"All's Well that Sims Well: Incorporating the Community of Inquiry Framework in an Asynchronous Graduate Level Security Studies Simulation"

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This paper provides a comprehensive model for incorporating simulations into an asynchronous graduate-level course in Security Studies. Specifically, we ask whether simulations can effectively increase student engagement in a fully online course environment. We suggest that by using innovative technology and adopting simulations created by the Council on Foreign Relations (CFR), simulations can increase student engagement holistically through the Community of Inquiry model, focusing on the full "educational experience." By applying the Community of Inquiry to the Security Studies digital environment, this paper provides the method necessary to increase the three facets of the holistic education experience: Cognitive Presence, Social Presence, and Teaching Presence. It has often been noted that asynchronous courses lack effective means to immerse and engage students fully. Still, we demonstrate that with slight adjustments to CFR simulations, using innovative technologies can bridge the gap between distance learning and experiential activities. To demonstrate, we use CFR's Mini Simulation, "Should the United States Ban TikTok to Preserve National Security?" We provide the learning objectives, student reflections, and state-of-the-art technological instructional tools for running simulations effectively in an asynchronous environment.

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Introduction

Even before the COVID-19 pandemic, but certainly as a result afterward, there has been increased academic attention given to online classroom environments, particularly asynchronous courses. Of particular interest within asynchronous courses is how engaged students are with the coursework, the professor, and their peers. The idea is that the less engaged students are, the poorer their performance and understanding of course material will be. Thus, the relationship between asynchronous learning and student engagement is a topic of great importance as it could not only be a predictor of performance but also of deep learning. Importantly, this unique relationship also reflects overall institutional effectiveness as well, which is measured by student persistence, retention, and graduation rates. Before delving into the direct purpose of the present paper, it is necessary to define asynchronous learning. Typically, when referring to distance education or online learning, there are two main forms: synchronous and asynchronous. Synchronous resembles a traditional classroom experience, giving both students and instructors the opportunity for real-time, live interactions (Pilotti et al. 2017, 145), including lectures, assignments, and discussion, all occurring simultaneously but in an online learning environment captured using Teams/Zoom, etc.

Asynchronous classrooms allow students and instructors to create and complete work at their own convenience (Pilotti et al. 2017, 145), and they traditionally lack any real-time, live, face-to-face interaction. Although coursework is flexible for student convenience, due dates are provided and other parameters established, allowing for student agency in completing the work in a timely fashion. Further, it is argued that asynchronous interaction allows students more time to engage deeply and reflect thoroughly on the course material, improving higher-order thinking (Lu, Pange, and Shadiev, 2023, 9748). The lack of interaction with one's peers and the faculty during a course has created questions on how this potentially impacts student engagement (Pilotti et al.

2017, 145). Other limitations persist with asynchronous learning, including delayed interactions with classmates and professors, often causing a sense of isolation for students (Lu, Pange, and Shadiev 2023, 9748). Together, it has been argued that "Such issues have a direct and negative effect on learning outcomes" (Lu, Pange, and Shadiev, 2023, 9748). Thus, a problem presents itself: how can asynchronous courses increase student engagement, making learning resemble more traditional classrooms, achieving higher-ordered thinking, and achieving learning outcomes? To address this problem, the present study asks, "Do simulations effectively increase student engagement in a fully online, asynchronous classroom environment?"

This paper suggests that incorporating simulations into asynchronous courses increases student engagement. To specifically address this position, this paper provides a comprehensive model for incorporating simulations into a graduate-level Introduction to Security Studies course. We suggest that by using an innovative combination of educational tools, including Yellowdig, Articulate Rise, and Canva, in chorus with the D2L learning management system, we have adapted a simulation created by the Council on Foreign Relations (CFR), to increase student engagement in the graduate asynchronous learning space. We demonstrate the theory behind our argument by relying on the Community of Inquiry (CoI) model, which focuses on a holistic approach to the education experience, including cognitive, social, and teaching presence. This paper argues that simulations using state-of-the-art instructional design tools and practices increase student engagement in these three components of the CoI model.

To demonstrate that asynchronous learning can offer equal, if not better, engagement than synchronous online courses or traditional in-person classes, we have adjusted and applied the CFR Mini Simulation, "Should the United States Ban TikTok to Preserve National Security?" to an asynchronous graduate-level security studies course. We achieve the learning objectives through

active discussions, student reflections, and state-of-the-art technological instructional tools for running immersive simulations effectively in an asynchronous environment. This paper proceeds in four main sections. The first section is a literature review highlighting our theoretical backdrop of the Community of Inquiry and also a review of the relationship between simulations and student learning and engagement. Next, we provide the specific case-study and design of the course, including course specifics, context, and setting, moving into the design of the simulation and associated technological tools incorporated for the exercise to succeed. Thirdly, this paper provides discussions and results from the data obtained from the course and simulations, including student feedback and engagement numbers as captured by our platform. Finally, this paper ends with a conclusion, limitations, implications for future teaching and research, and lessons learned. To begin, we turn to understanding our theoretical backdrop, the Community of Inquiry model.

Review of Literature

This literature review serves two purposes. The first is to set up our theoretical backdrop, which is the Community of Inquiry (CoI). The second is to contextualize this paper within the pedagogical literature of games and simulations. To implement an innovative instructional strategy, such as a role-based immersive simulation, we utilize a unique combination of educational technologies and employ a well-established learning model to provide guide rails that ensure pedagogy and learning science drive the learning design. In this project, the Community of Inquiry (CoI) framework was chosen by the researchers to serve this critical role. Recent studies confirm that not only does the framework support deep learning through its three components -- cognitive presence, social presence, and teaching presence (Richardson, Maeda, Lv, and Caskurlu 2017) -- but it also promotes active engagement with the content, other students and the instructor. But what exactly is the CoI framework?

The CoI has been described as a "collaborative constructivist model on online learning processes that can inform both research and practice" (Richardson et al., 2012, 98). CoI theoretical foundations lean on John Dewey's core educational philosophy of inquiry as a social activity and the importance of a sense of community as essential to learners' construction and confirmation of meaning (Swan, Garrison, and Richardson 2009). Dewey's influence can be seen in the center of the CoI, which has three core concepts, or "presences," overlapping to provide an ideal learning experience. In the present context, CoI assumes that effective online learning requires the development of a learning community that supports the meaningful inquiry and deep learning that is the hallmark of higher education (Dewey 1938).

The concept of a "community of inquiry" was explained by Matthew Lipman, a leading educational theorist, who asserted, "The community of inquiry is perhaps the most promising methodology for the encouragement of that fusion of critical and creative cognitive processing known as higher-order thinking" (1991, 204). Composed of the three fundamental elements of social presence, cognitive presence, and teaching presence, the CoI framework provides a structure and common vernacular for the examination, design, and teaching of online learning experiences. In 2000, Garrison, Anderson, and Archer illustrated CoI as a theoretical framework for assessing and crafting dynamic interactions in a high-designed online learning experience. They illustrated the three presences (i.e., teaching presence, cognitive presence, and social presence) as a Venn diagram with recognizable intersections (see Figure 1).

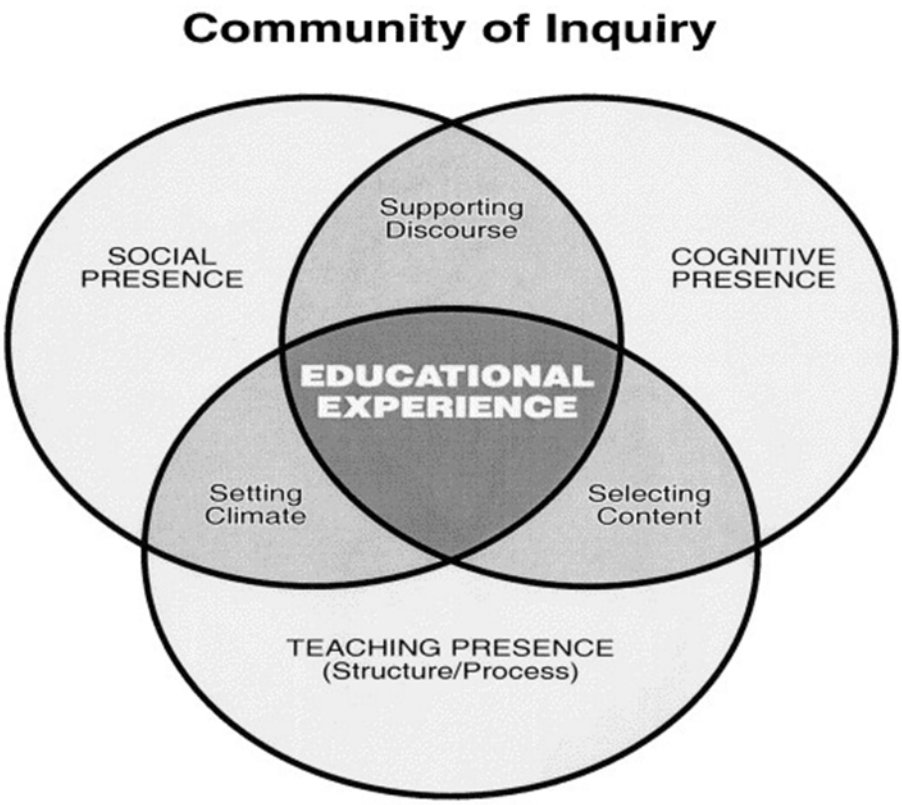

Figure 1:CoI model (Garrison et al., 2000,88).

