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Missing the Trees for the Forest? Learning Environments Versus Learning Techniques in Simulations

Chad Raymond
Salve Regina University, chad.raymond@salve.edu

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Chad Raymond, PhD

Assistant Professor of Political Science and International Relations

Salve Regina University

100 Ochre Point Ave

Newport, RI

chad.raymond@salve.edu

401.341.3294

Chad Raymond is an Assistant Professor in the Department of Political Science at Salve Regina University in Newport, Rhode Island. He received his Ph.D. in Political Science from the University of Hawai'i after language training and dissertation research in Vietnam. He teaches courses in international relations, comparative politics, and political economy, with a particular interest in Asia. He has published a number of journal articles on economic reform in Vietnam and China, state formation and nationalism in Cambodia, and the use of simulations in the teaching of international relations.

ABSTRACT

Institutions of higher learning are increasingly asked to defend curricular and pedagogical outcomes. Faculty must demonstrate that simulations are productive tools for learning, but a review of the literature shows that the evidence of their effectiveness is inconclusive, despite their popularity in the classroom. Simulations may in fact help students learn, but the pedagogical benefits of simulations may be being attributed too generally to the learning environments that they supposedly produce, rather than the specific learning modalities that occur within them. The paper concludes with a recommendation that educators choose particular learning techniques first, and then build simulations around these techniques, rather than the reverse.

KEYWORDS

simulations, international relations, learning, Kolb

SIMULATIONS AS PEDAGOGICAL INSTRUMENTS

Simulations attempt to "imitate a system, entity, phenomenon, or process . . . [they] represent or predict aspects of the behaviour of the problem or issue being studied" (Lean et al. 2006:228). A simulation's representation of reality permits participants to experience a high degree of complexity, while rules prohibit actions that are impossible in the real world (Lane 1995:607; Hensley 1993:64). Simulations that are used in an educational context typically involve aspects of role play, gaming, and/or computer-based models of complex physical processes.

> In a role playing exercise, participants act out the role of a character in a particular situation following a set of rules and interacting with other role players . . . With gaming, the key elements entail interaction within a predetermined context, often involving forms of competition, cooperation, conflict or collusion. These interactions are constrained by set rules and procedures (Lean et al. 2006:228, citing Feinstein et al. 2002).

While computer models are also rule and procedure based, these rules constrain how an individual interacts with a mathematical representation of the physical world, rather than directly affect how an individual interacts with other people (Koh et al. 2010).

Although the extent to which simulations are employed as pedagogical tools in higher education is unknown (Lean et al 2006:230), they have been and are being used in a wide variety of academic disciplines, from physics (Finkelstein et al. 2005) to economics and business (Tonks 2002; Vaidyanathan and Rochford 1998; Rodgers 1996).[1] In political science, such simulations have been used for decades (Guetzkow and Jensen 1966:268) and have been applied to subjects

[1] The use of devices or people to simulate illnesses or procedures during medical training – such as manikins or practice patients – is beyond the scope of this paper and is not discussed.

such as constitutional law (Fliter 2009; Hensley 1993), the U.S. Congress (Baranowski 2006), public policy (Mayer 2009), comparative politics (Dougherty 2003; Marsh and Bucy 2002; Shellman 2001; Steck et al. 1996), and international relations (Williams and Williams 2010; Chasek 2005; Hobbs and Moreno 2004; Shellman and Turan 2003; Kaufman 1998; Vavrina 1995).

Learning is a complex process, one that is affected by the environment in which learning is supposed to occur, the form of instruction, the specific knowledge being learned, and the cognitive and affective characteristics of the learner (Houtz and Selby 2009:18). Learning outcomes are the product of the interaction of these factors, and "can include level and type of achievement, rate of learning, and affective outcomes" (Vaidyanathan and Rochford 1998).

Simulations are frequently described as environments in which learning occurs through experience, something that. has long been recognized as a foundational component of learning. As described by American educational philosopher John Dewey,

> When we experience something we act upon it, we do something with it; then we suffer or undergo the consequences. We do something to the thing and then it does something to us in return . . . To 'learn from experience' is to make a backward and forward connection between what we do to things and what we enjoy or suffer from things in consequence (1916:108).

