = 77.61$, $SD = 1.08$), group performance on the six RATs ($M = 92.94$, $SD = 0.88$), and final course grade ($M = 87.79$, $SD = 1.56$).

Bivariate correlations were employed to test the relationship between involvement in cooperative learning and academic performance. Significant positive relationships were found between student involvement in cooperative learning and each of the three components assessing academic performance, supporting the first hypothesis (see Table 1). Findings indicate that the more actively a student participated in cooperative learning, the higher a student scored on average on individual and group RATs and their final course grade.

Table 1. Correlations between involvement in cooperative learning and academic performance.

	Individual RAT scores	Group RAT scores	Final Course Grade
Involvement in Cooperative Learning	0.62***	0.46***	0.58***

*** $p < 0.001$

Another set of analysis examined the level of importance of sense of achievement, grades, peer acceptance, and group success to a student in class. Bivariate correlations were performed to determine the relationships between these variables and involvement in cooperative learning and academic performance (see Table 2). Results indicated significant positive relationships between the importance of grades and involvement in cooperative learning, as well as that with academic performance on individual RATs and final course evaluation, showing support for the second hypothesis. The importance of sense of achievement was also a significant predictor of a student's individual performance on RATs. However, no significant relationship was found between the importance of group success and involvement in cooperative learning, showing no support for the third hypothesis.

Table 2. Correlations between importance of sense of achievement, grades, peer acceptance, and group success and involvement in cooperative learning and academic performance.

Importance to Student in Class	Involvement in Cooperative Learning	Individual RAT Scores	Group RAT Scores	Final Course Grade
Sense of Achievement	0.09	0.17*	0.02	0.06
Grades	0.18*	0.25*	0.10	0.17*
Peer Acceptance	0.01	0.08	0.002	0.05
Group Success	0.04	0.03	0.0003	0.04

* $p < 0.05$

A regression analysis was carried out to examine the relationship between a student's involvement in cooperative learning and a separate in-class peer evaluation administered by the instructor. The peer evaluation was conducted on the last day of class and required students to provide written open-ended evaluations about the ways in which each member, including himself or herself, contributed to the final group project. Students also indicated the percentage of contribution for each group member. Based on these percentage contributions, the instructor of the course scored each individual on a Likert-scale from 1(low) to 10(high) in terms of participation. Findings showed that a positive and significant relationship existed between student involvement in cooperative learning and peer evaluations ($\beta = 0.26, p = 0.01$).

In summary, results from the analyses suggest that involvement in cooperative learning is a strong predictor of a student's academic performance in class. A significant relationship was also found between the degree to which grades are important to a student and his or her active participation in cooperative learning for group exercises. Furthermore, the importance of grades yielded as a strong predictor of individual performance on RATs and higher final course grades.

V. Discussion.

The purpose of this case study was to examine the relationship between cooperative learning and academic performance pertaining to higher education in the field of communication. The empirical analysis provided considerable support that active participation in team-based learning has a positive relationship with a student's academic performance. Overall, students who were heavy participants in group exercises exhibiting behaviors, such as helping to accomplish the group's goal, coming to class prepared, providing constructive feedback to their peers, and cooperating with their team, had a higher likelihood of receiving better test scores and final course grades at the end of the semester. In other terms, students who were more engaged in group work also performed well outside of their groups, which was reflective of higher individual test scores and course evaluations. Moreover, the perception of grades holds significant weight in the degree to which a student participates in the cooperative learning process. Students who perceived grades as highly important were evaluated by their peers to be more active in cooperative learning, including wanting to take part in the group task, completing his or her share of the work, learning materials involved in the exercise, and verbally contributing ideas to the team.

Results from the study support the notion that cooperative learning is indeed an active pedagogy that works to foster higher academic achievement. Findings suggest that grades and group success hold greater importance to students than peer acceptance and sense of achievement, despite literature indicating the weight of interdependency on group success (Johnson et al., 1991). Grades may be a strong extrinsic motivator for students, and thus their level of importance may have been a predictor of how much effort students put in to learning their course materials or preparing for assessment tests. Furthermore, their perception of grades may encourage them to participate more in group exercises since they are driven by the attainment of the final group score, as it greatly affects individual scores. In this particular communication course, group exercise grades can only help a student's final course grade. Thus, viewing group opportunities as a form of extra credit and the group RAT scores as a reflection of the success of the team were potential factors that could have encouraged students to be more active participants in cooperative learning.

The data also provide support that the degree to which a student's sense of achievement was important to himself or herself predicted test performance on an individual basis. Sense of achievement is the feeling or awareness of personal accomplishment and success. Thus, it is logical that students who view this aspect of learning to be important may perform better on tests in accordance with Slavin's (1978) description of rewards structures.

Although an extensive body of research confirms the effectiveness of cooperative learning in higher education (Astin, 1993; Cooper, Prescott, Cook, Smith, and Cuseo, 1990), cooperative learning has several limitations. Instructors are often confronted with resistance and hostility from students who believe they are being held back by slower teammates (Shimazoe and Aldrich, 2010). In addition, such negative reactions come from the other side where weaker and less assertive students complain of being belittled or ignored by more responsive students. This study did not examine the factors that could potentially hinder student participation in cooperative learning. The desire to take part in a task and the significance of achievement and grades to students may only be limited factors that affect the degree to which a student is active in a group setting. The omission of additional variables in this study may explain why the predicted relationship between the importance of group success and involvement in cooperative learning was not significant.

As discussed, a limitation of using peer reviews is that students may feel a sense of competition toward one another, which could affect their evaluations. By moving students away from their groups while evaluating participation and by assuring them that the instructor and other students would not see the reviews, this study attempted to discourage a sense of competition and make students feel that their answers were confidential. Another limitation was that the questionnaire was administered to a small convenience sample comprised of a relatively homogenous group of undergraduate students. It is important to acknowledge that this research serves as a case study to examine the efficacy of cooperative learning in a communication research methods course. Therefore, the findings presented should be interpreted with caution in terms of generalizing them to a larger population or another culture. Future research may consider applying the same methods to study other research methods courses, as well as classes that require the same or greater demands of group work. Moreover, this study was a cross-sectional survey designed specifically to study associations between academic performance and cooperative learning rather than to draw conclusions about the effects of cooperative learning. However, despite the fact that the present research is not an experimental study, findings do indicate a positive relationship between active participation in cooperative learning and academic performance.

The relationships observed in this study apply to team-based learning in the communication discipline. This research examined the relationship between involvement in cooperative learning and academic performance and how factors, such as perceptions of grades and sense of achievement, are predictors of a student's performance in class. However, future research may explore other variables, including prior background and success in active pedagogy, student learning preferences, and interpersonal relationships among peers, which may play an integral role in the process of cooperative learning. In addition, variations in demographic factors, such as socioeconomic status, race, and gender, were not examined in the study and may influence the degree of active group involvement, familiarity, and comfort level with team members.

Other research opportunities exist in exploring how cooperative learning has progressed over the past decades. With an increasing trend of students pursuing higher education, the

question remains whether this form of active pedagogy is better suited and appropriate for smaller classes. Or, do larger lecture-oriented classes adequately provide students with the comprehensive benefits of enhancing their critical thinking and analytical skills? Furthermore, is it possible to implement active pedagogy in classes that are hundreds of students in size, exist completely online, or are hybrids delivered via face-to-face and computer-mediated-communication? Changes in higher education across disciplines may encourage modifications in the way professors select and implement their teaching strategies. With the rise in new digital media technologies and Web 2.0, smart classrooms equipped with online capabilities, and the use of course management tools and social media outlets (e.g., Wikis and Facebook), cooperative learning is in the process of being reconceptualized as a pedagogical concept. With the growing number of students in colleges and universities, it is necessary to examine the role cooperative learning plays in today's transforming academic institutions and the direction it will take in higher education in the future.

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Addressing pedagogical dilemmas in a constructivist language learning experience

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Abstract: Educational constructivism has long been associated with advanced pedagogy on the basis that, it champions a learner-centered approach to teaching, advocates learning in meaningful contexts and promotes problem-based activities where learners construct their knowledge through interaction with their peers. Involving language learners in video projects allows a seamless incorporation of constructivist assumptions into the teaching and learning experience. However, practicing educational constructivism has been fraught with a number of pedagogical dilemmas and challenges (Windschitl, 2002). First among these dilemmas is the need to promote learner autonomy while, at the same time, maintaining a solid framework for the learning experience. Secondly, constructivist teaching and learning require proper assessment strategies that take into account the uniqueness of this educational practice. This article describes a video project implemented by Russian language learners and deliberates on possible ways to deal with these pedagogical dilemmas.

Key words: educational constructivism, student video project, foreign language learning, foreign language teaching, grading rubric

I. Introduction.

The main notion of constructivism is that people construct their understanding and knowledge of the world around them. As Phillips (1995, p.5) observed, “Humans are born with *some* cognitive or epistemological equipment or potentialities ... but by and large human knowledge, and the criteria and methods we use in our inquiries, are all *constructed*” (italics appear in the original).

In education, constructivism is to many synonymous with “progressive pedagogy” (Semel and Sadovnik, 1999) because, it champions a learner-centered approach to teaching, advocates learning in meaningful contexts and promotes problem-based activities where the learners construct their knowledge through interaction with their peers. Furthermore, educational constructivism demands that learning experiences are enriching for the learners, that they support the learners’ autonomy and stimulate the re-activation of the previously acquired knowledge (see Loyens, Rikers, and Schmidt, 2007; Oxford, 1997; Phillips, 1995). In a constructivist classroom, the teacher ceases to be the sole authority on knowledge. Instead he or she becomes “a facilitator of exploration and a provider of experiences” (Prater, 2001, p. 45). Practicing educational constructivism

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would necessitate “creating and adapting curricula to meet the needs of learners, managing more active classrooms and dealing with accountability issues regarding student learning” (Windschitl, 2002, p.134). The pertinent question that arises from this discussion is: “How can constructivist assumptions be transformed into pedagogical strategies?”

Educators and educational theorists have been aware that implementing constructivist pedagogy in practice is fraught with many dilemmas. This is due to the fact that “‘Constructivist pedagogy’ is less a model than a descriptor for instructional strategies” (Windschitl, 2002, p.136). There is no blueprint as to how classroom proceedings should be organized in a constructivist classroom. Consequently, attempts to translate constructivist assumptions into pedagogical strategies have met with numerous challenges. Among these is the need to ensure that lessons lead to solid learning outcomes while giving the students the freedom to engage in active learning. Another dilemma concerns the assessment of the students’ learning where the instructor needs to allocate marks to individual learners for their participation in a collective effort (see Johnston and Karageorgis, 2009, p.1). Indeed, one of the misconceptions about educational constructivism has been that since the learners must be given a considerable degree of freedom “no rigorous assessment strategies” are required (Windschitl, 2002, p.139).

The aim of the present study is to examine possible ways to solve these pedagogical dilemmas. It focuses on the foreign language classroom and describes a video project carried out by Russian language learners at Universiti Malaysia Sabah (UMS). The paper gives a brief summary of two student-produced videos and reports the students’ opinions about the project. This study was carried out in an ethnographic manner whereby the researcher was also the teacher and the project advisor. The initiation of the video project was dictated by classroom considerations, such as the need to make language learning a more relevant experience for the students, and the desire to enhance their creativity, teamwork, and self-reliance.