In the last 20-plus years, the CoI framework has become widely used by researchers and practitioners as a tool to evaluate online learning interactions (Chan et al,. 2021; Martin et al. 2020; Lim and Anderson, 2022) and inform the design of online higher education courses (Hasani, LM, HB Santosos, and K Junus.2022; Ngubane-Mokiwa and Khoza, 2022; Goda 2024). Instructional Designers and instructors ought to employ the CoI framework to guide the creation of online learning experiences that promote deep learning (Rahmatalla, Harun, and Abuhassna 2024) especially when applied to games and simulations. As previously mentioned, the three elements of CoI are used to describe sets of activities and behaviors that take place within an effective online learning experience. Garrison, Anderson, and Archer, (2000) describe them as follows: Cognitive presence is "taken to mean the extent to which the participants in any configuration of a community of inquiry are able to construct meaning through sustained communication" (89). Social presence is "defined as the ability of participants in the Community of Inquiry to project their personal

characteristics into the community, thereby presenting themselves to the other participants as “real people." (89). Finally, teaching presence refers to the design and facilitation of the educational experience for people (89). As Figure 1 illustrates, these three elements interact with one another to create the learning experience. This paper’s third section demonstrates the connection between the components of the asynchronous simulation and the three presences and instructional design principles of the CoI.

The CoI was intentionally developed as a generic framework to guide development across disciplines. However, the effectiveness across disciplines based on instructional design decisions had not been well researched. One study does stand out, however. Richardson et al., (2024) conducted case-based research across disciplines and found the CoI framework could indeed be applied across disciplines. Richardson et al., further asserted that instructional strategies investigated in one discipline were transferrable to others that embody the CoI (2024.) As such, we apply the CoI to a graduate-level security studies course in an asynchronous environment, as described more in detail below. To guide the design, several CoI principles were utilized. Garrison (2019) references seven instructional design principles focusing on the three subcategories of teaching practice: design, direct instruction, and facilitation. These in turn, support the elements of social and cognitive presence. These principles guide the instructional designers, and the instructor of the simulation described in this article.

The seven principles do not have to be considered in sequential order. They are presented numerically for ease of reference within the paper, the number is borrowed from Garrison (2019). The first principle, open communication and trust, calls for establishing a safe space in which students feel comfortable expressing their opinions and ideas openly and without judgment. The second principle, critical reflection and discourse, leads course designers to encourage learners to

analyze, question, and challenge their own assumptions and perspectives through thoughtful discussion. The third guides the deliberate design to foster a sense of community throughout the course. Design principle four, support purposeful inquiry, guides the designer and instructor to actively engage learners in purposeful inquiry by presenting relevant questions, problems, and scenarios to stimulate critical thinking. The fifth principle focuses on enabling and supporting students to sustain collaboration throughout the learning experience. Principle number six, inquiry resolution, suggests guiding discussions towards meaningful conclusions and synthesis of ideas, where learners can articulate a shared understanding. The final principle, assessment congruence with learning outcomes, calls for assessments that directly reflect the intended learning processes and outcomes within the CoI. Examples of how these principles guided the design of elements of the present project are presented further below. Before proceeding to that discussion however, this paper briefly contextualizes the current project within the larger literature of games and simulations.

The academic literature is rife with correlating student success with games and simulations (Asal 2005; Krain and Shadle 2006; Chad 2010; Baranowski and Weir 2015). These examples of experiential learning span the entire spectrum of political science education and curriculum, from 15-minute sections of a course focusing on climate change (Brown 2018) to course-long simulations focusing on the international relations of COVID-19 (Fazal and Sanchez 2023) and everything in between especially in dealing with theory and conflict (Sears 2018; Frank and Genauer 2019). Much of this research focuses on student engagement and student learning outcomes, most of them aligning with Shanks and Zhang's statement, that, "Our findings demonstrate the success of simulations, both in terms of subjective student engagement, as well as in terms of objective student academic performances" (2024, 293). Directly relating to the current

paper and simulation, Whyte (2021), argues that "active learning methods of teaching content to social science students is not only effective over and above lecturing, but can also dramatically simplify the task of introducing political science students to cyber issues" (215). Whyte provides several mini-games to teach cybersecurity within the international relations classroom first seeking to "convey security concepts…in a way that emphasizes learning via a discursive debriefing process….Second, they intersect learning about IR and foreign policy with relevant discussion of cyber conflict dynamics" (Whyte 2021, 216). These points align precisely with the present research and course design, as will be discussed further below. Whyte's conclusion mirrors our project, "our experience is that these games clearly lead to more engaged discussion among students and an improved student ability to articulate the nature of insecurity in the age of the Internet" (Whyte 2021, 223). To reinforce Whyte's conclusions, Arora (2019), emphasizes that non-technical cybersecurity education, when paired with an effective curriculum, can foster advanced critical thinking and deep learning, equipping students with valuable employability skills. The author particularly advocates for the incorporation of mini-games and simulations in non-technical cyber education. All of this is in line with our employment of the CoI framework for designing simulations. However, the nature of the current paper is not on simulations generally but rather on asynchronous online simulations. Therefore, the remaining review focuses on this specific sub-topic of simulations and games.

There is little research on how simulations achieve student success in the online environment, and from that genre, most of the literature focuses on synchronous online, or even hybrid simulations (Da Vinha 2021), with far less focusing on asynchronous teaching and learning. For the synchronous environment, a few seminal articles require attention. Of course, The COVID-19 pandemic provided ample space for simulations to be moved into the online environment. One

of these conducted a WTO simulation, focusing on environmental aspects of international trade (Bratt et al. 2023, 253). The simulation was conducted remotely, and after the pre-simulation workup, the simulation was held online for two consecutive days, focusing on setting the agenda on day one and debating and voting on draft resolutions on day two (2023, 255). The authors note that the students self-assess as being underprepared for the simulation, notably because it was put together quickly because of the pressure of the pandemic, and thus, had some limitations in its success (Bratt et al. 2023). However, the simulation also demonstrated that online simulations work and help achieve student engagement and learning outcomes in a difficult setting (Bratt et al., 2023). Although lacking substantial evidence for how it worked, the authors were optimistic about future iterations, and so were the students.

Schiff demonstrates that online simulations and teaching, in general, can be effective if using a precise organizational framework template known as the WRIS system (watch, read, interact, and submit). The format demands that students first watch a weekly module by the instructor explaining relevant material; next, the students read the background theoretical materials underpinning the module lessons and, follow that by discussions and debate (2019). Finally, students submit an assignment that encompasses the main themes for the module (Schiff 2019, 2). The WRIS system was utilized in an online environment where the class was built around simulations focusing on conflict resolution for the civil conflict in South Sudan as well as a second simulation focusing on conflict resolution and the war in Syria (Schiff 2019, 5). Schiff finds that "Online courses using a consistent and progressive framework can be equally as engaging and pedagogically sound as their face-to-face counterparts" (2019, 11). The author notes that offering online simulations through the WRIS system achieves effective engagement with progressive

learning and creates an active learning opportunity that helps enhance students' comprehension (Schiff 2019, 12).

Concerning asynchronous simulations, as mentioned above, there is far less attention in the literature, a gap this paper hopes to fill. There are some pieces that discuss active learning and other assignments that we believe fit within the CoI framework and lend credibility to why simulations may also work accordingly. Heffernan, Murphy, and Yearwood focus on an active learning assignment, though not fully a game or simulation, that works to increase student success in an asynchronous environment. In this research, the authors developed and explained an asynchronous peer-review writing assignment and helped create an alternative to typical classroom engagement through a discussion board. They argue this type of assignment was more dynamic than critical reading reflections, forums, and other asynchronous learning activities because it "encourages students to actively learn by contributing to one another's learning journeys," providing "opportunities for students to consider different viewpoints, refine and clarify different positions, and construct more finetuned arguments in ways that are hard to replicate in other assignments" (Heffernan, Murphy, and Yearwood 2022, 546).

Although discussing synchronous and asynchronous teaching during and after the pandemic, Roberts (2021) discusses how our own theoretical approach, the Community of Inquiry, can be achieved in online environments. Roberts writes that the CoI is a necessary element of both forms of online education and writes, "The goal for all of my courses is to build a community of peers who are actively listening to one another…and the essence of the cognitive presence in classes—virtual or otherwise" (Roberts 2021, 183) The author notes that building rapport with the students is perhaps the most important element of the CoI. Roberts writes, "Rapport is about creating an environment in which students and faculty interact to achieve common goals" (2021,

183). To make sure the three elements of CoI were captured, Roberts made sure to comment extensively on each student's weekly writings, as well as on their discussion posts (2021, 185). He notes, "This served both classroom-social and cognitive-presence obligations" (Roberts 2021, 185). The author also notes that adding optional live video-conferencing for the duration of the course improves these aspects of CoI.

We agree with the author. However, we note that rather than solely relying on commenting on assignments and hosting optional live class sessions online, adding simulations where all of this is also required, as well as multiple interactions in role-playing scenarios fulfills better the student-centered approach required by CoI. Indeed, Roberts notes this aspect himself: "Maintaining that cognitive presence online requires adaptability and a student-centric approach to building a community of scholars engaged in thoughtful and meaningful dialog" (2021, 185). The simulation we use and discuss below forces the students to engage in deep-learning of the course material in order to produce a policy-paper addressing the simulation guidelines and mandates continual speeches, dialog, and debate with and between students as well as the "President" who in this case was the instructor of record. Thus, the communication involved with the CoI aspects of the educational experience was produced in the self-contained simulation module and by a simulation's nature, exposed students, at a deep level, to social, cognitive, and teaching presence. Now that the review has been completed, this paper proceeds to the case-study describing how the CoI framework was implemented using a simulation in an asynchronous graduate course in security studies.