Contemporary literature on simulations frequently claims that the active-experiential learning environment that they produce makes them a more effective pedagogical method than other forms of classroom instruction. This literature usually makes either explicit or implicit reference to Kolb's (1984) hypothesis of experiential learning; for example, Brock and Cameron (1999:251) write that

Kolb's Experiential Learning Model lends itself particularly well to classroom application (Kolb 1984, 1988). Kolb's model has been widely used, and is respected for its validity and reliability.

Kolb's hypothesis asserts that learning is facilitated if students are immersed in a particular application of knowledge – a concrete experience – that requires their active participation. Students observe and reflect upon the effects of their behavior in that instance of application. In the next stage of learning, students form abstract generalizations and concepts as they seek to understand overarching principles that may apply to their concrete experience. Lastly, students test these concepts against new circumstances – they experiment.

With traditional forms of instruction, all students must first passively receive information from texts or lectures and then understand it. Students next "infer particular applications of what is learned to general principles . . . [and finally] they learn to use the general principles to act in some way." Due to the delay between students' first encounters with new knowledge and the opportunity to apply it, the relevance of and incentives for learning may not be apparent to students during much of the learning process (Dorn 1989:6). In contrast, the environment created by role-playing simulations more readily provides the cognitive integration and feedback that Kolb (1984) asserts is necessary for efficient learning, by allowing students to match "theoretical concepts with empirical, accessible behavior" (Enterline and Jepsen 2009:58). The speed at which students experience the consequences of their decisions makes them "more intrinsically motivated to participate in simulations than in other instructional environments," or conversely increases students' motivation to learn, "either of which leads to more learning" (Koh et al. 2010:248).

Despite these claims, empirical validation of Kolb's hypothesis through the use of simulations is rare in the social science literature (Mandel 1987:339). Early quantitative studies found that simulations had no demonstrable advantage over conventional instructional methods in imparting factual or conceptual knowledge or in increasing retention (Wentworth and Lewis 1975:118; Heitzmann 1973:171-172). Smith and Boyer (1996:693-694) state that though "large amounts of anecdotal evidence [support] the idea that simulation promotes greater depth of understanding [and] stronger critical thinking and analytical skills . . . none of this information has been collected, standardized, or quantified," and Lantis (1998:51) writes that "there are very few studies that confirm our experiences (and convictions) that [role-playing simulation] exercises are truly effective." More recently, Krain and Lantis (2006:400) have stated that "the possible benefits of active learning . . . have remained generally untested in any rigorous fashion."

Evidence of the ability of simulations to improve learning outcomes remains mixed. Frederking (2005) and Baranowski (2006) reported a statistically significant improvement in exam scores among students who participated in simulations in American government courses, while Krain and Lantis (2006:404) found that both a diplomacy simulation and traditional lecture and discussion had "statistically significant positive effects on student learning, regardless of instructor or issue area," though possibly in different ways. Powner and Allendoerfer (2008) concluded that students who participated in a brief role-play activity scored better on multiple choice questions after the activity than students who participated in classroom discussion, but that there was no statistically significant differences in the overall performance of the two groups. Stroessner et al. (2009:614) found that in comparison to traditional instruction, *Reacting to the Past* role play exercises produced no statistically significant benefit in writing skills among first-year college students, and that the benefit to students' rhetorical skills was "marginal." Raymond (2010) found no statistically significant improvements in exam scores among students who participated in a role-playing simulation compared to students who received traditional lectures and assignments in an international relations course.

The pedagogical effectiveness of simulations is more frequently evaluated according to qualitative than quantitative criteria (Lean et al 2006:230). Data often consists of the impressions of students and the instructor, such as the written and oral statements of students during simulation debriefing sessions or from post-simulation surveys (e.g., Davidson et al 2009:160; Enterline and Jepsen 2009:57; Chasek 2005:13-15; Hobbs and Moreno 2004:239; Shellman 2001:833; Marsh and Bucy 2002:380-381; Steck et al. 1996:24). In these cases, authors claim, at least in part, that learning occurred because students perceived that it occurred, and that the experiential environment of the simulation caused this increase in knowledge.