II. How Learner-Produced Videos Can Promote Constructivist Pedagogy.

Studies devoted to using digital video as a medium for instruction have been an increasingly popular topic in educational research. Video projects have been implemented with the students of various academic subjects and at different educational levels (see Gross, 1998; Jonassen et al, 2003; Kearney and Schuck, 2006; Levin, 2003; Potter, 2005; Yildiz, 2003). As Shewbridge and Berge (2004) noted, “[v]ideo production has been recognized for its knowledge building capabilities and potential for application in constructivist learning” (p.36).

Constructivist views on education are built on the premises that knowledge is not only constructed by individuals but that it is constructed actively, involves social interaction between the learners and develops learner autonomy (see Jonassen et al., 1999; Loyens, Rikers, and Schmidt, 2007; Phillips, 1995). Involving a group of students in a video project creates a good platform for cooperative learning and stimulates social interaction among the learners (Goldfarb, 2002). It provides an authentic learning experience (Herrington, Oliver, and Reeves, 2003; Kearney and Schuck, 2006), helps in the development of various types of literacies and generic skills (Theodosakis, 2002;

Yildiz, 2003), introduces innovative teaching and learning modalities (Hernández-Ramos, 2006), and establishes a learning milieu close to the students' life experiences (Potter, 2005).

Some studies have been specifically devoted to the learner-produced video in the context of language teaching and learning. In the language classroom, video projects create a learning context for activities where the use of real language is imperative. As Sildus (2006) noted, "Real life language always happens in a context, and it would be logical to design classroom activities to resemble real language use" (p.55). The benefits of doing a film project in the target language are manifold: the project provides an excellent opportunity for "authentic communication" in the target language (Gareis, 2000), leads to better vocabulary retention (Sildus, 2006), encourages "higher order thinking in the language" (Carney and Foss, 2008), diversifies learning activities and enhances student motivation (Yamak, 2008), and promotes learner autonomy (Gardner, 1994). Some of the studies on student video projects have offered practical suggestions as to how the activity can be organized (Brooke, 2003; Carney and Foss, 2008; Gardner, 1994; Yamak, 2008).

III. Video Production Phases.

As Phillips (1992) observed, putting the learning in the hands of the learners may be a disturbing idea for some educators because this may be perceived as giving the students a "frightening degree of freedom". Obviously, some fine tuning is required by the teacher to ensure that lessons have solid learning outcomes while still giving students a high degree of control over their learning. For this to happen, teachers need to devise a suitable framework for the learning activity as well as having to hammer out proper assessment strategies.

Based on the available studies on student-produced video in the context of the foreign language classroom (Carney and Foss, 2008; Gardner, 1994; Yamak, 2008) the implementation of video projects can be divided in two phases: (1) the pre-production phase, and (2) the production phase. The teacher's role varies in each of these phases. In the pre-production phase for example, he or she acts as a referee who establishes a set of ground rules for the students.

The pre-production phase can be divided into several stages. First of all, the learning goals must be set and the learning outcomes must be identified. The goals and outcomes must be perceivable by the learners and concerned with the subject matter (Gardner, 1994). For a film project in the context of language learning, the main goal is to develop fluency in the target language. It is important to note here that the assessment strategy for the project will need to reflect this ultimate target.

Next, the project organization must be decided upon. Gardner (1994) suggests several possible organizational models, namely (1) the whole class is engaged in one project, (2) the "project elite" coordinates the project, selects and appoints "experts" for various production tasks, (3) small groups work on their own video, and (4) a modular design which combines elements from (1) and (3). The choice of which model to adopt can be left to the learners. However, the final decision needs to be based on several considerations, such as the availability of equipment for video making (*e.g.*, digital

cameras), the learners' technical expertise, the ability of the team members to meet regularly, etc.

Once the most viable model for project implementation has been selected, the focus shifts to the video theme. The choice of theme should relate to the course contents or the curriculum. At this stage, the teacher may want to make it explicitly clear that the learners are required to use the vocabulary and linguistic structures they had learned during the language program. This is done to counter the temptation to use 'electronic' or word-for-word translations of the conversations and narratives in the video. However, the choice of the theme for the video is best left to the learners. Finally, the intended audience for the video presentations must be identified. The audience may be limited to classmates or it may include students from other groups or courses, teachers, etc. It is important to identify the intended audience because if the video is to be shown to people who do not know the language, subtitles will almost certainly be required.

Once the issues pertaining to the pre-production phase of the project are settled the learners begin to work on their video. The students need to develop the storyline, write the script, compose conversations, discuss how and when to shoot the video, etc. This stage is characterized by learner interaction and the teacher "disappear[s] into background" (Gardner, 1994, p.48).

IV. Assessment Strategies for Student Video Projects.

A. Devising Evaluation Strategies.

The instructor needs to develop proper evaluation strategies in order to enhance the students' awareness of the expected learning outcomes and to motivate them to achieve these targets. Determining the parameters for project evaluation requires thorough deliberation. For a video project carried out as a part of language program the linguistic aspect is undoubtedly the most important. In a sense, the production of student videos can be described as placing of the "visual icing on the textual cake" (Goldfarb, 2002, p. 20) where the language output by the learners is a pivotal element.

One of the numerous pedagogical dilemmas in a constructivist classroom is allocating the marks to individual learners for their performance, participation in and contribution to a collective effort. Therefore, it is important that the evaluation scheme for a team work project is fair and effective, and perceived as such by the students (Johnston and Karageorgis, 2009). Formative assessment -- based on the 'end product' (i.e., the video itself), the teacher's informal observations of the students' work, and the feedback received from group members -- could be the most suitable method of evaluation. In order to encourage feedback from students, the instructor may insist that they keep a 'work-in-progress report', wherein team members describe their activities at various stages of project implementation, mention each group members' contribution to the team effort, and include other information related to the project. Such reports would provide additional insight into the mechanics of each group, which would in turn be of use when evaluating the students' efforts.

B. The Evaluation Rubric for the Video Project.

The students' work on the video was evaluated based on (1) the end product (i.e., the video itself), (2) the work-in-progress reports submitted to the instructor, (3) the instructor's own observations of the group's work on the video, which included discussions and consultations with the students, etc., and (4) the classroom presentations which included a short question and answer session.

The evaluation rubric was given to the students before the work on the project began (see Appendix 1). A maximum of 10 points was allocated for the video project out of a total 100 points for the course evaluation. Considering specific features of the subject matter where mastery of the language is imperative, the highest mark in the evaluation scheme (i.e., 6 points out of a total of 10) was assigned for appropriate language use. This included the use of proper vocabulary and grammar structures, employing idiomatic expressions and suitable mood register in the video conversations and narratives.

The use of language was to be determined by the contents of the video or the choice of topics from the course synopsis. The maximum mark for the contents of the video was 1.5. The same maximum number of points (1.5) was allocated to the creative aspect of the video. In a sense, producing a video is an art project. The students have to develop the storyline, write the video script and conversations, prepare physical props, act in front of the camera, select music for the soundtrack, add special effects (e.g., animations, captions, sound effects, etc). Therefore, creativity is deemed an important element and included in the evaluation rubric. Last but not least, one (1) point was allocated for the students' ability to work as part of a team. The decision to allocate only one point for team work was based on the instructor's observations (from previous projects) that the students had no difficulty in working together.

Before the project began, the students were informed that the video presentations would be done in the classroom during the last two weeks of the semester (i.e., weeks 13 and 14). The instructor also asked the students whether they knew how to shoot video and suggested holding a workshop on video-making. The majority of the students knew how to make video using their hand phones or digital cameras; some of them knew how to use special software to edit video. Consequently the idea of the workshop was abandoned.

V. Method.

A. Background and Participants.

The project involved a class of 37 students who were completing their fourth, and final, semester of Russian language study at Universiti Malaysia Sabah (UMS). UMS is a big public university located in Kota Kinabalu, the capital of Sabah state in Malaysia. Learning a foreign language (e.g., French, Japanese, Russian, and Spanish) or a local language (e.g., Kadazan-Dusun, Tamil) is compulsory for the university students who are proficient in the English language and who obtained scores in Bands 4, 5, or 6 of the Malaysian University English Test (MUET).

The participants were all below 26 years of age and included representatives from various ethnic groups in Malaysia (i.e., the Malay, Chinese, Indian, Bidayuh, Kadazan-

Dusun, and Iban). The class was of mixed gender, and the majority of the learners were science and engineering students.

B. Data Collection and Analysis.

The data sources for this study consisted of artefacts (i.e., the student-produced videos and the work-in-progress reports), the researcher's observations of the work on the project, discussions with the students at various stages of the project implementation, and the students' answers to the open-ended questions. The questionnaires were distributed to the students at the end of the semester (week 14), after all the presentations were finished. They contained the following open-ended questions: (1) "What was the most challenging part of the project?", (2) "What was the most enjoyable / fun part of the project?", (3) "Do you feel that you have benefited from being involved in this project? If 'yes', then in what way?" (4) "If your answered 'no' to Question 4, can you suggest how this project could be improved?", and (5) "Would you recommend that this type of activity be continued with your juniors? Why?", and (6) "What have you learned from being involved in this project?". A qualitative analysis of the data was carried out using the interpretive paradigm described by Cohen, Manion, and Morrison (2007). Answers to the open-ended questions were analyzed by unitizing the data, sorting it into categories and coding each category in accordance with Stringer's (2008) recommendations.

VI. The Project.

A. Setting Project Goals.

The guidelines distributed to the students before the project commenced stipulated that (1) the video should include topics learned during the four semesters of the Russian language program (this was done with the aim of reactivating previously gained knowledge - an important principle of educational constructivism); (2) the students must use appropriate vocabulary and grammar in the conversations and narrations (this requirement was aimed at preventing the learners from using electronic translations that are readily available on-line); (3) each and every group member must participate in the role-play (in order to eliminate the 'free rider' problem ubiquitous in team work); (4) language that the students use must be comprehensible to their audience; (5) videos can be up to 15 minutes in duration (see Appendix 1).

For the rest of the project, the students were given complete freedom and took their own decisions regarding project implementation. However, they were encouraged to consult the instructor about any problem they encountered at any stage of the project. A few weeks after project commencement, before they began shooting their videos, the students were asked to submit drafts of the video scripts to the instructor for checking. After the scripts had been corrected, some groups opted for pronunciation practice with the instructor.

B. Project Organization.

The most feasible model for project implementation dictated that students work on their video in separate groups. This form of organization is closely linked to the cooperative learning framework described by Johnson and Johnson (1987, 1991), Slavin (1990), and Sharan and Sharan (1992); however, there are “virtually no models for cooperative learning methods” developed for the language classroom (Allen, 2006, p.12).

The students were given freedom to form their own teams. Though it is normally recommended that the teacher separate the students into groups, it is also accepted that learners should be allowed to group themselves for self-directed projects if they have sufficient experience in implementing group projects and are proficient in cooperative group work (Sharan and Sharan, 1992). For the work on the video project, the students were encouraged to self-organize for several reasons. Firstly, the learners were adult university students who had studied Russian together and had worked on assignments in small groups over the previous three semesters. Secondly, encouraging students to organize their own groups promotes the learners’ initiative and responsibility for learning from the onset of the project (Johnston and Karageorgis, 2009), and lends additional support to the constructivist assumption of learner autonomy. Thirdly, consideration was given to the fact that filming a short movie in the target language is, to a large extent, an artistic endeavour; hence freedom to form the creative team would boost group creativity, promote student motivation, and lead to a better outcome. The instructor only advised that the groups be not too large and that the group members be able to meet each other for regular discussions. A total of six groups were formed by the students.