Case-Study Analysis: Security Studies and the CoI Framework

The CFR simulation chosen for this course aligns with the literature on what a simulation needs in order to succeed. In the literature, it is oft-noted that a simulation needs to resemble the

real world as closely as possible. For instance, Kempston and Thomas note that by mimicking the real world, "the intrinsic nature of the concept [realia]—the utilization of objects from the real world to facilitate learning in the classroom—makes it a particularly relevant concept to incorporate into simulation-development strategies" (2021, 253). The CFR mini-simulation we choose to implement in this asynchronous graduate course in security studies is entitled "Should the United States Ban TikTok to Preserve National Security?"

It was chosen for several reasons. First, social media warfare and information warfare are already one of two modules offered in the course that focus on the information and cyber environments. Second, the professor of record and one of the co-authors of the present study is an expert scholar in information warfare and influence operations, and thus, it was a natural fit for the instructor's knowledge set to be able to run a simulation in an asynchronous course. Thirdly, the simulation fits with the literature in being realia, matching reality as closely as possible. During the time of the course and up through the writing of this article, there have been many news stories and commentary written concerning TikTok, national security, and constitutional freedoms. For all these reasons, the simulation was chosen. It was, however, modified and implemented with various enhancements and alterations to fit asynchronous learning—described further below.

The course fits within an asynchronous graduate program in intelligence and security studies. The course student learning objectives (CSLO) are multiple, but for the purposes of this paper, the ones aligning with the simulation are 1) describe major concepts, questions, and interests that comprise the field of security studies; 2) analyze emerging trends in security studies; 3) assess global threats to US national security. Each of these CSLOs are captured in the simulation prep, the additional readings provided by CFR and the instructor of record, as well as the policy and reflection papers for the simulation itself. All of this fits within best practices for using practical

simulations that mimic reality (Kempston and Thomas 2021) as well as in the CoI theoretical underpinning. Quoting Petternger, Kempston and Thomas note, "In doing so, the pseudo-reality creates 'situations in which students are more actively engaged with the learning process'" (2021, 258). As mentioned above, the simulation had to be altered and implemented into an asynchronous course design while maintaining graduate-level rigor. The following describes how this was achieved.

Simulation Design Process

The interconnectedness of the global economy and geopolitical landscape increasingly ties US interests to the actions and interests of others, highlighting the need for effective global affairs education. The course faculty and instructional designers sought to address this by integrating asynchronous learning methods that provided flexibility while maintaining rigorous student engagement within an online environment. To achieve this, they turned to the Council on Foreign Relations (CFR) Education, an organization dedicated to bridging the global literacy gap through accessible, accurate, and authoritative resources (Council on Foreign Relations, 2024). CFR Education equips students with the knowledge, skills, and perspectives necessary to tackle complex global issues. Among its offerings, CFR Education provides guidance and materials for creating simulations. These simulations enhance critical thinking, persuasive communication, and collaboration skills by immersing students in decision-making roles.

Recognizing the importance of providing graduate-level learners with a flexible yet interactive educational experience, course faculty collaborated with the campus online instructional design team. Together, they adapted a live simulation into an asynchronous format, enabling students to engage deeply with global affairs and foreign policy challenges on their own schedules. This approach preserved the sense of presence, intentionality, and lively engagement

found in traditional synchronous classrooms while accommodating the diverse needs of online learners, fitting within the CoI framework. The asynchronous simulation design is heavily inspired by the CFR Education simulation guidelines, developed to help instructors integrate real-world re-enactments of hypothetical, historical, and current event scenarios (Council on Foreign Relations, 2024). These scenarios guide learners through the decision-making processes of U.S. policymakers addressing issues in international relations. Our simulation specifically focused on the U.S. National Security Council's policy decision-making process when faced with the social media platform TikTok's threat to U.S. security through its ties to the Chinese-owned company ByteDance.

Recognizing that creating a deep learning experience is essential for fostering meaningful and lasting understanding, particularly in the context of global affairs education, our goal was to create an asynchronous, online experience that facilitated learning beyond surface-level memorization of facts and focused on critical thinking, problem-solving, and the ability to apply knowledge in real-world scenarios. By generating a deep learning experience, educators empower students to become informed, thoughtful, and proactive participants in a globally connected world. (Kovač, 2023). To adapt CFR Education's synchronous/face-to-face simulation into an asynchronous space that fosters a deep learning experience, the Community of Inquiry model—comprising teaching, social, and cognitive presence—guided the integration of multiple instructional and collaborative technologies. These technologies create an inclusive, immersive learning environment that delivers content across various platforms while fostering social collaboration, critical thinking, and effective facilitation.

The CoI framework is a highly effective approach for fostering a deep learning experience because it integrates social, cognitive, and teaching presences to create a holistic and meaningful

educational environment. By using the CoI framework, educators and instructional designers can collaboratively design a structured yet flexible environment that encourages deep, collaborative, and transformative learning experiences (Garrison, 2019). As we determined the instructional framework of the simulation design, we selected a suite of technology tools best suited to support an immersive asynchronous learning environment. Yellowdig (See figure 2 below) is an online learning platform that leverages social media functionality, an understanding of human behavior, and gameful technology to build online learning communities. This platform offered an online space for learners to ask questions, make observations, and role-play within a trusted community-based environment with their instructor as a guide. In turn, the role of the instructor was to be another citizen of the community, modeling the behavior expected from learners. This dynamic between learners and the instructor made Yellowdig a valuable tool for active, intentional engagement.

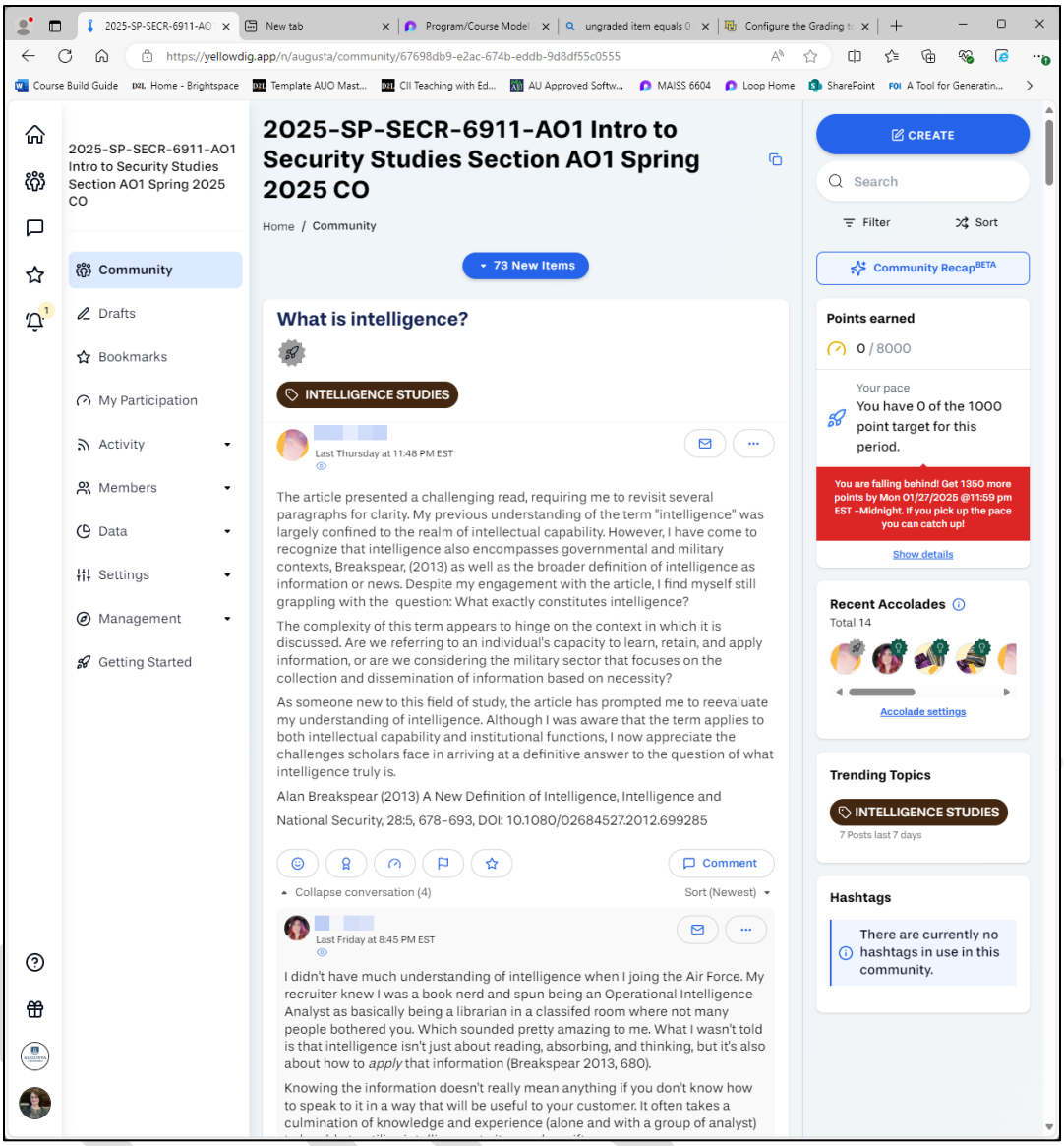

Figure 2: Screenshot of Yellowdig Course Discussion

To create a more immersive and impactful experience, the simulation itself was developed using the eLearning authoring tool Rise by Articulate. Rise is nimble enough to create a heavily stylized but structured online "world" that includes easy access to interactive tools and resources as well as a detailed system of rules, tasks and strategies that are created for the purpose of developing specific competencies that can be directly transferred to the real world (Liubchaki, Zuban, Artyukhov, 2021, 343). Additionally, Rise allowed us to embed our simulation within the

existing learning management system, which kept learners within the familiar context of their course. As Ghai and Tandon explain, learning performance is significantly increased and enhanced by visual design (2022). To style the simulation space and create a variety of visual elements that maximize the overall sense of authenticity and increased usability, we used Canva, a free, web-based graphic design software. With Canva, we were also able to easily create supporting infographics that is both attractive and consumable.