However, as noted by Stroessner et al. (2009:608), a "sizable literature suggests that people tend to be quite inaccurate in judging both the nature and the extent of the impact of experience." Although students can provide valuable information about how they perceived – or misperceived – their experiences in a simulation, this information should not be considered to always be an accurate assessment of the influence of the simulation on their learning, or even on their responses to the questions (Wilson and Nesbitt 1978:130). After an event, individuals "try to detect or retrieve causal antecedents that potentially caused the outcome," often leading to hindsight bias (Nestler and von Collani 2008:482). Conversely, students' perceptions of simulations might also be affected more by a simulation's confirmation or disconfirmation of the beliefs held by students prior to the simulation than by their experience of the simulation itself – a situation of confirmation bias (Maznick and Zimmerman 2009:34; Eiser et al. 2008:1023).

Introspective reports about the causes of behaviors "may have little value as a guide to the true causal influences" of those behaviors (Wilson and Nesbitt 1978:118).

Given the inconclusive evidence that simulations can educate students more effectively than traditional modes of instruction, it is worth examining reasons why many university faculty advocate their use in the classroom. First, it is possible that the concept of experiential learning has become conflated with that of learning styles. While Kolb (1984:30) believes that the processes of experience, reflection, abstraction, and experimentation are all necessary components of learning, he also claims that each individual has a particular "learning style" in which one means of learning is preferred or dominant. Learning is thought to be maximized when the form of instruction matches the preferences of the learner (Pashler et al. 2008:105). That an individual's specific characteristics determine which instructional techniques are more efficacious for that individual is a common perception among educators.

Learning styles are assessed with Kolb's Learning Styles Instrument (LSI), a concise self-reported inventory that classifies subjects into four categories. Kolb's LSI appears to generate statistically significant results, but the way in which the instrument is constructed draws its validity and reliability into serious question. Basuray (1982) found the LSI to be "an unreliable instrument . . . whatever the LSI dimensions are measuring are being measured by chance." Freedman and Stumpf (1980) describe Kolb's work as "a theory whose supporting empirical evidence comes from an unreliable instrument designed in such a way that its results spuriously support the theory." Cognitive researchers broadly agree that learning involves a wide variety of cognitive processes involving memory and mental schemas (Willingham 2009). While individuals my prefer particular methods of acquiring new information over other methods.

> [P]reference does not mean a total lack of capability. Students who prefer examples with concrete numbers to abstract mathematical expressions may be responding to a lack of familiarity with algebra rather than a lack of innate ability (Redish 2002: 37).

For example, Vaidyanathan and Rochford (1998) found that students' performance in a simulation correlated with their exam scores, but the effect was caused by a preference for reading rather than for a "kinesthetic" learning environment.

Second, scholars who base their research on simulations on Kolb's hypothesis have often relied upon the anecdotal information contained in the literature. For example, Brock and Cameron (1999) claim that Kolb's theory has been found to be valid and reliable, but they do not reference any literature other than Kolb's that might demonstrate this. They do quote Stice (1987) in the following manner:

> Learning research frequently cites the following: "Students retain 10 percent of what they read, 26 percent of what they hear, 30 percent of what they see and hear, 70 percent of what they say, and 90 percent of what they say as they do something" (Brock and Cameron 1999:254).

Stice (1987:293) attributes these percentages to an unidentified study performed by the Socony-Vacuum Oil Company in the 1930s or 1940s. Stice (1987) reports that these findings correspond closely to what happens to retention when "more of [Kolb's four] learning stages are used" – retention increases from 20, to 50, to 70, and finally to 90 percent, respectively. His source for this information is listed as a private conversation, not a scholarly publication. Stice (1987:296) claims that in his classroom exercise, students

> used all the stages of [Kolb's] learning cycle, and the theory says they will retain about 90 percent of the topic. It says that they will learn, they will understand what they are learning, and they will like it. My experience has confirmed these assertions.

Yet Stice (1987) makes no mention of how he reached this conclusion.