C. Choosing a Video Theme.

The students themselves chose the theme for their video. They were encouraged to be creative and given freedom of choice regarding the format of their video. The following titles were proposed by the students: “Old Friends”, “Kidnapping”, “Vlad”, “My First Day at the University”, “Show Time”, and “Vkusno!” (“It’s Tasty!”).

D. Identifying the Intended Audience.

Since the videos were to be presented in the class, the intended audience included all the classmates. The instructor tentatively suggested that the most successful videos could be uploaded on YouTube. For this purpose, it was decided that English subtitles of the conversations must be supplied. The students were very enthusiastic about the idea of sharing their videos with an international audience. However, after all the videos had been presented the students agreed that some additional editing would be required before the videos could be posted on YouTube.

E. Video Presentations.

Through discussions with the students about the format of the video presentations it was decided that each group would begin the presentation with a short introduction. The introduction could include an explanation about the choice of the video theme, a brief

description of the difficulties the group had encountered while working on the video and of how the team members solved these difficulties, etc. A notebook computer, speakers, and an LCD projector were set up in the classroom for the presentations.

VII. Student-Produced Videos.

The following subsections offer a description of two videos produced by the students. In a sense, these artefacts represent polar opposites whereby one video is a successful outcome of the team effort while the other is a less satisfactory outcome.

A. The Video “Old Friends”.

In this video, which lasts 10 minutes 27 seconds, the students act as themselves. As they explained, “[It is] a story about old friends coming together after many years apart and recalling the happy times they had together, only to realize times have changed and they can never regain what they had experienced”. The events in the video take place on 28 February 2030, when a group of former classmates gathers at the Kota Kinabalu airport to welcome their friend. The English translation of the opening conversation is:

A: Welcome! Long time no see!

B: Hello, my friends. How are you?

C: And how are you? Where are you planning to stay?

B: I am thinking of staying at the five-star hotel “Luna”.

B: The service in this hotel is very bad. There are mice in the room - and bed bugs.

C: Let’s go to my place.

B: Oh, thank you!

C: Are you hungry? We can go to a Japanese, Italian or Malaysian restaurant.

B: Thanks, but I ate in the plane.

In this conversation, the students use appropriate greetings and employ the idiomatic expression “long time no see” which in Russian is literary “(how) many summers, (how) many winters!” They infuse the dialogue with humour when they discuss an imaginary five-star hotel with the mice in the room and the bed bugs! The students also made an appropriate socio-cultural ‘move’ by inviting their friend to stay in their house rather than in a hotel.

On the way home, the “old friends” remember their life as UMS students some 20 years ago. The segments where the friends recall the “good old times” are filmed in black and white and are accompanied with sentimental music. As for the “present”, the friends make plans how to spend their time, whom to visit, and which places of interest to see. One of the conversations, translated into English, proceeds thus:

A: Where do you want to go today?

B: I don’t know.

C: We could go to Kinabalu Park or Tanjung Aru beach. Or, perhaps, we could go to “One Borneo” Mall or even to the Manukan Island.

B: That’s interesting... Mmm...

A: Let's go to UMS!

B: Yes, let's go there!

In the campus, they find their former classmate who now works as a university lecturer. They share information about some of their university friends. The video ends on a nostalgic note that “what was, will never return”.

Evaluation of the Video “Old Friends”. The students produced a successful video, and received 10 points each for their work. First of all, as far as language use is concerned, the students employed an appropriate vocabulary and the correct grammar; they used the proper mood register for various situations, and employed some idiomatic expressions they had learned during the language program. They spoke fluently with good pronunciation and made very few errors in their speech. Secondly, the contents of the video were well thought through and a variety of topics were included in the storyline (e.g., meeting friends at the airport, choosing lodgings, discussing which places of interest to visit, giving directions, eating out, etc.). Thirdly, the students received a high mark for creativity because they approached their topic from an unusual perspective where they looked at the everyday reality of being university students from a point in the distant future. The soundtrack of the video conveyed to the viewers the emotions that the ‘old friends’ experienced in various situations. Finally, good team work was in evidence. In the video, all the group members participated in the conversation and spoke for periods of approximately equal duration.

The work-in-progress report prepared by the group mentioned how each group member contributed to the joint effort of the team; the tasks were equally shared by the team members. For example, each student participated in developing the storyline and wrote a part of the script in Russian. Some ‘division of labour’ was in evidence regarding the technical side of the project implementation. Thus, two students were in charge of typing the English subtitles, while one group member was in charge of “piecing together the recorded bits”; another team member was in charge of procuring the equipment to shoot the video, and one group member prepared the physical props. A section in the report that covered the problems that the students encountered gave an additional glimpse into the inner workings of the team. The biggest challenges mentioned by the group members were writing the script in Russian and solving some technical problems (e.g., sometimes the format of the recorded video was not compatible with the software).

B. The Video “Show Time”.

The duration of this video is 13 min 53 seconds. As the students explain in their report, “This is a story about a man who is determined to achieve his dream of becoming a singer”. The video begins with the story of a student who is late for an audition for the role of lead singer in a rock group. He oversleeps and forgets to bring his guitar. As a result, he performs poorly and fails the audition. Later in the afternoon he goes to a café where he meets another student who failed the same audition. The two young men become friends.

In the following episode, which takes place in the student hostel, three girls talk about their dream of joining a rock band. One of the girls suggests that they all go to café and have lunch. At the café, they meet the two young men. They chat over the meal and

decide to form their own rock band. After practicing together for some time they perform well in a band competition, and realize their dreams.

Evaluation of the Video "Showtime". The video "Showtime" received 6 points; its weakest part was the language use. Only two group members spoke fluently in front of the camera. The rest of the students paused frequently while trying to remember their lines and spoke with numerous grammatical mistakes. Another problem was that some group members talked very little in the video. The students noticed this shortcoming and commented in the report that the "dialogues were not equally distributed among the team members". As they explained, the members of the group who had little to say in the video "did a little bit more behind the scenes in exchange", such as preparing the props and the equipment.

On the positive side, the students showed good team work and creativity. Each of the group members can play a musical instrument, and in the video they performed a cover version of a Russian rock song. However, since the language use was the most important part of the video project and was allocated the highest number of points in the grading rubric, the overall mark for the video was comparatively low.

VIII. Students' Opinions about the Project.

The first open-ended question that sought the students' opinion about the project was "What was the most challenging part of the project?" Four main categories of challenges emerged from the answers, namely, (1) linguistic (n=15), (2) technical (n=15), (3) creativity-related (n=14), and (4) team work (n=7). In the first cluster of answers, the typical problems were "memorizing the script" and lacking a linguistic aptitude to realize a "lot of good ideas". In the second category, the main challenges were "shooting the video" and "editing the video". Further, "acting in front of the people", "developing the storyline" were among the most prominent challenges regarding the creative aspect of the project. As for the team work, "finding time to meet" was the biggest challenge followed by problems with "task sharing".

Two categories emerged in the students' responses to the second question, which sought to identify the most enjoyable part of the project. The most frequent answers were from the "working on the video" category (n=23) and included "shooting the video", "acting", and "going to site". This was followed by responses from the "group work" category (n=12) where the most typical answers were "getting together", "learning from others", "working with group members", and "sharing ideas".

All the students gave positive answers to the question, "Do you feel that you have benefited from being involved in this project? If 'yes', then in what way?" The biggest category related to "linguistic benefits" (n=19) which included an increased use of the language (e.g., "I spoke more Russian, as I usually don't", "(It was) a good chance to speak Russian", "I talked real Russian", "I could talk without reading the text") and improved language skills (e.g., "I improved my speaking", "I learned some new words and grammar", "I know the right way to speak Russian", "I can apply similar language in similar situations", etc.). The smaller categories were "improving one's technical knowledge" (n=5) (e.g., "Now I know how to edit video", "I became more experienced in shooting video"), and "enhancing one's life skills" (n=4) (e.g., "(I) became more

determined to complete any given task in the future”, “Now I am less shy to speak in front of the camera”, “I got some life skills from the project”).

The question “Would you recommend that this type of activity be continued with your juniors? Why?” received full support from the students and everyone agreed that the project should be continued. Most of the answers (n=19) stated that it was “a novel and enjoyable activity” (e.g., “it’s a new way to learn”, “it’s fun”, “it’s more practical and enjoyable”, “it’s enjoyable and allows us to express creativity”). Responses in the second largest category (n=13) supported the project because it helped “improving language skills”; typical answers were “they (the juniors) can practice real Russian”, “they have more opportunity to speak Russian”, and “the project gave me confidence to speak Russian”.

Finally, in response to the question “What have you learned from being involved in this project”, the students cited a variety of learning outcomes. The biggest category of answers (n=18) was related to learning about working as a team. The most frequent answers were “I learned about teamwork”, “I learned how to cooperate with the classmates”, “I learned that unity is important”, “I learned about commitment and teamwork”. The second biggest cluster of answers (n=12) pertained to the enhanced linguistic aptitude (e.g., “I learned a proper way to speak Russian in real life”, “I learned pronunciation, something that is hard for me”, “I learned to communicate more fluently in Russian”, etc.). The third category of opinions related to acquiring various “life skills” (n=8), such as being on time (e.g., “I learned to be on time (don’t let your friends wait for you to do the project)”, “I learnt the importance of being on time”, “I learned that I should improve my time management”) and being committed to the task (e.g., “I learned to never give up”, “I learned to persevere under undesirable circumstances”).

IX. Discussion and Conclusion.

Due to a fact that visual culture has become “the means of knowledge and meaning production” (Goldfarb, 2002, p.2), numerous student video projects have been carried out in various educational settings and across different academic disciplines (see Goldfarb, 2002; Goodman, 2003; Gross, 1998; Kearney and Schuck, 2006; Levin, 2003; Potter, 2005; Yildiz, 2003). The current study focused on a video-making activity in the context of language learning and argued that designing a proper framework for the activity and developing an effective grading rubric would help address some of the pedagogical dilemmas that arise in a constructivist learning situation. Among these dilemmas are the extent of the teacher’s presence in the learning activity, and the allocation of grades to individual students for collaborative work.

In the video projects the instructor might be required to take a more prominent role in the earlier pre-production phases when a set of ground rules for project implementation and the grading rubric need to be established and communicated. The rules must be aimed at “minimizing the risk of negative, and maximizing the likelihood of positive results” (Johnston and Karageorgis, 2009, p.3) while the grading rubric needs to be developed in order to help the student achieve the desired learning outcomes. In the current video project the paramount aims were to improve the students’ linguistic and “life skills”. Another important consideration when developing the rubric is to ensure that the learners produce a “*high-quality product*” through a “*superb teamwork process*” as

suggested by Johnston and Karageorgis (2009, italics as in the original). At the production stage, the instructor can retreat into the background in order to promote the students' autonomy as learners and to support the constructivist nature of the learning activity.