Utilizing D2L, which is the existing learning management system available at the university, offered a familiar online space for course delivery that not only alleviated the cognitive load of introducing a new technology, but is also available to all faculty, staff, and students. Additionally, D2L allowed easy content scaffolding using learning modules. Thus, an instructor could begin to build foundational content throughout the course in preparation for the actual simulation activity. The design team set out to ensure that the simulation's technology integration supported the course design to create a cohesive learning experience. As we created activities that supported the CoI model, it was important to ensure that the technology we utilized maximized the learning goals. Teaching presence is essential to the success of the simulation. While Garrison (2019) describes teaching presence in terms of a theoretical construct to reinforce the need for active engagement, he also provides an actionable framework of seven design principles to guide instructional designers. We used these principles to define how to best utilize supporting technologies.

Principle 1: Design for open communication and trust.

To build a community of communication and trust, Yellowdig was introduced in the first week of an 8-week course. Many of today's learners are very comfortable with both the technology and more organic discourse associated with social media. "The new social learning combines

social media tools with a shift in organizational structure, a shift that encourages ongoing knowledge transfer and connects people in ways that make learning enjoyable" (Bingham and Conner, 2015 8). By introducing Yellowdig from week one, the course instructor was able to establish a rapport with students and set the tone of the discussion. Once established, the students themselves grew the community through their own comments and reactions, adding familiar contextual elements to emphasize their perspectives, like video, emoticons, hashtags. In this environment, the instructor's job was to set the tone for engagement, establish a rapport with learners, and become a source of truth as learners developed trust in his guidance as well as their cohorts.

Principle 2: Design for critical reflection and discourse

The overall design process for the simulation incorporated multiple methods for reflection and discourse. Once again Yellowing operated as a reliable and relatable vehicle for ongoing, candid discussion. These discussions involve students posting initial entries as well as them replying to their peers. The later has been identified as a predictor of overall grade per Martin, Martin, and Feldstein (2017, 71), "The results of the analysis indicated that out-degree (the number of times a community member has sent feedback directly to another student through comments and up-votes) is a significant predictor of course grades. We believe that a student's course grade was impacted because commenting on other students' posts requires thought and effort into articles being posted on Yellowdig." Using the eLearning authoring platform Rise by Articulate, we also provided easily accessible simulation source materials for learners to review and consider within the online space of the simulation. Additionally, the simulation itself was bookended by two activities designed to encourage critical reflection: a role-playing policy paper before the simulation to establish the perspective and subsequent policy recommendations supported by each

student based on the NSC role assigned to them, and a reflective essay immediately after the simulation. Learners who are able to select their own roles are shown to be more engaged with a simulation exercise (Mills, Laubepin 2022). The role proposal required participants to take on the role of a National Security Council member of their choosing before describing what their membership to the NSC represented historically, what their decision-making priorities were, and how they hoped to address the dilemma presented to them during the simulation. Each of these steps was supported by discussion through Yellowdig, which acted as both an engagement and a content scaffolding tool. After the simulation, each participant submitted a reflective essay describing the final policy decision and offering analysis of the policy options presented, as well as the deliberations process that took place during the simulation. Thus, the simulation was ultimately made up of multiple cohesive parts developed through multiple integrated technologies: the ongoing discussion, content scaffolding, and role-play were supported by Yellowdig; the simulation environment, instructions and access to source materials were supported by Articulate Rise; the policy proposal, the embedded simulation activity, and the reflective summary assignment were supported by Desire2Learn (See figure 2 below for module content screenshot).

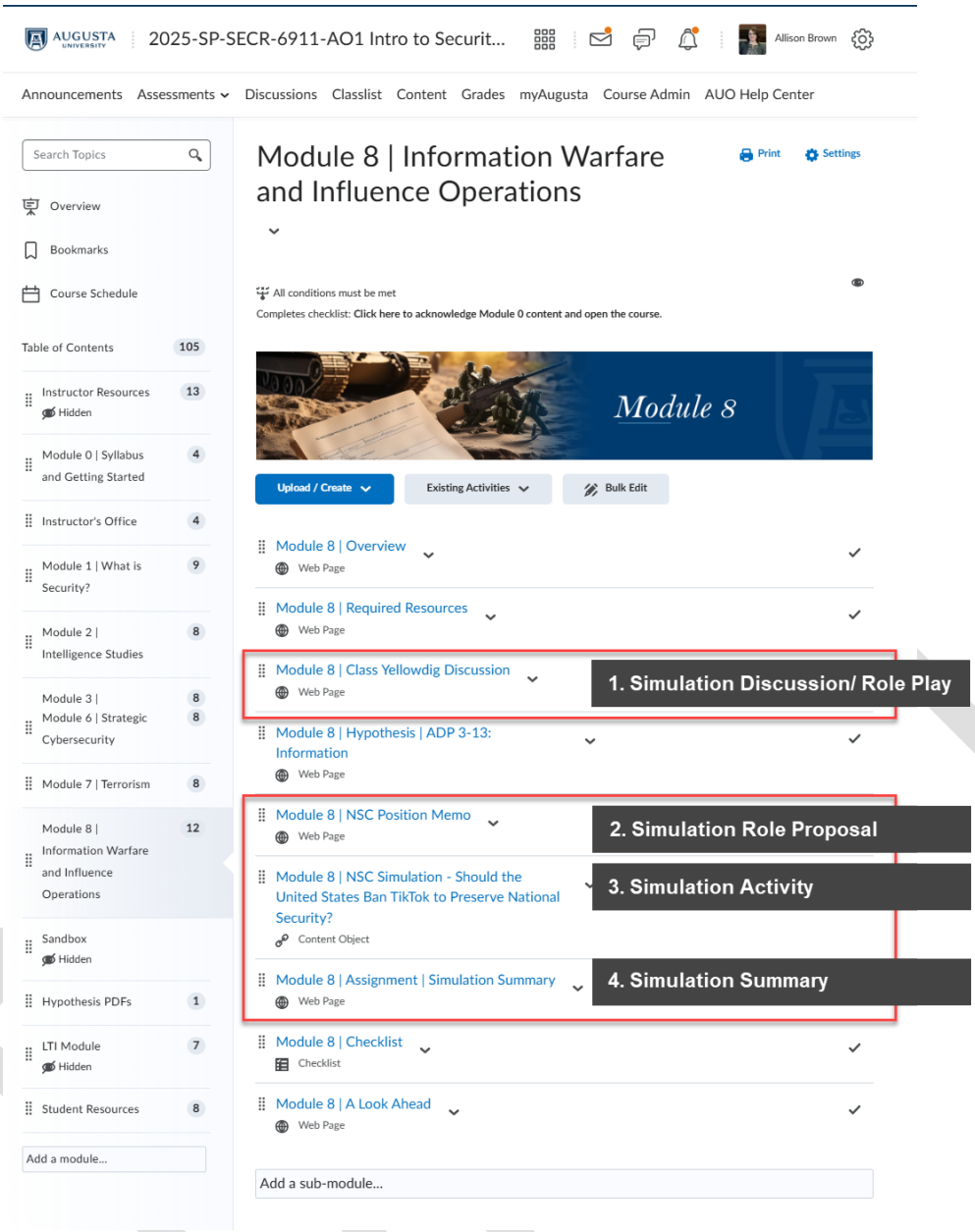

Figure 3: Simulation Module Screenshot

Principle 3: Create and sustain a sense of community

Yellowdig not only supports the creation and sustainability of an online learning community. Whiteside and Ensmann (2023) described four strategies for establishing and sustaining a community with the use of Yellowdig, connections, extending, journalling, and supporting (2023).

Each of these lend to the ongoing sense of community. In addition it also encourages sustained and proactive engagement through its gamified point system. Students earned points for different types of interactions in Yellowdig (see figure 4), and those points were converted into a grade and passed back to the D2L gradebook. The grade was based purely on participation, so students feel freer to discuss topics openly without fear of academic penalty. Additionally, the instructor was able to analyze participation data to gauge community health, then act proactively by managing the topics and participation of the community members.