Third, some authors have misquoted the work of other scholars. For example, Starkey and Blake (2001:537-538) state that "simulations give students the opportunity to learn experientially and *have been shown to* 'develop different skills from [conventional] classroom teaching – especially those of being imaginative and innovative' (Winham, 1991:417) (italics mine). Winham (1991:417), however, actually writes that "*[i]t is argued that* simulation develops different skills from classroom teaching (Brademeier and Greenblat, 1981:316), and among those skills are especially those of being imaginative and innovative (Brewer, 1984:805)" (italics mine).

Yet the passage from Brademeier and Greenblatt (1981:316) cited by Winham (1991) actually states that "there is a growing body of evidence that game ability may differ in significant ways from other academic abilities which rely heavily on the capacity to think abstractly or on verbal ability" – hardly an endorsement of the superiority of simulations to other modes of classroom instruction – and they also write (1981:320) that "[a]pproximately as many comparative studies report superior subject matter learning from simulation-gaming over conventional classroom methods as report the reverse; the majority of studies to date have found no significant differences."

In the case of Brewer (1984:805), the passage cited by Winham (1991) states that discovery is "emphasized and highly valued [in simulation games] . . . Thus, imagination and innovation play a central role in the drama of the manual game." Brewer (1984:810), however, goes on to say that "[t]here is little or no scholarship . . . on the limits or validity of knowledge generated by modeling, simulating, or gaming . . . Models are gross simplifications of reality, by definition, but the implications resulting from the acceptance of one or a few such simplifications are seldom addressed."

LOOKING AT THE TREES RATHER THAN THE FOREST

It is quite possible that simulations have beneficial effects on student learning, but that these benefits are incorrectly attributed to a supposed overarching environment rather than specific activities that occur within some simulations. Simulations may require that students collaborate in small groups to achieve common goals or formulate questions instead of memorizing facts. Students who participate in simulations may directly observe problems and engage in discussion that provides them with immediate feedback about possible solutions. These types of activities are variously known as engaged learning, cooperative learning, inquiry-based learning, technology-enabled active learning, evidence-based learning, exploratory learning, and problem-based learning (Hosal-Akmun and Simga-Mugan 2010; Matveev and Milter 2010; de Freitas 2006; Huxham 2005; Wilke and Straits 2005; Ebert-May et al. 2003; Hake 1998; Ebert-May et al. 1997; Johnson et al. 1991). For the sake of brevity, "cooperative-engaged learning activities" will be used as an umbrella term to refer to all of these techniques.

When cooperative-engaged learning activities are employed, the development of students' skills often takes precedence over the delivery of course content. Instruction is designed to engage students' higher-order cognitive skills through problem solving and hands-on experimentation (Hosal-Akmun and Simga-Mugan 2010:252; Breslow 2010:25; Hake 1998:65).

Students are frequently given a question to probe their existing knowledge of a particular topic and are challenged to demonstrate their conceptual understanding and skill proficiency (Ebert-May et al. 1997:602).

While this approach is no panacea (Ebert-May et al. 2003:1221), several well-designed quantitative studies have shown that cooperative-engaged learning generates better academic performance among students than traditional teaching methods (Breslow 2010; Ali et al. 2009; Potthast 1999; Hake 1998; Giraud 1997; Keeler and Steinhorst 1995; Johnson et al. 1991). Studies where cooperative-engaged learning was associated with no or only a weak positive effect on student performance (Hosal-Akman and Simga-Mugan 2010; Huxham 2005) suggest that at minimum "allocating time to cooperative learning activities at the expense of delivering more [lecture] content did not harm student learning or reduce knowledge acquisition" (Ebert-May et al. 1997:604).

EUROPE1914 SIMULATION

In the Fall semesters of 2008 and 2009, I taught an introductory undergraduate international relations course. The objectives for the course in both semesters included learning fundamental concepts of international relations and developing argumentative writing skills. In the Fall 2009 class, I used a self-designed role-playing simulation that I called Europe1914. In this simulation, each student played the role of a high-ranking official in a European government on the eve of WWI. The students were grouped into teams that represented the states of Britain, France, Germany, Austria-Hungary, Russia, Greece, Serbia, and the Ottoman Empire.