Based on the project's outcome and the findings of this study, the framework developed for the activity and the grading rubric helped the instructor to achieve her pedagogical aims. The students improved their language skills as they spoke considerably more Russian than in previous semesters. Significantly, the learners themselves commented on this fact. Furthermore, the students had an ample opportunity to engage in team work and, as was evident from their answers to the questionnaire, they liked the mode of learning. During project implementation, the students encountered various problems and had to think of the ways to solve them; also, various learning outcomes were achieved. As the students' answers to the questions attest, they had a positive opinion about the project and considered it beneficial for their learning and worthy of continuation.

However, the project could have been implemented more successfully and certain modifications are recommended. First of all, considering that "shooting the video" and "editing the video" were regarded as the biggest challenges, the addition of workshops for students who need extra technical knowledge on video making would seem a prudent idea. Secondly, all the students should be required to have pronunciation practice with the instructor before they shoot the video, even if this does necessitate a brief appearance by the teacher from the "backstage". In the project described in this article, pronunciation practice was not obligatory. Students could practice the dialogues with the instructor if they felt they would benefit from this. However, it was evident while watching the videos that there were a few students who had not realized that they needed to polish their pronunciation before talking in front of the camera.

In addition, some changes to the grading rubric are necessary. Firstly, the work-in-progress report will be included among the evaluation categories, and the number of points for the project increased to a total of 15. In the project described in this article, the students submitted their scripts in Russian to the instructor for checking and correcting. In future, the students will be required to include the video scripts written in Russian in the reports, and the accuracy of the written language will be evaluated. Secondly, a more detailed scoring rubric will be given to the students with an evaluation scale provided for each category (see Appendix 2).

To conclude, there is no blue print as to how a constructivist learning experience should be organized and evaluated. Involving the learners in the production of their own video is a viable way of putting constructivist theory into educational practice. To make the learning experience meaningful and to achieve the pedagogical agendas the instructor needs to consider educational, social, cultural and situational contexts in which the learning and teaching takes place in order to work out an appropriate framework for a learning activity and the effective evaluation strategies.

Appendices

Appendix 1. Guidelines for Your Video Project

Dear Students,

I. You are free to choose the topic of your video and to decide how you want to approach the topic. However, the following conditions must be observed:

- (1) The video must include the topic(s) that you have learned during the Russian language course.
- (2) Use appropriate language and language structures (no “electronic” translations!).
- (3) The video must include role-play (i.e., conversations/dialogues) involving each and every group member.
- (4) The language in the video must be understandable to the audience.
- (5) The duration of the video is up to 15 minutes.

II. You are required to prepare a report on your work on the project. The report will contain:

- (1) A synopsis of the video, i.e., a short summary of your video (can be written in English or in Malay).
- (2) The video script, i.e., conversations, narrations, and everything that you say in the video. The script must be written in Russian.
- (3) A “work-in-progress progress” report (e.g., the dates when the group met for discussions, issues discussed, and any other relevant information about the implementation of the project).
- (4) Information on the problems encountered by the group while working on the video, and a short explanation about how these problems were solved.
- (5) Information on the personal contribution to the project by each and every group member (such as developing the storyline, writing the script, editing the video, solving the problem(s), selecting the soundtrack, doing “special effects”, etc.).

III. The marks for the video will be calculated according to the following formula:

Language use	6 marks
Content	1.5 marks
Creativity	1.5 marks
Team work	1 mark

Appendix 2. Video Project Grading Rubric

Title of the video _____

Names and metric numbers of the group members:

You will get the maximum 15 marks for this project. The following aspects of the project will be graded:

- (1) Language use -- maximum 6 points
- (2) Report -- maximum 3 points
- (3) Contents -- maximum 2 points
- (4) Creativity -- maximum 2 points
- (5) Team work -- maximum 2 points

The highest score in each category will be given if the group's performance is considered excellent. Zero marks will be given for a completely unsatisfactory performance in the given category.

(1) Language use

Each group member speaks fluently in front of the camera, demonstrates good pronunciation, and makes no grammatical mistakes. Appropriate language and language structures are used by each student.

Score: 6 – 5 – 4 – 3 – 2 – 1 - 0

Explanation:

(2) Report

The report contains the video script (i.e., conversations, narratives, and everything that is said in the video). The script is written in Russian and contains no grammatical errors. The language used reflects what you have learned during the course. There is no clumsy “electronic” or word-by-word translation into Russian.

Score: 3 – 2 – 1 - 0

Explanation:

(3) Contents

You are free to choose the topics from the course synopsis to develop your storyline. However, not less than 8 topics must be included in the video (e.g., introducing oneself, commenting on the weather, going out to eat, describing your place of residence, etc.). The topics must blend well and be organized in a logical sequence.

Score: 2 – 1 - 0

Explanation:

(4) Creativity

The group demonstrates good creativity in the video. This may be indicated by how you approach your topic, develop the storyline, select the soundtrack or add special effects (e.g., animation, sounds), etc. Be creative!

Score: 2 – 1 - 0

Explanation:

(5) Team work

Each and every group member acts and speaks in front of the camera (i.e., the conversations). There is clear evidence in the video and in your report of each and every group member's contribution to the project including acting, development of the storyline, writing the script, editing the video, etc.

Score: 2 – 1 - 0

Explanation:

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Research-able through Problem-Based Learning

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Abstract: This research project describes an attempt to move towards a more student centered and participatory approach on learning through problem-based storyboards (themes/scenarios) and a unique opportunity for students to have an academic cross-cultural exchange. The purpose of the study was to analyze students' conceptions of this approach on learning through storyboards, experiential learning and the evolution of assessment methods that reflect and further student capabilities. While student satisfaction with the aims of the course was high and technology facilitated a unique cross-cultural opportunity, the challenges of maintaining reliable technology and matching student expectations proved challenging. Despite critical comments, the overwhelming outcome was positive.

Keywords: problem-based learning, student-centered, storyboard, ICT, research-able

I. Introduction.

This paper is a case study to improve the learning experiences of university students through the use of innovative collaboration technologies and novel methodology to make students more motivated and research-able² through problem-based learning.

The Remote University Network (RUN) for human performance is a joint research and development project in technology and education between the University of Gothenburg (GU) in Sweden and Stanford University (SU) in the USA financed by the Wallenberg Global Learning Network (www.wgln.org). Within the RUN project, students from GU and SU have the opportunity to take part in a joint Human Biology course. The course unit at GU, entitled “*Biomechanics and Human Performance, (7,5 ECTS)*”, involves collaboration between various disciplines such as medicine (anatomy, physiology), exercise science and pedagogy. At SU, the course is titled “*Functional Human Anatomy*” in the department of Human Biology. This course is unique in that it uses a blended learning³ approach, which focuses on processes and problem-based perspectives. Instead of traditional didactic learning with lectures and examinations, students themselves search for the information they require and create a team-based research project. The advantage of running a joint international course is that the quality of the content is raised because of possibilities of using international experts and that students get a unique cross-cultural exchange. The aim of the course was defined in the syllabus as follows:

The course unit is intended to provide students with increased knowledge about how human movement is controlled and adapted with focus on sport, health and performance. This will be achieved by the integration of a number of basic biomechanical, anatomical and physiological principles. An additional aim is to develop the students' ability to work independently and in a group, to search for new knowledge as well as to employ interactive teaching aids and communications systems.

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² Research-Able is the concept we use for making students become more reflective and critical as well as knowing more about scientific methods (Kjellgren *et al.*, 2008).

³ “Blended Learning is learning that is facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning, and founded on transparent communication amongst all parties involved with a course” (Heinze and Procter, 2004).

The general aim for the project was to develop and create a network of contacts in the area of exercise science research and higher education through developing a joint international course, where new pedagogical modes of working and learning were being focused and where student learning and motivation were central. Before describing the research project in detail we comment more broadly on our conceptions of teaching and learning in university settings.

II. Perceptions on teaching and learning.

Bruner (1996, p. 129) claims that education has to include a critical component so that students are equipped to "go beyond ... information ... to figure things out" for themselves. However, this noble aim is not always achieved and teaching methods often remain the same. Ruth (1997, p. 1) claims that, "while a medical doctor from the previous century would not recognize the technology in today's hospital, a college professor from that era, would see virtually no change in the tools of education". Even though we do not fully agree with the rather stark conclusion of Ruth, we do agree that teaching methods need to be examined and developed and that there definitely are lots of alternatives to stereotype lecturing in academic institutions.

During the 1980s most research projects designed to improve learning in higher education focused on teaching and the ways in which learning activities were structured, organized and presented by the teacher (Dunkin and Barnes, 1986). In the early 1990s this orientation had broadened to include the relationship between teaching and learning, with particular emphasis placed on the latter (Ramsden, 1992). As the 1990s progressed, student learning was being focused and effective teaching and learning became a central theme and organizing principle of academic education. Towards the end of the 1990s, quality questions were raised and the way students learn was problematized and related to the way teaching was conducted. The necessity of taking the learner's perspective and trying to change the teaching towards a more learning centered approach was discussed (Marton and Booth, 1997).

All theories of learning are based on assumptions concerning the individual, the world and the relationship between the two. Our notion of learning is that, as much as possible, it needs to be grounded in daily activities and cannot be separated from the complex environments in which knowledge is applied. Learning is mostly the result of social processes that require problem solving and negotiation with others and results from engaging in difficult issues and dilemmas.

By situated learning within social and cultural contexts the individual is continuously involved in constructing knowledge through direct experience of social practice (Säljö, 2005). This can be regarded as an active process where students are seeking information related to the task and the given context, and testing this within the context formed by the task and the environment. Situated views on learning originated with, among others, the work of Lave (1988), Brown *et al.* (1989), Rogoff (1990) and Lave and Wenger (1991).

Lave (1988) focuses "on relations between socio-cultural structure and social practice" (1988, p. 177) and her focus is on the inseparability of the individual, activity, and environment. The assumption is that development and learning emerge from the relations among rather than interactions between individual, activity, and environmental factors (Rogoff, 1990). Brown *et al.* (1989) were critical towards education that teaches content in decontextualized ways and stated that "by ignoring the situated nature of cognition, education defeats its own goal of providing useable, robust knowledge" (p. 32). They argue that

teaching and learning needs to reflect how the subject matter is used outside academic settings. Thus, situated learning theories offers perspectives on learning that are well supported by research and have been successfully applied in education.

Within research on learning there are also various perspectives discussing students' engagement and approaches to learning in academic settings (Ramsden, 2003). Approaches to learning are primarily concepts that characterize students as either active or passive in their learning and having either a deep or a surface approach towards learning (Marton *et al.*, 2006). Students seem to do what they think is asked of them, using techniques to learn as much factual knowledge as possible, or they are interested in the subject in a way where understanding and comprehending course material is the focus (Biggs, Kember and Leung, 2001). On the other hand, students' view on education is not once and for all fixed, but instead constructed in relation to the learning context.

In developing our new course we wanted the students to reflect on their own learning and to be aware of possible applications of the knowledge they acquired. Therefore we decided to include reflective blogs as concrete ways of structuring reflections both individually and in groups. Schön's (1983, 1987, 1991, 1995) literature on reflection has made a significant contribution to the discourse on learning and education, and his concepts of reflection-on-action and reflection-in-action are widely used in educational settings. A repeated spiral of appreciation (problem setting), action (strategy generation, experimentation, evaluation) and reappreciation (problem setting) is, according to Schön (1995), referred to as a reflective conversation. This reflective conversation is what problem based learning, especially when working in groups, is trying to accomplish.