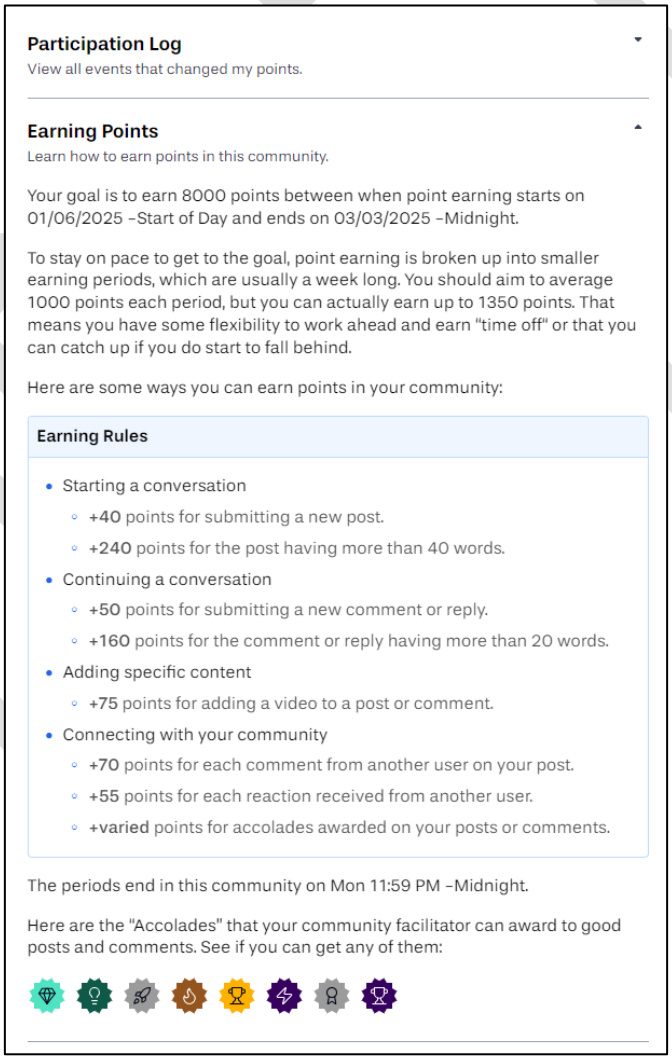

Figure 4: Yellowdig Instructions and Example

Principle 4: Support purposeful inquiry

Because Yellowdig facilitates discussion among learners with a variety of backgrounds and experiences, participants were able to explore diverse perspectives. Learners were encouraged to access and critically evaluate the validity, reliability, and relevance of any additional source materials they studied as part of their own independent research and discussion preparation, leading to more thoughtful conclusions. Access to these shared materials through both Yellowdig and Articulate Rise ensured learners could engage deeply with primary or secondary sources to analyze, question, and synthesize information.

Additionally, the use of technology that supports interactivity (Rise and Yellowdig) allowed learners to interact with content, peers, and the instructor in dynamic ways, including role-play. Role play created an experiential learning scenario where learners could make emotional connections to both the subject matter and their learning cohort, which enhanced their ability to apply new ideas to realistic contexts. This emotional connection promotes critical thinking and adaptability in real-world situations (O'Flanagan, Jester 2025). Such a connection to the simulation content and the course learning community fostered a more critical review and discussion of the CFR materials the required academic readings provided by the instructor. The simulation role play and discussion culminated with a reflective essay that encouraged learners to connect academic knowledge with practical experiences. Through this activity, learners were able to articulate their learning journey by analyzing their experiences, considering the impact of their actions, and identifying areas for improvement. This critical reflection enhanced their ability to transfer insights to future challenges.

Principle 5: Ensure the students sustain collaboration

Yellowdig fosters student-led discourse. While the instructor modeled behavior, it was the synergy created by the ongoing discussion that sustained the enthusiastic participation of each learner. The gamification principles inherent in the Yellowdig functionality also motivated authentic engagement. Gamification elements can keep learners in a state of flow in non-game activities (Uz Bilgin, C., Gul, A. 2020). The instructor encouraged continued participation by using gaming elements such as accolades, badges, internal polls (see figure 5) and guided discussion that drew directly from course assignments to garner participation points and high-quality discourse.

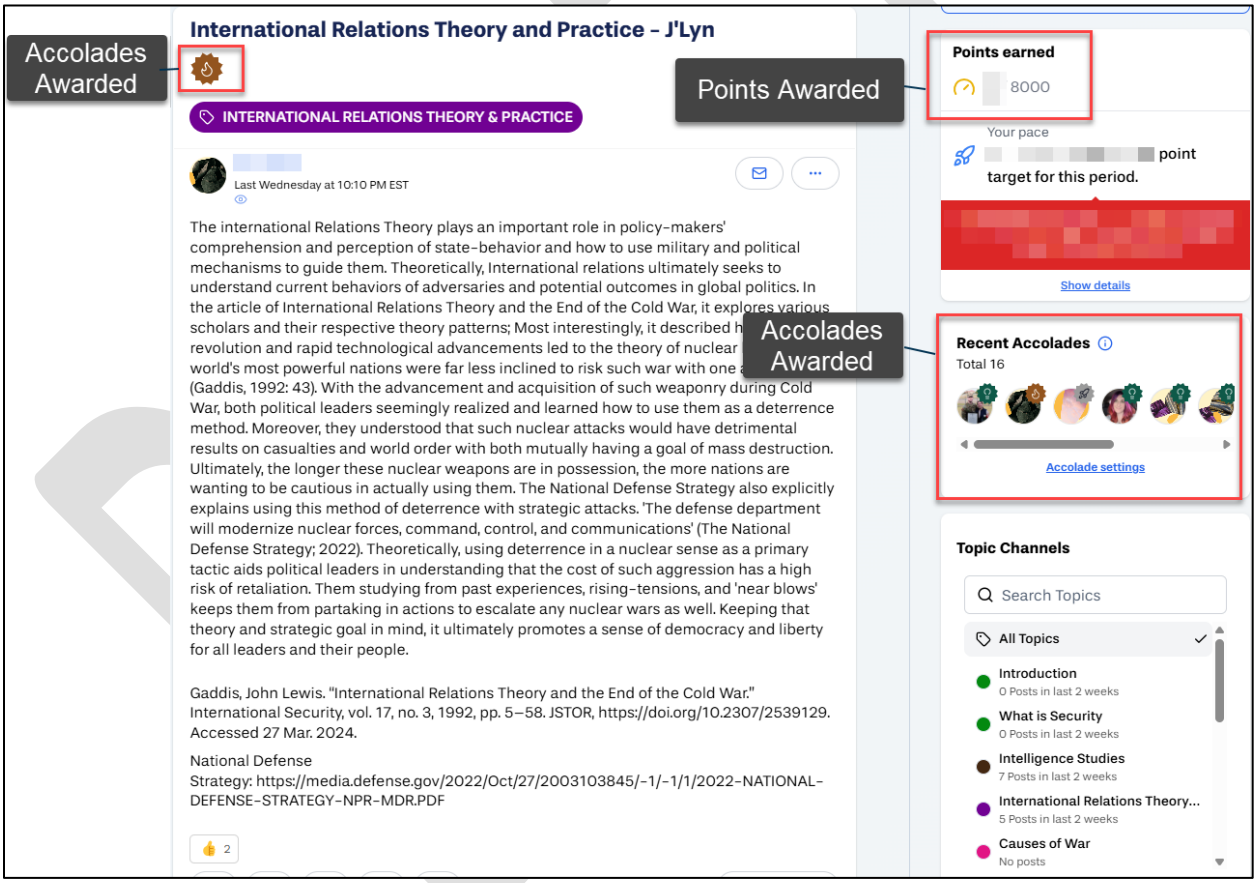

Figure 5: Yellowdig Gamification

Principle 6: Ensure inquiry moves to resolution

As part of the course design, students submitted written assignments that required them to recall new information and contextualize that information. Through reflection and analysis of new information acquired because of the simulation activity, students were encouraged to apply their knowledge to other real-world scenarios. In this way, learners were able to assimilate new information with their own existing knowledge, essentially taking ownership of these new ideas and enhancing their ability to analyze future scenarios (Khmelivska, 2024).

Principle 7: Ensure assessment is congruent with intended learning outcomes.

To ensure assessment aligned with the course learning outcomes, we included activities that were designed to clearly define and support course learning objectives. While written assignments before and after the simulation required the use of cited source materials and analysis to develop measurable demonstrations of the learning objectives, the simulation itself and the coinciding discussion was designed to encourage learners to authentically reflect real-world scenarios for more qualitative assessment. Using rubrics with clear criteria for formative and summative assessments, the instructor facilitated learning by setting expectations, providing feedback, and leading debriefing sessions. Reflection and self-assessment further reinforced learning by connecting experiences to learning outcomes. By integrating these elements, the simulation effectively evaluated student performance while fostering critical thinking, problem-solving, and collaboration in a structured and meaningful learning environment (Khmelivska, 2024).

Cognitive Presence: Research and Real-World Simulation

When planning an asynchronous simulation, our first consideration was creating a space that encapsulated a real-world, fully immersive scenario. The design included historical context,

crucial decision points, and clear instructions for utilizing the learning space and associated platforms. Opportunities for both interactivity within the simulation and independent research were provided through multimedia integrations and links to collaboration tools. Articulate Rise enabled us to quickly create a modular, web-based learning space where simulation content is presented in manageable, interactive blocks. For example, the simulation includes five primary sections:

- **The Situation**: Contextualizes the simulation and provides access to source materials supporting critical reflection. The part of the simulation sets the tone and **e**nsures learners can engage deeply with primary or secondary sources to analyze, question, and synthesize information. By exploring diverse perspectives or evidence, learners are encouraged to critically evaluate the validity, reliability, and relevance of materials, leading to more thoughtful conclusions.