Students in both the 2008 and 2009 classes were required to read the same textbooks, heard lectures on the same topics, and wrote answers to similar or identical questions for exams and reading assignments. Students in the 2008 section had three exams while students in the 2009 section had two exams. The students who participated in the simulation in 2009 had the additional assignment of writing about which international relations theory they thought best explained what occurred during the simulation. Final grades for the two classes were calculated as shown in Figure 1.

Final Grade		
	Fall 2008 (percent)	Fall 2009 (percent)
Reading responses (10)	20	20
Analytical essay	25	25
Exams	45	20
Discussion participation	10	05
Simulation	n/a	25
Simulation essay	n/a	05
Total	100	100
(Victory condition)	n/a	(+5)

Figure 1

In the 2009 class, each student had both general and specific objectives to attain as the simulation unfolded. Although students were free to take whatever political positions they wished, they were obliged to conform to the social and historical environment that existed in Europe in 1914. Students were instructed that they did not need to personally believe in what they argued, but that their writing and speaking had to advocate for or against particular courses of action and that they should persuade other students to accept their arguments. Students were cautioned not to take a position without first examining the logic upon which that position was based – for example, “democracy is good” or “war is bad”:

Europe1914 included three collaborative writing assignments: a threat analysis, a treaty with another government, and a declaration by the head of government to citizens. Blogs were created for members of each government to work on the writing assignments online and to communicate about strategy. Each government's blog was not viewable by students who belonged to other governments. Each government posted the final versions of its writing assignments on a separate blog that was viewable to all members of the class. For this particular blog, all students in the class had the ability to post and reply to comments. Also, each student received a rubric on the collaborative writing process.

During class periods, the simulation took the form of a "Council of Nations," which had only three rules: 1) any oral statements to the Council hat to be made from a podium at the front of the room, 2) no one except the instructor could address the Council without being first recognized by the Council of Nations moderator (a student, selected by the class), and 3) participants were prohibited from using any written text or notes when making oral presentations.

I evaluated student's performance in the simulation according to the frequency and quality of collaboration on blogs, the quality of the final versions of each government's three writing assignments, and the quality of a student's oral statements during Council of Nations sessions. Every role in Europe1914 also had a particular objective that constituted a "victory condition." If a student achieved his or her victory condition during the simulation, that student earned a bonus of 5 percent equivalent to half of a letter grade. I designed the victory conditions to deliberately conflict or agree with those of other students.

Students were orally debriefed and asked to submit a written appraisal of their experience after the simulation concluded. Students stated that they enjoyed participating in the simulation and believed that it was a worthwhile educational experience. Comments reflected upon three major themes. First, many students appreciated the degree of interaction afforded by the simulation and the ability to work in groups with students that they did not know. One student wrote:

> Not only were we engaged with our peers, we were engaged with the subject – this project helped us learn with interest rather than necessity. In other words, we were interested in what we were learning and were not taking notes just to pass the class.

Second, there were a variety of comments on the ways in which this student interaction occurred. Students believed that the Council of Nations sessions in the classroom allowed them to debate matters with members of their own governments and with representatives of other governments. They said that oral statements made before the Council forced them to do additional research to become more familiar with actual historical conditions. During Council of Nations sessions, face to face negotiation among students was clearly evident.

Students gave a mixed verdict on the blogs as collaborative workspaces, however. Some said that the blogs were helpful, easy to use, helpful, and fostered clear communication. One student wrote:

> I think that being able to talk to each other on the [the blogs] was a helpful way to get things done. I personally enjoyed connecting with my group over [the blogs] so we could share ideas and put a finished product together.

Others found the blogs inefficient; for example, one student said that

> the blogs were a useful tool, but I felt that all communications for my group was via text or email, sometimes posting finished paragraphs on the blog for a designated person to edit and submit.

The amount of student collaboration on writing assignments varied widely. Some students regularly used the blogs to contribute written work and participate in back-and-forth discussions with other members of their governments, while others posted only a handful of comments and probably functioned as free riders. Some groups clearly had an unequal division of responsibilities. One student wrote that "it was hard to get group members to do their job and some of them did poor work."