A. Problem-based learning.

Problem-based learning (PBL) is a pedagogical approach that has been used successfully over the years and continues to gain acceptance in multiple disciplines. For example, Socrates presented students with problems that through questioning enabled him to help them explore their assumptions, values and understanding. In more modern times PBL, as a general model, was developed in medical education in the early 1970s and since that time it has been refined and implemented in many different educational contexts (Barrows and Tamblyn, 1980; Barrows, 1986; Savery and Duffy, 1995; Duch, Gron, and Allen, 2001b).

PBL is a learner-centered approach that empowers learners to conduct research, integrate theory and practice, and apply knowledge and skills to develop a viable solution to a defined problem (Savery, 2006). Duch, Groh, and Allen (2001a) have summarized the methods used in PBL and the specific skills developed, and these include the ability to think critically, analyze and solve complex, real-world problems, to find, evaluate, and use appropriate learning resources; to work cooperatively, to demonstrate effective communication skills, and to use content knowledge and intellectual skills to become self-directed learners.

Our understanding of problem-based learning is through constructivist learning theories. From a socio-cultural perspective the learner is seen as transforming as well as being transformed when participating in communities of practice and the PBL group might be regarded as such a community. Thus, the focus is on learners as constructors of their own knowledge in a context, which is similar to the context in which they would apply that knowledge. Students are encouraged and expected to think both critically and creatively and to monitor their own understanding. Social negotiation of meaning is an important part of the problem-solving group structure. However, the faculty is responsible for sensitizing students

to learn what learning might be and creating environments conducive to learning and thereby helping them to become ‘reflective practitioners’, to borrow Donald Schön’s (1987) phrase.

Thus, the role of the tutor during PBL is that of a facilitator of learning. Therefore, tutors need to have subject matter knowledge but also subject-specific pedagogical knowledge as well as general pedagogical knowledge (De Grave *et al.*, 1999). In his discussion of the tutorial process Barrows (1992) states:

The ability of the tutor to use facilitory teaching skills during the small group learning process is the major determinant of the quality and the success of any educational method aimed at 1) developing students’ thinking or reasoning skills (problem solving, metacognition, critical thinking) as they learn, and 2) helping them to become independent, self-directed learners (learning to learn, learning management). Tutoring is a teaching skill central to problem-based, self-directed learning. (p. 12)

A meta-analysis of 20 years of PBL evaluation studies was conducted by Albanese and Mitchell (1993), and also by Vernon and Blake (1993), and their conclusion was that a problem-based approach was equal to traditional approaches in terms of conventional tests of knowledge. Apart from that, students who were using PBL also showed very good problem-solving skills. Students in problem-based learning programs also seem to place more emphasis on meaning (understanding) than reproduction (rote learning and memory) (Entwistle and Ramsden, 1983; Savin-Badin, 2000). Marton and Säljö (1976) talk about two approaches to learning – a deep and a surface approach, where students according to a deep approach emphasize understanding and meaning and this is what is emphasized in PBL.

In summary, there is growing evidence that real-world type of questions and learning activities that are student-centered may be more valuable than traditional teacher-centered lectures (Martin *et al.*, 1998; Norman and Smidt, 1992).

These conceptions on teaching and learning were our point of departure as far as pedagogy is concerned and it meant implications for how we wanted to design our course and what methodology to use when designing the course structure and the way it was distributed.

III. Design and organization of the course.

A five-week joint course, here called RUN (Remote University Network), took place concurrently at Stanford University (SU) and University of Gothenburg (GU) during spring 2007 (<http://runproject.stanford.edu>). This course was co-developed by the faculties at SU and GU. During the course, students at both universities had access to globally-distributed expert key note lectures and various online resources and learning methods to study biomechanics and human performance. The main concept and the design of the course, initially given by Rydmark, are presented below and in Figures 1 and 3. Experiences gained from the LearnAble-project at the Sahlgrenska Academy (GU) were fundamental for the course (Hultberg *et al.* 2008 and Kjellgren *et al.* 2008). The introduction and examinations portions were conducted separately – each institution used its own guidelines to assess their students’ learning.

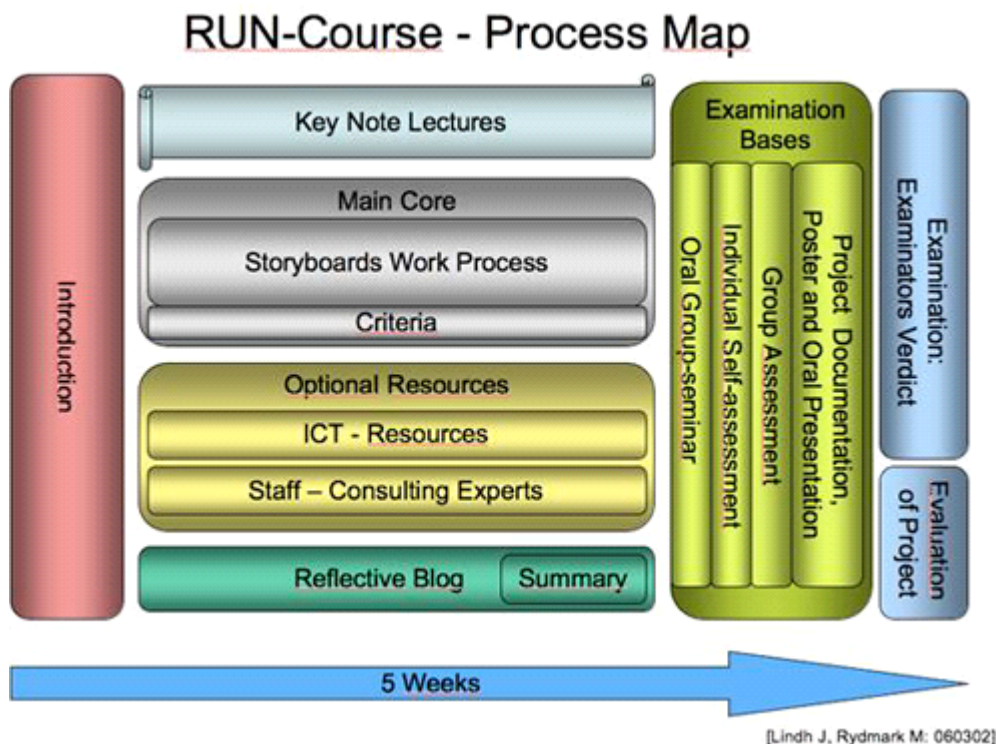


Figure 1. Design of the RUN-course. Key terms are explained in the following subsections.

Introduction.

The goal of the first week was to set up groups, orient the students to the course design, technology, participating faculty, and to their group members. A pilot study the previous year indicated that this type of arrangement helped students work more effectively. Students from each institution formed groups of 3-4 based on their preference for one of 4 (SU) to 6 (GU) project “storyboards” (see below for details). Each group partnered either with another group from the same institution or from the other institution (Figure 2). Each group was also assigned to a teaching mentor for the duration of the project. In total, there were 40 students at SU and 68 students at GU with 63.1% female and 36.9% male students.

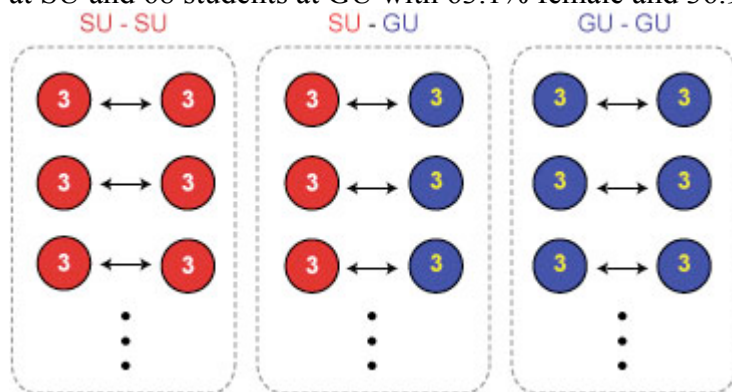


Figure 2. Diads of groups: SU-SU, SU-GU, GU-GU.

Students spent the introductory week to get to know each other and to become familiar with the online components of the course: Marratech⁴ and PingPong⁵ programs. Marratech and

⁴ Marratech is an audio/video multi user communication and conference system (www.marratech.com).
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PingPong were used to allow students to participate in Key Note lectures from another institution and communicate with each other asynchronously and synchronously using shared whiteboards, blogs, wikis, chat, and course management software. After the introductory week, the students started to work independently on their own storyboards.

Storyboards.

Storyboards⁶ are defined by Cave (2002) as “a popular management tool to facilitate the creative-thinking process and can be likened to taking your thoughts and the thoughts of others and spreading them out on a wall as you work on a project or solve a problem”. These creative outlines of ideas for project work were designed to allow student groups to work on a particular application of biomechanics and human performance (mostly exercise science) that required integration of educational goals. Each storyboard was a learning tool that required innovation, cooperative work, research design and execution in a human performance lab. The storyboards were purposely kept somewhat vague, with respect to focus and methodology, to allow degrees of freedom for students’ planning. Over the five weeks of the course, students had to manage all available resources to help produce a scholarly work that could lead to further research. Students could choose from 4-6 different storyboards: ankle, shoulder, knee, back, running economy (GU only), cross-country skiing (GU only).

Keynote lectures.

Experts in the field, originating from Gothenburg and Stanford, presented specially designed lectures 15-30 minutes long that discussed content that could not be typically found in conventional textbooks. Students watched the lectures live using Marratech or reviewed the recordings as streaming media accessed through links in PingPong.

Resources for Information and Communication Technologies.

Through our universities we had access to computers, microphones, web cameras and big screen televisions for meetings and laboratory work. Technical support from our departments was also available every time we were on line for meetings and labs.

Faculty Consultants.

Faculty was recruited to serve as consultants to the student groups. Besides answering to e-mail, they were available face-to-face or online at Marratech on scheduled times or after previous agreement via e-mail. This optional resource was provided to give edge quality in consultation.

Reflective Blog.

Students had to keep a reflective blog in PingPong that recorded their experiences throughout the course. The blog was utilized by students as an element of reflective learning, a strategy that was used to stimulate students to use their own experiences to discover learning for

⁵ PingPong is a LMS (learning management system).

⁶ Klaus (2002) defines a storyboard as “a plan for teaching and learning activities. It can be a combination of outlines and visual sketches (e.g., flowcharts) that map out the contents or sequence of ideas”.

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themselves. At the end of the course the students were requested to review their blogs and summarize their own key findings.

Assessment at GU.

Here assessment is primarily seen from the perspective of the GU student learning, with only some insight into the procedure at SU.

Stage at spring 2007: Student assessment involved an element of structured reflection; self-assessment. Students were asked to grade themselves based on how well they had met objective criteria that were presented in the course introduction as well as how effective the students perceived their learning. These individual assessments were then presented to the group for further discussion and evaluation. The student's final grade rested with the course director's objective assessment, including an evaluation of the formal presentation of the group research and a small written examination.

The self-assessment pilot trial was held for the Gothenburg students (n=32) during the final day of the RUN course of 2007. The purpose was to test if the self-assessment model was useful for students to enhance learning in biomechanics during a course like RUN. The students were informed about the purpose of this pilot trial before the assessment.