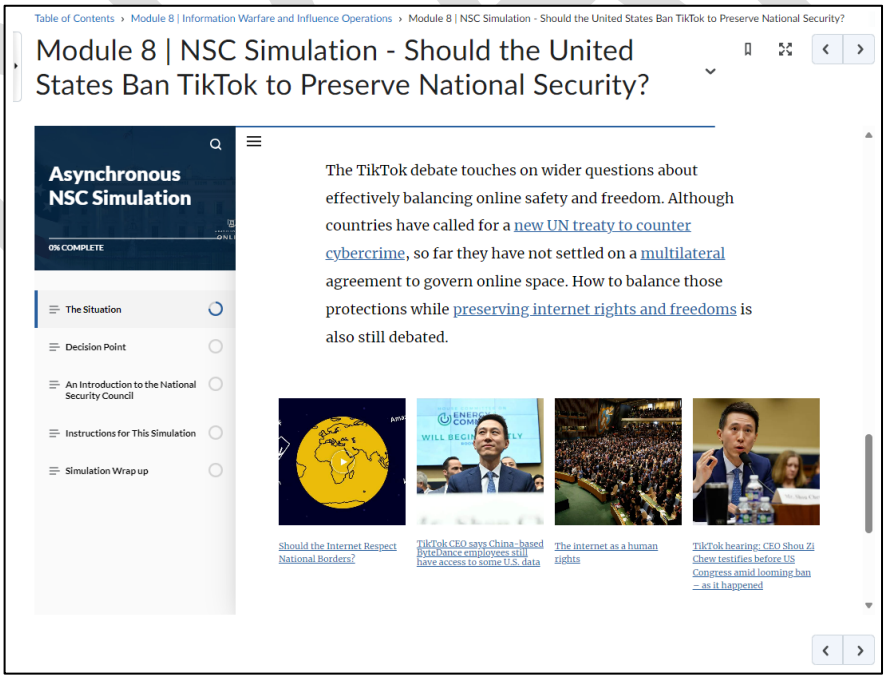

Figure 6: Embedded Simulation Example

- **The Decision Point**: Outlining the problem-solving goal based on situational details. This section describes the goal of the simulation as a whole by narrowing the focus of the situation and giving learners direction and purpose in their discussion and research.

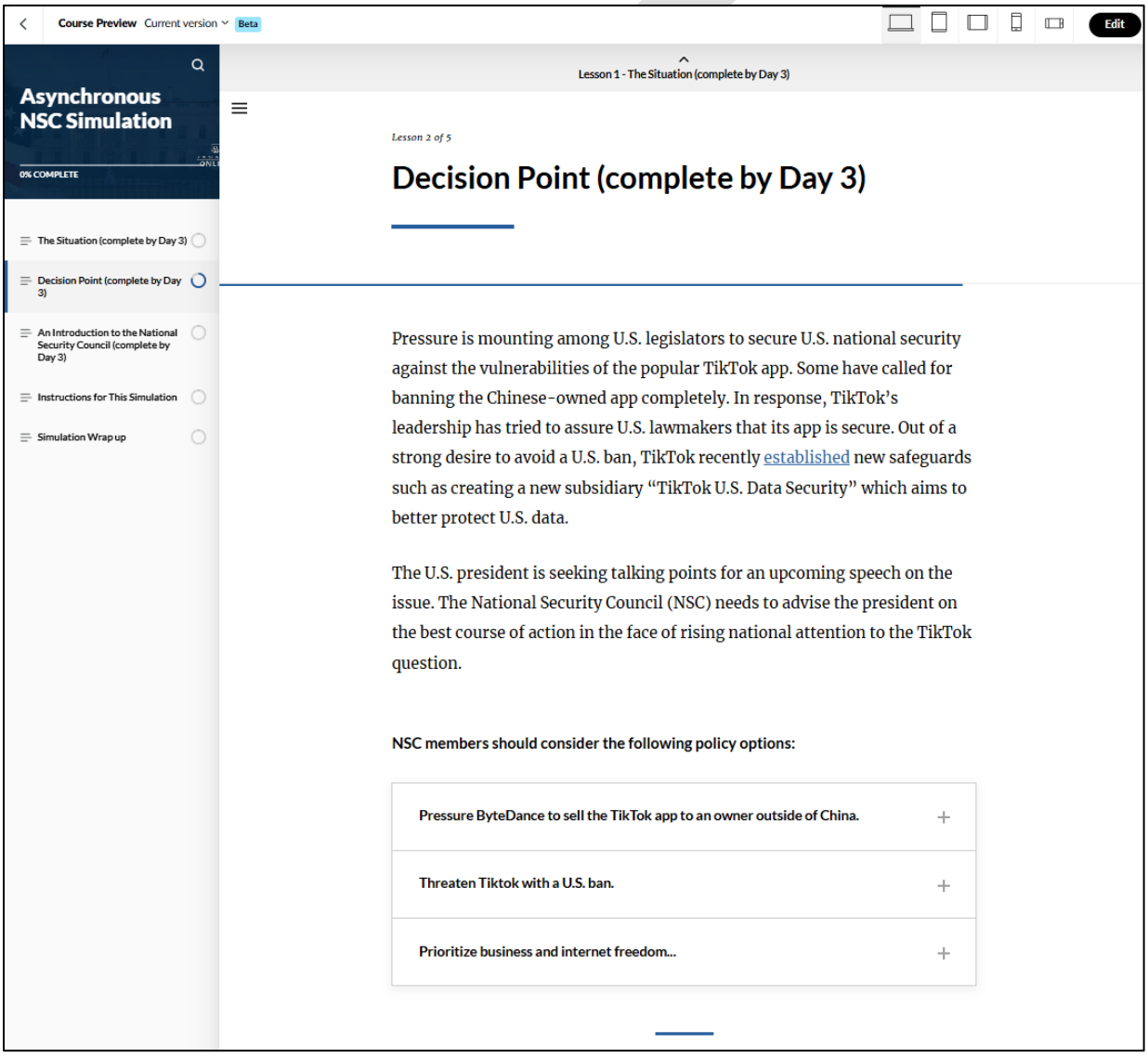

Figure 7: Embedded Simulation Example

- **Introduction to the National Security Council**: A video-based lesson on the NSC's role in the simulation. This part of the activity ties directly back to the pre-simulation NSC role selection and policy proposal, providing learners with a more robust historical understanding of the part they play in appreciating perspectives outside their own and how those perspectives guide the priorities of each group member.

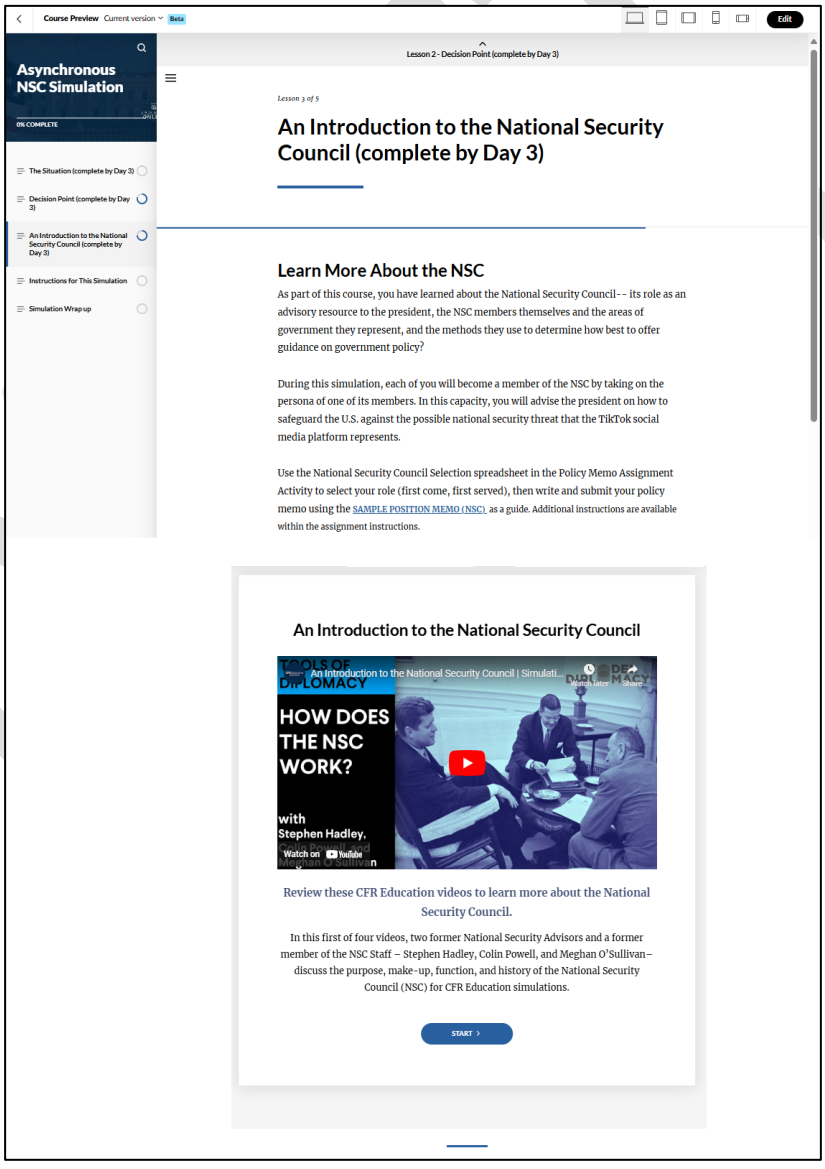

Figure 8: Embedded Simulation Example

- **Instructions for the Simulation**: Step-by-step guidance for collaborative and independent participation. In this section, learners are prompted to take part in immersive role-play, debating and discussing policy in character as members of the National Security Council. The role play and ongoing discussion using resources and source materials provided by the instructor and their cohorts create an experiential learning scenario where learners can apply knowledge in realistic contexts. By adopting roles, making decisions, and solving problems, learners deepen their understanding of concepts while promoting critical thinking and adaptability in real-world situations.