Students evaluated their and their group members' work on the first two collaborative writing assignments and on Council of Nations sessions on a scale of one to five (Appendix A). Despite receiving a rubric for collaborative writing assignments, the evaluations produced little usable information – the vast majority of students gave each other high scores. Comments on the evaluations were often unspecific.

Third, many students wanted Europe1914 to have more of an explicit rule-based structure. Although a few students were, as described by Lantis (1998:49), "more comfortable with the rules of procedure from the outset and [were] ready to use them to their own advantage," many were initially hesitant to act. Several students said that they found the initial phases of Europe1914 to be confusing because, according to one, "it was very difficult to grasp the purpose of the simulation." Students did recognize the importance of alliances in achieving their interests – an important concept in international relations – and treaty-making between governments soon occupied most of the Council of Nations sessions. However, many students said that they wanted serious consequences to be imposed when treaties were abrogated or when one government declared war on another.

On four occasions during the simulation, students completed a self-assessment (Appendix B). The assessment instrument asked students before and after a Council of Nations session 1) how confident they were in being able to meet their goals for the simulation (very confident, somewhat confident, not very confident, or not at all confident) and 2) how much control they thought they had over their success in the simulation (I control my destiny in the simulation, I generally control my destiny in the simulation although some events are out of my control, I partially control my destiny in the simulation; much is beyond my control, but my actions do have some effect, I do not control my destiny in the simulation at all).

Mean scores on the assessment show that students began the simulation with a high degree of confidence in their ability to control events and achieve goals. Their confidence dropped markedly between the first and second assessments and then rebounded somewhat in the third and fourth assessments. Students were more confident about their ability to achieve personal goals than their ability to exert control during the simulation, and scores on assessments completed after Council of Nations sessions were generally higher than before the sessions began.

EXAM PERFORMANCE

If the cooperative-engaged learning activities that occurred within the simulation helped students learn more effectively than traditional lectures and assignments alone, students in the 2009 class should have scored higher on exams than students from the Fall 2008 semester. In both classes, exam questions were either identical or very similar. Both groups of students Students were instructed in both semesters to answer the exam questions by forming a hypothesis out of the question and then defending the hypothesis using an international relations theory and specific examples from reading assignments. All exams were graded on a 100 point scale.

In the 2009 class, the first exam was given two weeks after the conclusion of the simulation, seven weeks into the semester. In the 2008 class, the first exam was given at the end of the fourth week of the semester and the second exam was given at the end of the tenth week of the semester. The same material was covered in lectures and reading assignments before the first and last exams in both semesters. The last exam in both classes occurred during the final exam period.

As shown in Figure 2, the 2009 students scored on average 4 percent lower on exams than the 2008 students. Their final grades were 8 percent lower, despite many of them earning additional credit for achieving their victory conditions during the simulation.

Exam Scores and Final Grades					
	Fall 2008		Fall 2009		Difference In Means
	N	Mean	N	Mean	
Exam 1	22	85.9	33	81.8	4.1
Exam 2	22	89.4	n/a	n/a	8.6*
Final exam	22	85.5	33	81.5	4.0
Mean final grade	22	87.9	33	79.6	8.3

*Fall 2008 Exam 2 compared to Fall 2009 Exam 1

Figure 2

A two-tailed t-test indicated that the difference between means for exam scores and final grade averages of the two classes was statistically significant, except for the case of Exam 1, as shown in Figure 3.

	P-value	Significant?
Exam 1	0.1326	No
Exam 2	0.0045	Yes
Final Exam	0.0371	Yes
Final Grade	0.0211	Yes

*Fall 2008 Exam 2 compared to Fall 2009 Exam 1

Figure 3

It appears that the Europe1914 simulation did not help students perform better on exams or in the course as a whole; however, it is likely that mean exam scores and final grade averages were affected by factors other than the simulation. First, the Fall 2008 class was composed of honors students whereas the Fall 2009 class was not. At this university, students who enroll in the honors program are not only better academically prepared for college than the rest of the student body, the also indicate that they have an interest in international affairs. Thus they may be more interested in course content than non-honors students and more motivated to learn. A better experimental design would be to employ the simulation in a third class populated by honors students, but unfortunately I have not yet taught the course again and have nothing to use as a control group for a more meaningful analysis.