The self-assessment consisted of two parts, one individual self-assessment (ISA) part and one oral group seminar part. During the ISA the students had to answer three key questions in biomechanics, just like in a traditional written examination. Immediately after the students had answered all questions, they received the correct answers from their teacher. They now had to sit in the lecture hall and reflect upon their own answers and the correct answers written by an expert, and assess if they "Passed" or "Did not pass" this test (84% passed). There was no limit for "Passed" suggested by the examiner. The students had to assess themselves and decide on their own if they "Passed" the key questions in biomechanics or not. The students that answered "Did not pass", had to fill in what they needed to learn more about in order to pass the test. Then, all students received a one hour study-break to enable them to reflect upon their answers before being assessed by their tutor in a group seminar. The purpose of the group seminar was for the students to make sure that they understood all key learning points and for the tutors to learn more about their students learning progress during a course like this. The outcome of this pilot assessment was very positive. All tutors and 91% of all participating students answered that this concept was very useful for learning key concepts in biomechanics and should be implemented during the next RUN course.

Stage at spring 2008: For the spring 2008 course, an internet-based software for self assessment as a base for examination was developed and used as a result of the pilot course in 2007. The intention was that this would give good feedback both to the student and the faculty. The individual student was i) presented to a set of questions and asked to ii) give written answers which were "locked" at submission. Then, iii) suggested correct answers were presented and iv) the student was asked to reflect over i-iii. Finally, v) the student had to give a statement, either "passed" or "not passed". In the former case the whole self assessment was sent to the examiner, in the latter case the student was also requested to suggest a work plan in support of fulfilling her/his educational goals, and was thereby given a new chance to fulfill the educational goals at a later specified date. In a summarizing group seminar with the students the examiner discussed the validity of the self-assessments and commented upon the outcome and, if necessary, gave additional questions to the students.

The advantage of an interactive ISA is that the students can assess and reflect upon their own learning in key points only by clicking on a link and with almost no administrative

work for tutors. Tutors can collect their student's answers by logging into a page and use the results for the group seminars. A similar concept has been tested previously on dental students in Lund and Malmö in Sweden (Mattheos *et al*, 2004, Leisnert and Matheos, 2006).

Assessment at SU.

Students at SU were assessed based on a content mid-term examination, a content final examination, and a project presentation in the format of a Power Point presentation or poster. Students evaluated themselves during each week of the RUN course and the final project was evaluated by their teacher mentor and faculty experts at SU. Due to space constraints we are unable to present this in more details here, but will do so in a later paper.

Presentation of Storyboard work.

Each GU student project group submitted a scientific report at the end of the course. The scientific reports were allowed to be 5-8 pages long, with the main focus on new scientific knowledge extracted from the laboratory experiment versus results from other similar scientific experiments. A keynote lecture on the project design was presented to the students covering a scientific approach, design, and presentation technology and performance expectations. Students were also given the option to have experts' comments on their achievements before finalizing their work. All findings from the scientific report were presented orally as a Power Point presentation in front of the class. Fellow students and an expert panel commented on their work. The scientific reports and the Power Point presentations were graded after the course by tutors, with the verdict "Passed with distinction", "Passed" or "Not passed". The grading was based on scientific approach, content, oral presentation and individual efforts.

Posters.

GU students presented their significant findings by producing power point-based posters and by following common protocol for posters at international conferences. A keynote lecture was presented to the students with examples and guidelines for the posters. All project groups were asked to show their poster on a big screen after their oral presentation in class of their storyboard work. Their fellow students and an expert panel could now reflect critically upon their work. The posters were graded by tutors with "Passed" or "Not passed". The grading was based on content, design, oral presentation and individual efforts.

Examination.

At the end of the course the students presented their work in the form of a poster and by means of a mini-lecture on the subject of their own poster. Examination took the form of the students making a self-evaluation of their work both independently and within the group, which was then judged and graded by the examiner (see above). The faculty responsible for examination will in all cases summarize the above components of assessments, examinations and presentation for the final verdict.

Pedagogy.

One of the most important conclusions reached by faculty during the pilot study was that this integration of mathematics, physical sciences, and biological sciences, required a new pedagogical approach to teaching. The GU faculty developed a pedagogical model (see figure 3) that not only called upon students to meet educational goals within the curriculum, but also to develop skills required of independent researchers. This pyramid approach emphasizes the progression of students from learners to researchers as they complete the course. The course therefore required the students to actively *learn* key concepts in biomechanics and exercise science through lectures and independent work. Then, students had to begin *constructing* solutions and models to test their solutions. Finally, the group derived data to be able to evaluate their proposed solutions, a key component of *research*. The aim was to provide students with the skills to be able to produce research (Jenkins and Healey, 2009).

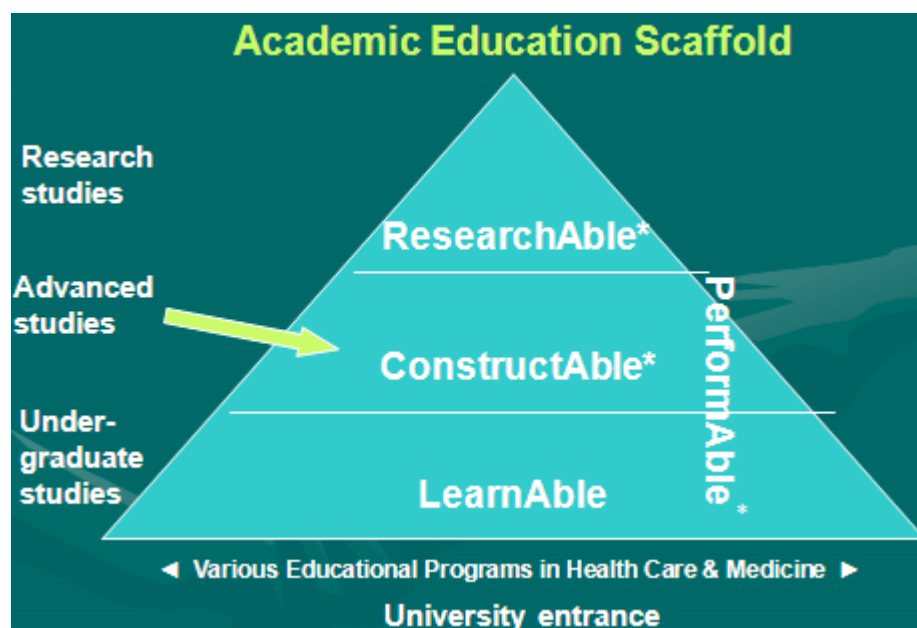


Figure 3. Advancement of the LearnAble model. *Project phase.

The course was led by staff from the School of Sport Science and the Sahlgrenska Academy at GU and from the department of Human Biology at SU. GU staff included a course director, two teaching mentors, and 2 student evaluators; SU staff included a course director, four teaching mentors, a technical support team, and one project manager.

IV. Purpose of the empirical study.

This study analyzed students' conceptions of the content and pedagogical approach of the course by studying how new technology changes the process of learning from both the student and faculty perspective and how the cross-cultural exchange between students changes the educational quality.

V. Method.

The study was carried out by engaging two graduate students (Bohlin and Kocken, 2007) who followed the course and collected data during the five weeks, while being closely tutored by a faculty member (Annerstedt).

The study used an ethnographic research design to gather evidence on the students' questions, actions and meaning-making in their natural settings while playing an active part in the production and interpretation of data (Tedlock, 2000).

Hammersley and Atkinson (1995) have described ethnography in the following way: "In its most characteristic form it involves the ethnographer participating, overtly or covertly, in peoples daily lives for an extended period of time, watching what happens, listening to what I said, asking questions – in fact, collecting whatever data are available to throw light on the issues that are the focus of the research." (p. 1). Further, we agree to Kullberg's (2004) analysis that ethnographic researchers attempt to capture "the perspective of the subjects and tries to see the world through their eyes (p. 43).

Sparkes (1992) states that, in order to truly understand the world through the eyes of the informants, it is usual for ethnographic researchers to actively try to become part of the group under study. This is what Bohlin and Kocken tried to accomplish as researchers in the project.

According to Stukat (2005), ethnographic studies usually involve a qualitative research method for collection of data employing informal and formal interviews (conversations and in-depth interviews) as well as participant observation. Kullberg (2004) likewise mentions that several data collection methods can be employed in an ethnographic study, which she describes as "method triangulation" and which can be used to establish the validity and trustworthiness of the results.

Participant observations were used throughout the evaluation process, although both formal and informal in-depth interviews at individual and group level during the course were also employed. On completion of the course unit, the students answered a questionnaire in order to further strengthen the analysis. The purpose was to establish whether the data obtained through observations and interviews agreed with the students' perceptions.

Bohlin and Kocken (2007) observed and talked to all students and the course leaders during the first weeks of the course, after which they concentrated on three groups of students and their perceptions. Two of these groups consisted of both Swedish and American students, while the third comprised Swedish students only. In order to gain an insight into and as true a picture as possible of how the students and the faculty perceived the course and its outcome, they were observed and conversations (informal interviews) held with them on a continuous basis. During the course, the two ethnographic researchers spent four weeks in Gothenburg and one week at Stanford in order to obtain a fuller picture of the outcomes in the Swedish part of the course in relation to the American outcomes.

VI. Results.

In this section we present data from the 2007 RUN-course and we mainly present data from the GU students in this article and include some comparisons with SU students. Data from interviews, questionnaires and participating observations are compared according to the method of triangulation in ethnographic research discussed by Kullberg (2004). The students who participated in the course in Gothenburg numbered 68, of whom 59 (87%) answered the questionnaire. The focus interviews with three student groups included altogether 13 students and interviews were also carried out with three members of the faculty. Participating observations as well as informal discussions were used continuously during the five-week period.

At SU the students numbered 40 and data were collected through questionnaires, interviews (with three focus groups) and participating observations. Two interviews were carried out with faculty. The teaching evaluation from the faculty was also compared

between the RUN course in 2007 and the more traditional didactic presentation of the course in 2006.

A. Pedagogical approach and learning outcomes.

Students provided constructive feedback on the pedagogical design of the course and suggested ways to improve the course logistics. The majority of both the GU and the SU students (78%) stated that they liked the design of the course and were enthusiastic about the student-centered approach. This included problem-based learning and the possibilities to interact and get to know students from another country studying in the same content area.

Problem-based learning.

The data showed that the students differed in their opinion about the method of working, but agreed on the whole that it had been satisfactory or very satisfactory, as they believed that they would better remember what they had learnt. They were especially satisfied with the opportunity to influence the content of the course including being able to choose how to design their storyboard and research project. This process increased the student motivation where they could either themselves, or together with their supervisor, decide what to enter more deeply into in order to solve their assigned problem. The questionnaire study revealed that 74% of the GU students considered PBL to be a positive method, which they preferred to the more traditional lectures and examinations. All of the students in the GU focus groups expressed their agreement that PBL enabled them to explore and learn on their own and at their own pace. One male GU-student commented:

I like to find information for myself because I learn more this way... and sharing this with the others in the group is stimulating.

One of the faculty members at SU also specifically pointed at problem-based learning as a positive challenge that made him more motivated and creative in his teaching:

I have found that traditional teaching is less stimulating as an educator. The majority of my time is spent finding ways to keep students entertained during lectures. In addition, it seems as though students simply wait until the days before an exam and simply memorize facts so that they can pass. Learning is not as much a priority as getting a good grade. With problem-based learning I am constantly challenging myself to respond to the questions posed by creative minds – it is infinitely more challenging as an educator.