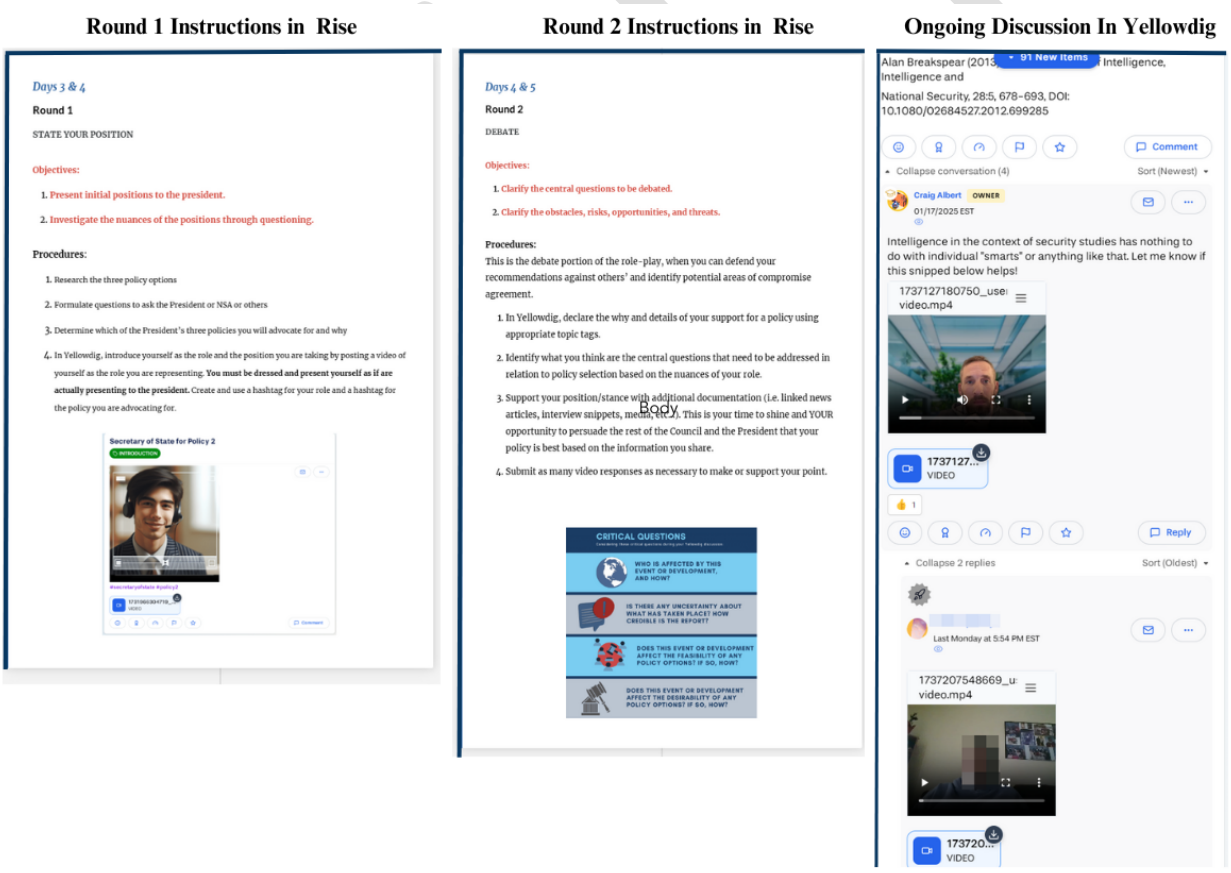

Figure 9: Embedded Simulation Directions

Simulation Wrap: Reflection prompts and key takeaways for self-assessment. This section encourages learners to connect academic knowledge with practical experiences and articulate their learning journey. Through structured reflection, learners analyze their experiences, consider the impact of their actions, and identify areas for improvement, enhancing their ability to transfer insights to future challenges. This approach supports critical thinking and problem-solving, key aspects of cognitive presence within the CoI model.

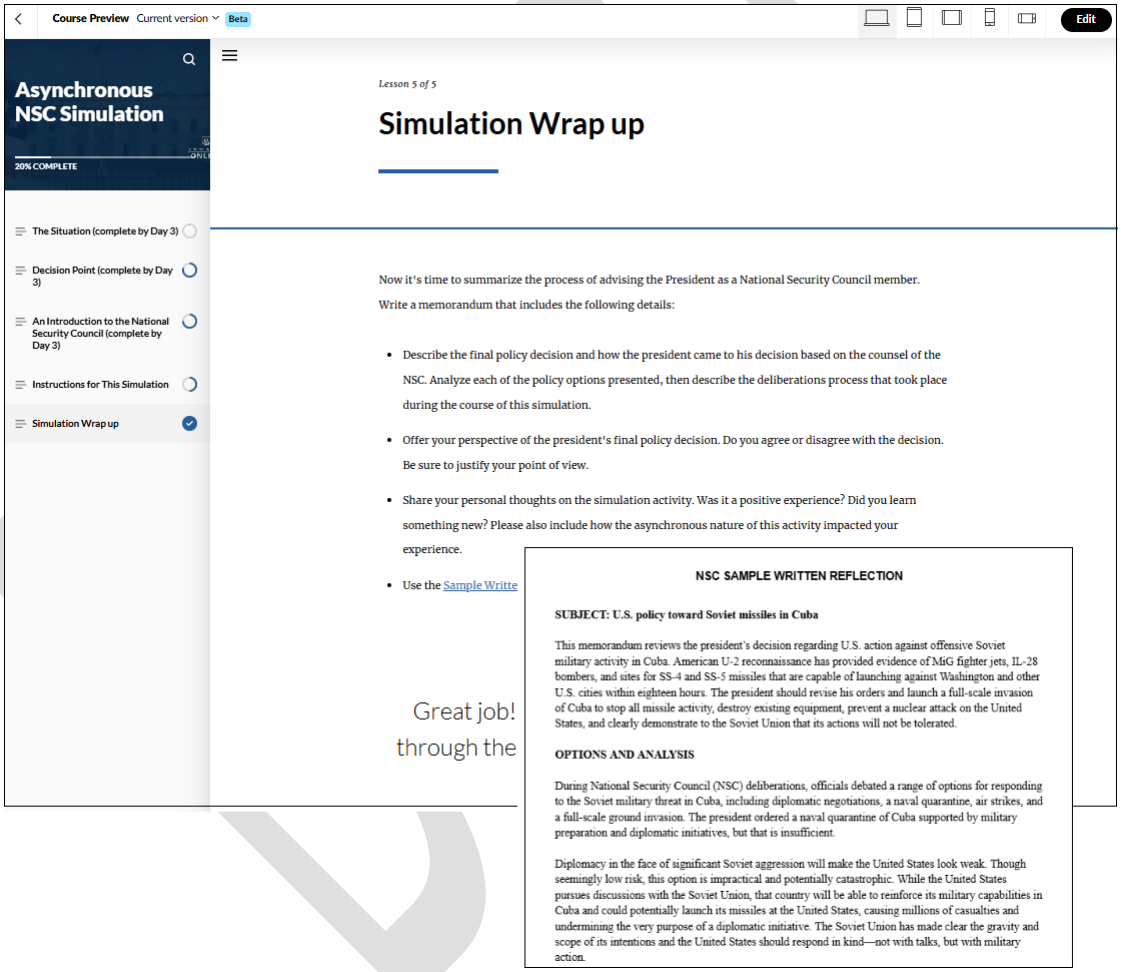

Figure 10: Embedded Simulation Example Instructions

Social Presence: Role-Playing and Community Engagement

To establish a deep sense of social presence, learners were assigned specific roles as members of the National Security Council. These roles encouraged them to adopt perspectives beyond their own values and opinions. To share their perspectives, Yellowdig was used as a discussion-based community platform. Unlike typical discussion boards, Yellowdig fosters organic, student-driven conversations about real-world topics relevant to the simulation, which was crucial in maintaining momentum through discussion and resource sharing (Johnson, 2016). Again, the instructor played a critical role in our design considerations and in the implementation of the simulation. By modeling thoughtful engagement and redirecting discussions to deepen content understanding, the instructor was able to facilitate a trusted, community-based environment where learners felt connected and engaged.

This asynchronous simulation design demonstrates how the CoI model can guide the development of engaging and effective online learning experiences. By fostering social, cognitive, and teaching presences, the simulation offers learners an opportunity to engage deeply with content, collaborate meaningfully, and develop critical decision-making skills in a flexible, inclusive learning environment.