Second, the use of the simulation as a framework for cooperative-engaged learning activities was probably faulty. Student performance would probably improve with additional training in collaborative writing, small group dynamics, and blog use. The structure of the simulation also did not prevent free riders. Rivera and Simons (2008:302) recommend that simulations be designed to include several checkpoints that allow students to be assessed on both individual efforts and group results. Europe1914 had no such checkpoints. In the future, it may be useful to require that students complete the simulation's three writing assignments individually before creating a collaborative version of each assignment. Grades for both individual and group tasks could also serve to prevent an unequal division of responsibilities.

Third, the 2009 simulation ran for five weeks. Lectures were simplified and condensed in comparison to 2008, and information critical to student performance may have been omitted from lectures. The demands of the simulation may have also consumed students' time and energy outside of class in ways that might have been unproductive for learning (O'Toole and Absalom 2003:185; Rivera and Simons, 2008:301). Providing students with outlines or other instructional supplements, decreasing the amount of time in and out of class devoted to the simulation, or re-orienting the simulation's online component away from collaborative writing assignments and toward individual knowledge assessment might improve student performance.

CONCLUSION

Institutions of higher learning are increasingly asked to defend curricular and pedagogical outcomes, and faculty are now under pressure to close the assessment loop (Walvoord et a. 1998). “If educators assume that it is important to use data to assess student learning, then they should be using data to make decisions about how they teach” (Ebert-May et al. 2003:1221). Demonstrating that simulations are effective and productive tools for learning, rather than simply enjoyable exercises for students, is critical. University faculty must ask themselves what a simulation adds to a student’s knowledge base that cannot be learned more efficiently in a traditional classroom setting, and how can this be measured.

Simulations are typically created from the top down – the content knowledge that students are supposed to learn is predetermined by the instructor, the instructor decides to use a simulation on the assumption that doing so will help students learn course content, and then the educator designs the simulation. Perhaps the learning outcomes of simulations would be more demonstrable and consistent if instructors first chose specific activities that foster cooperative-engaged learning and then built simulations around these activities.

APPENDIX A

Self-Evaluation

Your Name:

Please evaluate your contributions and those of the other members of your government to the Europe1914 simulation. **Use a scale of 1 to 5, with 0 being low and 5 being high.** Please refer to page 7 of the syllabus and the rubric for collaborative writing assignments for guidance on evaluation criteria.

Put yourself in the first row of the table.

If your government has four people, leave the last row blank.

		Writing Assignment		
Name and Government Position:	Council Sessions	1	2	Total Points

Explain your reasons for the scores in row 1:

Explain your reasons for the scores in row 2:

Explain your reasons for the scores in row 3:

Explain your reasons for the scores in row 4:

Explain your reasons for the scores in row 5 (if needed):

APPENDIX B

START of class

1. What are your goals for today's session?

2. What did you do to prepare to meet these goals? (List specific actions you took.)

3. How confident are you that you will be able to meet your goals today?
    a. Very confident
    b. Somewhat confident
    c. Not very confident
    d. Not at all confident

Please explain why you have this level of confidence:

4. How much control do you think that you have over your success in the simulation?
    a. I control my destiny in the simulation
    b. I generally control my destiny in the simulation although some events are out of my control
    c. I partially control my destiny in the simulation; much is beyond my control, but my actions do have some effect
    d. I do not control my destiny in the simulation at all

Please explain your answer to this question:

END of class

1. Were you successful in meeting your goals in today's simulation session? Why?

2. What specific actions do you need to do to prepare for the next session? Why?

3. How confident are you that you will be able to accomplish these actions?
    a. Very confident
    b. Somewhat confident
    c. Not very confident
    d. Not at all confident

Please explain why you have this level of confidence:

4. How much control do you think that you have over your success in the simulation?

    a. I control my destiny in the simulation
    b. I generally control my destiny in the simulation although some events are out of my control
    c. I partially control my destiny in the simulation; much is beyond my control, but my actions do have some effect
    d. I do not control my destiny in the simulation at all

Please explain your answer to this question:

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