However, students expressed frustration with the open design of the course where they needed to search for solutions – they would have preferred more guidance and more direction from their instructors. As one GU student declared:

I think it would have been a good idea if we had... sort of a basic course in the beginning. It could have been problem-based learning all from the start, but the teachers should actually have been here... and that we could have gotten a little more ordinary teaching as we are used to.

At the start of the course, the students also appeared to worry about how they would find information relevant for their storyboard and expressed that they would have liked more guided instructions. However, upon completion of the course, the questionnaire responses

showed that as many as 78% of GU students had had no problem finding such information. One student stated:

Because we didn't get very much guidance and help in the beginning...when we were about to start with our storyboard, we just had to gather as much information and facts as possible on our own. And we have learned a lot from that, but it has for sure meant just as much work as working with a ten-week essay... even though, during this course, it was just equivalent to three weeks!

Bohlin and Kocken (2007) also noted that the differences between GU and SU evaluation methods and approaches lead to a less collaborative approach to assessing their own students. As a result, students, especially at GU, perceived the initial weeks of the course as “disorganized” and did not see how the course approach contributed to their learning. However, as the course progressed, there was an improvement in the organization that was noted by the students.

The course design fostered skills that students may not get from a traditional didactic classroom. The majority of both groups (81%) felt that the course contributed to these life skills – that the strength of a team results from the diversity of the team members and how to manage decisions, workload, and collaborations within a team. More specifically, students reported that they learned about “cultural differences”, “how to communicate effectively and efficiently”, gaining insight into how to approach problems”, and getting a “global perspective on the same topic”. They also understood the challenges that teams normally face, with managing expectations and work distribution being the most common comment, and learning how to best utilize each team member’s skills effectively.

The social context of learning from each other when working in groups worked well. Writing about their own storyboard, together with presenting it, gave their work a real touch and made the students more aware of the research process. However, according to the questionnaire, 65% of the GU students perceived their assigned storyboard as difficult to work with. On the other hand, the evaluations made on completion of the course indicated that the students were satisfied or very satisfied with this student-centered and more independent method of working.

The students were positive towards working in groups. Students in the groups engaged actively in the learning process and formed a type of learning community, with each making a meaningful contribution, as they tackled the problems. The responses to the questionnaire revealed that 63% of the GU students agreed completely and 30% partly with the statement that collaboration within the group had been satisfactory.

Teamwork is more commonly practice for GU students, but less so for SU students, so GU students’ perception about teamwork changed little as a result of the course. However, the majority of the students from both institutions commented on the value of the teamwork and skills they gained as a result of this course. After the RUN course, more students reported that they were more comfortable working in a group. Here are some comments on the group work stated by SU students:

This was the best group work I have done at Stanford...my group was very respectful, focused, and each brought different strengths to the group.

Even though I have had a lot of group work experience, I did feel that this class was more of collaboration between us, the TA's (mentors), and the professors than I've experienced in the past – which I found very helpful.

I discovered that you can go deeper into a subject and also divide different areas of the subject between the members. Each member can do research within their area and then you

put it together and discuss it. Everyone within a group is good at different things. This is good, and in the end I believe that the work will have a better quality and be better thought throughout if it has been accomplished by more than one. More critical eyes.

It brings together more energy and vibrancy to a project, more points of view, more strengths of varied backgrounds and diverse information sources, making the atmosphere creative and stimulating. It is also important to have others to bounce off and critique the validity of my ideas.

Working in a group setting is beneficial in that you have the opportunity to bounce ideas off one another and get perspectives on themes that you could not have come up with on your own.

The students' responses to the questionnaire showed that 51% considered that the relationship with their pedagogical mentor had been satisfactory or highly satisfactory. However, an equal number reported that they did not receive adequate assistance during the course, although observations and informal interviews revealed that the supervisors had been highly committed and tried to help the students as much as possible (Bohlin and Kocken, 2007).

Reflective blogs.

The activity of writing reflective blogs was appreciated by most students. However, to write with an analytical perspective was perceived as very demanding and not intuitive to students. Many students asked for guidance at the beginning of the course - they wanted detailed and specified instructions about how to write a reflective blog. Students seemed to eventually learn how to write a reflective blog as the course progressed. Our general impression was that the students were more interested in learning the subjects included in the course, than to think about how they learn and to reflect about their process of learning. Yet, a lot of students reflected around the learning process and commented on it in their blogs. A Swedish female student wrote:

I really hope I have helped to make my fellow class mates think that I have put forward some ideas that have helped us to make progress in our group work.

Comments such as how the students reflect on their own learning were also an important goal in the course.

Content.

The students appeared to perceive the course content as relevant and that they had gained much knowledge during the course. The questionnaire revealed that 52% were of the opinion that they had learnt a great deal, while the majority of the students interviewed (informal and formal) reported that they had learnt most within their specific area, i.e. in connection to their own storyboard and not as much about the content in the other storyboards presented.

However, Bohlin and Kocken's (2007) observations and formal interviews also showed that many GU students regarded their basic knowledge of biomechanics too poor for working with PBL. Some suggested that more focus should be placed on biomechanics at the start of the course in order to make the students more prepared and able to apply the knowledge in sport activities. Looking at students' answers, it seems as if basic knowledge in the given content area is a prerequisite for PBL.

In summary, the ethnographic data emphasize that the researchable coursework played a predominant role in students' work and learning in the RUN course. Keynote lectures and the course literature were still necessary (and requested by the students); they established the foundation of knowledge necessary for group investigations, overall students reported substantial increases in comfort and competence directing their own learning through guided research questions and explorations. These student-reported survey and interview conclusions were corroborated by the quality of the proposals, lab work and final poster presentations that made up the graded portion of students' collaborative grades. Students responded very well to the challenge of open-ended group storyboard research questions, and were eager to engage faculty and course tutors for guidance as they narrowed research questions, conducted laboratory tests, and analyzed results.

B. Communication and ICT.

An essential element of constructable and researchable course goals involved cross-cultural interactions and collaborations through the use of ICT. These interactions predominantly focused on the use of Marratech software during collaborative problem sets and interactive discussions of student-directed research. While video conferencing, interactive white-board use, and document sharing were presented as avenues through which students could engage each other as colleagues investigating similar storyboard-based research questions, subjective staff evaluations as well as student survey responses illustrate that this aspect of the course was not received as positively as was hoped.

Using ICT throughout the course and being dependable on this was different from most other university courses the students had taken. Marratech, PingPong and lectures on wide-screen TVs broadcasted from other countries was regarded as quite new and exciting by the students. One SU student commented:

Just the fact that we can take part in a course like this is almost unbelievable. Like..., just think about the lecture we had the other day, you know. There wasn't anybody lecturing. We sat down and looked at a video-screen and listened to somebody who gave a lecture for us and another class. This is something I have taken for granted just because we have a globalized world, but it is quite astonishing! To be in a lecture from the other side of the world with somebody who is a real expert in the field... I don't know, but I think it is pretty cool!

The biggest challenge reported by the students was the technical aspect and time differences. One focus group stated:

If the Americans in the morning decided to change something concerning the schedule we were already in bed..., which meant that we couldn't get the information until much later. This fact has meant some difficulties.

Critical remarks like this one can partly be explained by the fact that communication with Stanford always had to take place during the evenings (Swedish time) because of the time difference. Changes in schedule meant, for example, that other planned activities during the evenings had to be cancelled.

The official course language was English and this was not perceived by the GU students to present any great problem, as they had the option to choose Swedish literature and were allowed to write and present their work in Swedish. They also appeared to experience the use of English as unproblematic in the communication with SU.

On the questionnaire item on the subject of whether the GU students perceived that communication with SU had worked in a satisfactory way, the majority answered however

that it had not. They did not consider that this was due to either lack of language skills or the time difference between Sweden and the US, but instead to course organization and value for collaborating with their counterparts. Moreover, the technical problems associated with Marratech were the greatest hurdle. For example, the sound quality was often poor when the program was used in conjunction with the webcam, which was therefore not frequently used. There were also problems with the Whiteboard and no one knew why. The students believed that the technical part of the course would have worked much better, had it only been thoroughly explained at the start of the course and clear instructions provided.

In general, both sets of students found that the on-line communication and collaboration had not added enough value to their coursework and they were disappointed about that since that was one of the unique components in the course that compelled many students to take it. This is, according to the faculty, the most important thing to change and develop before the start of the next joint course.

Technological difficulties, mismatches of time-of-day between Gothenburg and Stanford, differences in student educational experiences and focuses, as well as the overall difficulty of creating and integrating meaningful cross-cultural exchanges with regard to conceptually complex course content, were all likely contributors to the frustration the students felt at certain times during the course. However, students had a multitude of suggestions for improving these interactions. These suggestions typically fell into the categories of improving technological ease-of-use, improving consistency and relevance of weekly interactions, and framing interactions such that students had increased need/desire to interact. In general, there was among the students an overwhelmingly positive attitude toward the pedagogical approach that emphasized constructable and researchable skills through collaborative research.

C. The cross-cultural collaboration.

Perhaps the biggest challenge of implementation was the facilitation of communication between Swedish and American students. The course design was such that students, as previously mentioned, interacted mainly via Marratech with students working on similar storyboards, but projects were not shared. The aim was that students would be able to discuss each other's projects, and provide insight. Unfortunately, this free exchange of ideas did not proceed as hoped for. There are several possible explanations for the poor communication. Early technology problems as well as groups being mismatched, meant that students were not able to communicate with other groups as planned. Language barriers were a minor problem, but it sometimes made the students frustrated particularly with scientific terminology.

In future collaborative courses, it may be valuable to require each cross-cultural group to work on a shared project with a common grading scheme at each university, so that the students have a common interest and motivation to communicate and successfully complete the projects. As implemented, there were no negative consequences (aside from lack of additional perspective) if the cross-cultural interaction did not proceed successfully. This would also require a similar cooperation in evaluation between the faculties at both institutions.

According to Bohlin and Kocken (2007) it was problems with the ICT that were the main reason why this cross-cultural aspect of the course did not work as the course leaders had hoped. They concluded that organizational measures need to be taken in future courses in order to get a positive development of the cultural aspect of the project.

The faculty claimed that the cultural differences between Gothenburg University in Sweden and Stanford University in the USA resulted in some problems concerning the

collaboration. These variations had to do with slightly diverse views on some pedagogical questions and differences in technical resources as well as staff. SU had more staff assigned to the course as well as better technical resources and support. This meant, on the other hand, great challenges and a striving among faculty for success despite the differences.

Faculty also called attention to the fact that through the RUN course students already at bachelor level had the possibility to take part in a joint international course between universities, cross time-zones, meet and listen to international experts in the field and develop possibilities for international relations and project-work. This was indeed something faculty had to emphasize even further, in order for the students to notice and make use of it.

Faculty also pointed to the fact that the students learned communication skills and how to cooperate with colleagues with the same education in other parts of the world and that these generic skills also had to be regarded as important learning outcomes. The Swedish students were used to cooperating in groups and didn't see this ingredient of the course as very different from other courses they had been taking, while the American students were more challenged by teamwork in the course.

The Swedish students were older than their American counterparts. Some had already families, a part-time job and a very active life-style beside their university studies. The American students, on the other hand, had a different main subject and could choose the RUN course as a course among others in order to get a certain profile in their study-program, while the Swedish students had it as a mandatory course in their sport-science program. These cultural differences did also result in different expectations and a different approach towards the course.

In their evaluation of the course students suggested that to make the global component of the course work (working with team members from the other university) would be to 1) remove the technological challenges; 2) design a project that is truly collaborative where a team of GU/SU students have a single project and contribute to different aspects of the project – otherwise there was no incentive to collaborate.

VII. Discussion.

Clearly there is growing professional agreement that new and more student-centered teaching needs to be developed and acknowledged in higher education. Instead, traditional teaching methods have focused on lectures that have served the interests of teachers more than they have served the interests of students. What contribution new technology can make to the improvement of the standard of higher education and to student learning also needs to be explored. In this paper, we have presented a project that tries to improve the quality of teaching and learning through the use of new technology, cross-cultural collaboration, new pedagogy where problem based learning is central, and where students can start their journey on becoming able to conduct research; i.e. to become research-able.

Our increasing awareness of the limitations of traditional methods convinced us that we needed to develop and explore alternative strategies of teaching and learning. Such strategies should include active participation from students concerning their own learning, new technology, distribution forms and problem based learning where students need to search, evaluate and adapt knowledge and skills in real world settings. We also decided to include an international aspect to the course, where students had to interact with students at another university in another cultural context. This would, we argued, mean that the students also received “cultural knowledge” and that they could compare their own knowledge with students studying in the same content area in another country. We thought this would add another dimension to their professional development. The challenge as an educational

research project was to be able to successfully implement such a complex course with only one iteration of the course design.

It is of course not possible to state that one teaching method is better than another, because it depends on so many variables and the context in which it is used. However, almost all students were positive toward the course design and the PBL method that was presented. This was probably due to increased motivation and as a result of being challenged and involved in their own learning while searching for information via their storyboards. According to Bohlin and Kocken (2007), a contributory factor to their positive attitude toward PBL was that collaboration within the group had been satisfactory; both the method of working and the design of the course were perceived as stimulating. What was missing from the GU students was sufficient basic knowledge of biomechanics and many students expressed frustration at having to acquire knowledge themselves in this area.

From the start, students at both GU and SU were eager to connect with their counterparts using web-based ICT programs. The students hoped to exchange knowledge; i.e. learn from colleagues on the other side of the Atlantic as well as make new friends. The new contacts would also make it possible for them to assess their own level of knowledge within the field in comparison to their counterparts. Since this was a pilot, a few major limitations prevented successful and sustained interactions between the cross-Atlantic teams: technical, pedagogical, and organizational. The main limitation was to have a similar technological set-up on both sides with standardized equipment and rooms set-up and available for students to communicate in. Had there been no technical problems and had the organization allowed more interaction, the picture would most likely be different.

Since this type of exchange was also new to many students, more guidance and structure from the course directors were requested by the students to foster the interactions, help define common goals for the interactions, and “break the ice”. Students on both sides were eager to have the global exchange and expressed disappointment with the technical failures. As mentioned in the results section, while students were able to be friendly with their counterparts, the buy-in on the academic work was more challenging since both sides had their own project and had little knowledge on how to use each side’s strengths. As a result, most groups worked independently.

The cross-cultural collaboration was less than the researchers hoped for, because it lacked the desired results. The reason for this was primarily that the groups did not know how to make use of the other group, which was why many of them decided to work independently. Another reason was lack of communication at leadership level between GU and SU, which resulted in a smaller number of mixed groups than intended. A third reason was that the storyboards were different – two being applied and the four others a bit more traditional – which meant that the work in the groups varied a bit too much. A fourth reason was technical problems, which obstructed a transparent exchange of knowledge. Had there been no technical problems and had the organization allowed more interaction, the picture would most likely be different. Many students described it as regrettable that this part of the project did not work as intended and that the commitment on the American side did not seem to be one hundred percent in terms of the cultural, comparative aspects. The specified shortcomings need to be improved in order to get the students even more involved and to foster cooperation between students as well as members of faculty. In a wider perspective, this course was a singularity and a first time experience for most students and teachers. The natural human inertia towards changes and the technical and administrative shortcomings may explain the somewhat meager outcome. This type of course might include projects that are truly collaborative if this learning strategy is more widely used and familiar, if ICT-infrastructure and course management is working and most important, faculty are truly in

favor of it.

VIII. Conclusions.

While student satisfaction with the aims of the course was high and technology facilitated a unique cross-cultural opportunity, the challenges of maintaining reliable technology and matching student expectations proved difficult. The majority of students had a positive attitude toward the idea behind the project and argued that the course would probably turn out successfully after evaluation and discussion about shortcomings. The conclusion is that a vast majority of both the GU and the SU students liked the design and the implementation of the course and were enthusiastic about the student centered approach. However, there is a great deal that would benefit from improvement and that in particular the cultural aspect must be more clearly emphasized.

The overall pedagogy of the course inspired students to learn about the research process as a result of the teamwork and group projects. As with any new pedagogical approach, especially to an interdisciplinary science like sport science, several iterations of a course are needed to refine the planning, organization, technologies, and approaches to learning. To develop the global component of the course requires an adaptation to the learning goals – the cultural aspect must be more clearly emphasized to successfully incorporate the global component of the course.

However, there is little doubt that lectures made accessible through the Internet and the Web will provide an important piece of the puzzle for developing courses not just for campus students but also for “virtual” students who could be resident anywhere in the world (Milliken and Barnes, 2002). We have tried to expand this approach further by giving a joint course at two different universities using mixed groups consisting of students from both Sweden and the USA that are confronted by storyboards consisting of problems that needs to be solved and presented as a joint venture.

The students had to be able to apply their knowledge in a real-world situation related to the subjects presented in the course. From our ethnographic data we know that this task was considered valuable by the students. However, some of the students also asked for a more traditional approach to teaching and learning, with hard facts communicated through traditional lessons. There were also students who experienced difficulties in taking a greater responsibility for their own learning, as well as in making personal reflections on their own learning. Reflective writing is not something you easily learn from one day to another, but instead something that takes time and demands effort. Changing established teaching and learning experiences is a slow and long-term project. However, despite many critical comments, the overwhelming outcome was that the students wanted the course to be made permanent.

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Mission

Founded in 2001, the Journal of the Scholarship of Teaching and Learning (JoSoTL) is a forum for the dissemination of the Scholarship of Teaching and Learning in higher education for the community of teacher-scholars. Our peer reviewed Journal promotes SoTL investigations that are theory-based and supported by evidence. JoSoTL's objective is to publish articles that promote effective practices in teaching and learning and add to the knowledge base.

The themes of the Journal reflect the breadth of interest in the pedagogy forum. The themes of articles include:

1. Data-driven studies: formal research projects with appropriate statistical analysis, formal hypotheses and their testing, etc. These studies are either with a quantitative or qualitative emphasis and authors should indicate the appropriate domain. Acceptable articles establish a research rigor that leads to significant new understanding in pedagogy.
2. Reflective essays: integrative evaluations of other work, essays that challenge current practice and encourage experimentation, novel conclusions or perspectives derived from prior work
3. Reviews: Literature reviews illuminating new relationships and understanding, meta-analysis, analytical and integrated reviews, etc.
4. Case studies: These studies illustrate SOTL and its applications, usually generalizable to a wide and multidisciplinary audience.
5. Comments and communications: Primarily, these are comments based on previously published JoSoTL articles, but can also include book reviews, critiques and evaluations of other published results in new contexts or dimensions

Submissions

Authors are encouraged to submit work in one of the following categories:

- **Traditional Research Reports: data driven studies with either a quantitative or qualitative emphasis**
- **Reflective Essays on SoTL**
- **Reviews of current themes in SoTL research including meta-analysis**
- **Case studies illustrating SoTL and its applications**
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In your e-mail with your submission, please indicate which of the above categories most applies to your submission. Despite their differences, all of these types of submissions should include the author's expression of the implications their work has for the teaching-learning process. This reflective critique is central to our mission in furthering understanding of SoTL. Authors are encouraged to review the [Guidelines for Reviewers](#) in order to understand how their submissions will be evaluated. **Authors are strongly encouraged to study the Reviewer's Rubric that reviewers shall apply in evaluating their submitted work.**

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Style Sheet for the *Journal of the Scholarship of Teaching and Learning*

John Dewey¹ and Marie Curie²

Abstract: This paper provides the style sheet for the Journal of the Scholarship of Teaching and Learning. Manuscripts submitted for publication should adhere to these guidelines.

Keywords: radiation, metacognition, identity theory, constructivism, educational philosophy.

I. General Guidelines for the Manuscript.

The final manuscript should be prepared in 12-point, Times New Roman, and single-spaced. Submissions should be double-spaced. All margins should be 1 inch. The text should be fully left- and right-justified. The title (in 16 point bold) and author's name (in 12 pt. bold) should be at the top of the first page. The author's name should be followed by a footnote reference that provides the author's institutional affiliation and address. The abstract should be indented 0.5" left and right from the margins, and should be in italics.

Except the first paragraph in a section subsequent paragraphs should have a 0.5" first line indent. Use only one space after the period of a sentence (word processors automatically adjust for the additional character spacing between sentences). The keywords should be formatted identically to the abstract with one line space between the abstract and the keywords. Authors should use keywords that are helpful in the description of their articles. Common words found in the journal name or their title article are not helpful.

Pages should be unnumbered since they will be entered by the Journal editorial staff. We will also insert a header on the first page of the article, as above.

References should be incorporated in the text as authors name and date of publication (Coffin, 1993), with a reference section at the end of the manuscript (see below for the desired format for the references). Titles of articles should be included in the references in sentence case. Unless instructed otherwise in this Style Sheet, please use APA style formatting. Footnotes should incorporate material that is relevant, but not in the main text.

II. Section and Sub-Section Headings.

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Major section headings should be flush-left, bold-faced, and roman-numeral numbered. Major section headings should have one-line space before and after. The first paragraph(s) of the article do not require a major heading.

B. Sub-Sections.

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Sub-section headings should also be flush-left, in italics, and alphabetically numbered. Sub-section headings should have a one-line space before and after. Sub-sub-sections should appear at the beginning of a paragraph (i.e., with an 0.5" indent, followed immediately by the text of the sub-sub-section), with the heading also in italics.

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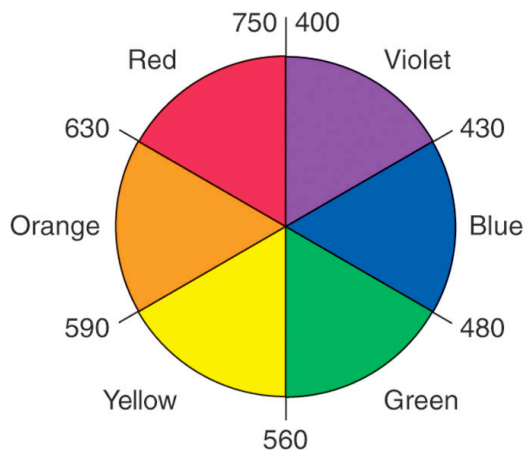


Figure 1. Color wheel with wavelengths indicated in millimicrons. Opposite colors are complementary.

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Appendix

Please insert any appendices after the acknowledgments. They should be labeled as follows:

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