Discussion and Results

The data presented below was accessed within Yellowdig. The data shared here is a sample of the actionable data provided.[1] The three images included represent data through the first three weeks of the course. At this stage the instructor is building a trusting community in which the students openly share their ideas, opinions through scholarly discourse. Each data element is

[1] Note: The simulation has not actually occurred as of the present writing and conference, so these data are taken from the general course rather than from the module on the simulation to provide an example of what expected results from the actual simulation will look like.

briefly described in terms of purpose and design, followed by an interpretation for actioning the information.

Community Participation

The Community Health Dashboard provides community facilitators/instructors insight into their community's overall and week-by-week engagement levels (Miron 2023). Through the dashboard, instructors can access detailed metrics, such as *total posts*, *total comments*, *total reactions,* and the c*onversation ratio*. The conversation ratio reflects the extent to which students are paying attention to each other's work and engaging in back-and-forth conversation.

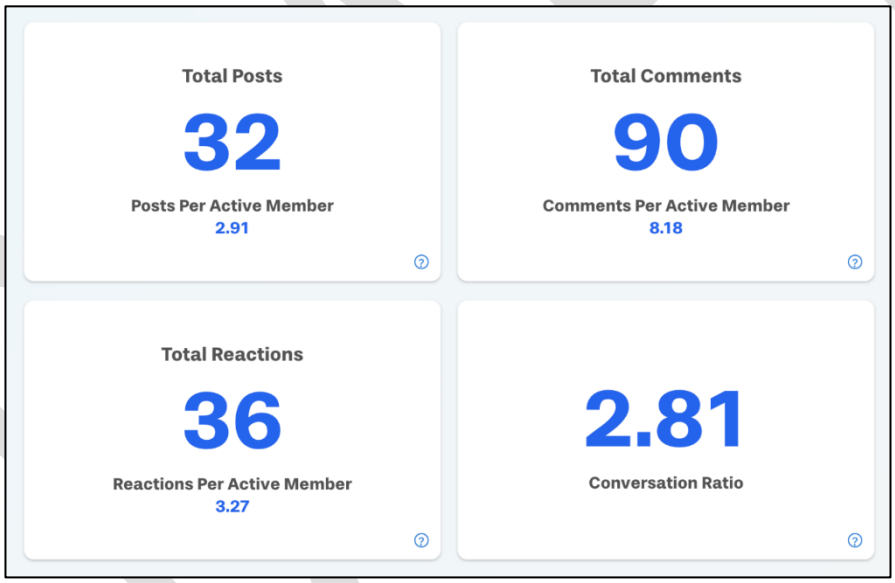

Figure 11 Community Health Data Dashboard for Yellowdig.[2]

The higher the Conversation Ratio the more engaged students are in the discussions. This means more comments are being posted than initial posts which indicates active discourse with multiple contributors. While a target conversation ratio is eight or higher per Yellowdig, the ratio of 2.81 tells the instructor they may want to award accolades (additional points facilitators can award to

[2] Data capture from week 3 of an 8-week course, before the simulation started, to provide an example of expected results.

encourage desired behaviors) for those that comment on another's post or comment. With the goal being sustained conversation rewarding this type of behavior may aide in increasing the conversation ratio.

The Community Health Composite Scores provide instructors with a detailed analysis of their community's strengths and areas for improvement (Miron 2023). The platform offers three primary composite scores—Sharing, Listening, and Interacting—each derived from metrics that assess the extent to which students engage with their peers by contributing content (sharing), consuming shared content (listening), and actively participating in discussions (interacting). The three scores are measured on a scale from 0 to 100 and are compared to the global Yellowdig communities' score. For academic communities, the following interpretive guidelines apply:

- **0 to 24**: Deficient
- **25 to 74**: Improvable
- **75 to 100**: Healthy

Yellowdig indicates that higher Listening and Interacting scores suggest that students are not only engaging with posted content but also actively discussing it. Notably, students do not receive direct points for behaviors reflected in the Listening and Interacting scores. Therefore, high scores in these areas often indicate voluntary participation – perhaps increased engagement. Over time, as Listening and Interacting scores increase, the Sharing score tends to align with them, as students begin to contribute and engage beyond the required level.

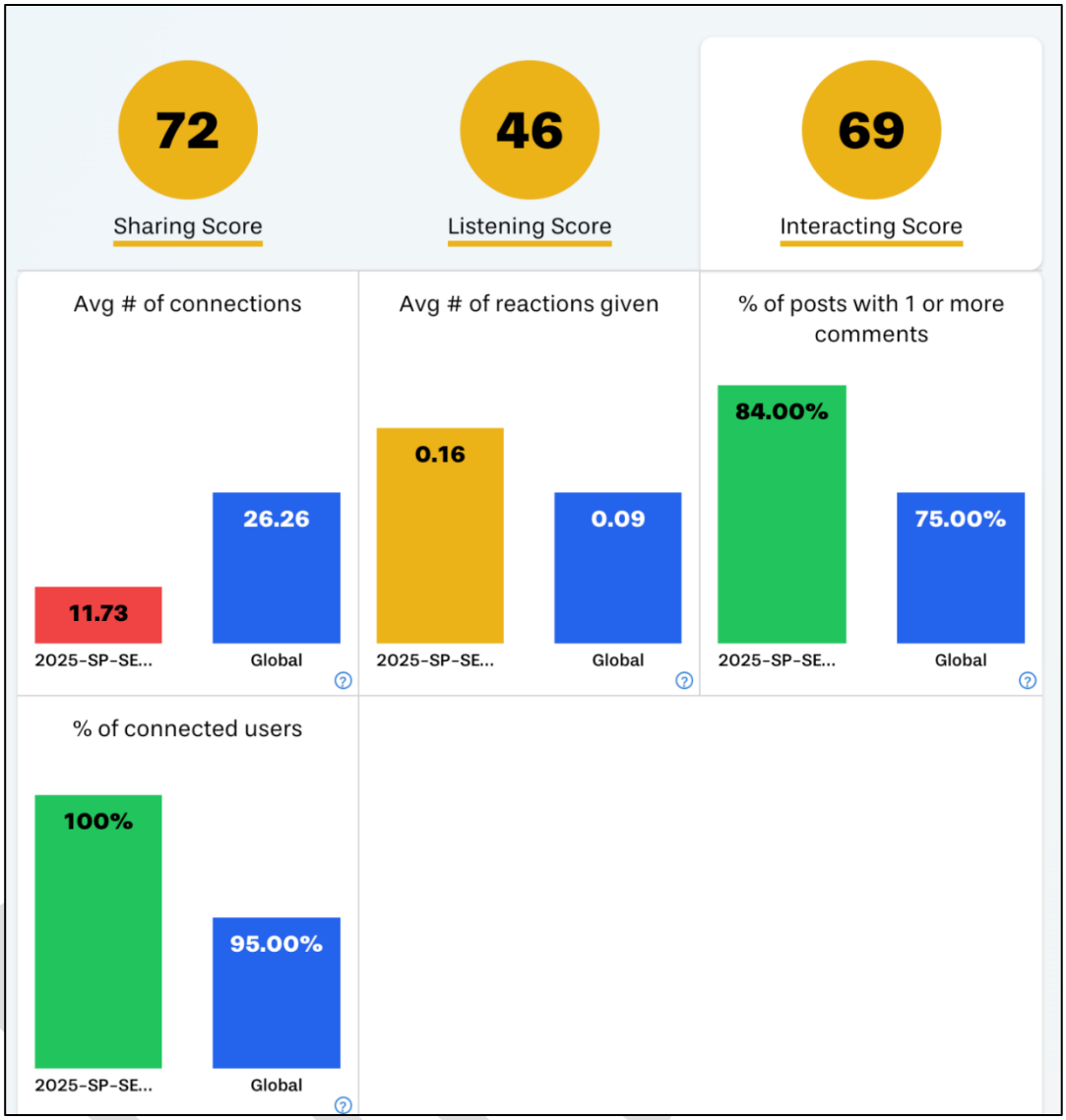

Figure 12 Community Health Composite Scores Yellowdig 1/27/25[3]

The green, yellow, red bars used to display the data from this one course, illustrates how this learning community is performing in comparison to the global Yellowdig scores. The instructor can see that the community is performing well related to comments per post and the number of connected students. The yellow bar indicates that the instructor may want to model the use of reactions in the community or award an accolade (extra points and a badge) for students that have

[3] Week 3 during the course, not including the simulation. Data will be updated once simulation is concluded.

provided reactions to their peers. The red bar for average number of connections may a bit more challenging to interpret. Looking at the Network Graph Visualization & Table may provide insights into the reasons behind the low score. The instructor may want to model using the @ to connect one student's post with another's in a meaningful way. In addition, the faculty may want to award an accolade to those that are commenting on posts/comments from a variety of class members.

The Network Graph Visualization & Table allows instructors to analyze community interactions at both the whole class and individual student levels. This feature enables instructors to proactively recognize at-risk members and implement timely interventions to support their participation (Miron 2023). It visualizes connectivity, highlighting key discussion leaders who engage with multiple peers, as well as individuals who may not be actively connecting with others and may require additional support. Community members may fall behind for various reasons, including social anxiety, personal circumstances, or academic challenges. Identifying these situations early is essential to preventing prolonged isolation or disengagement. In the visualization, circles with profile images represent individual community members, while arrowed lines illustrate connections between them. These connections are established when a member comments on a post, receives a comment, or engages in a reply. The density of arrowed lines serves as an indicator of a member's level of engagement within the community.

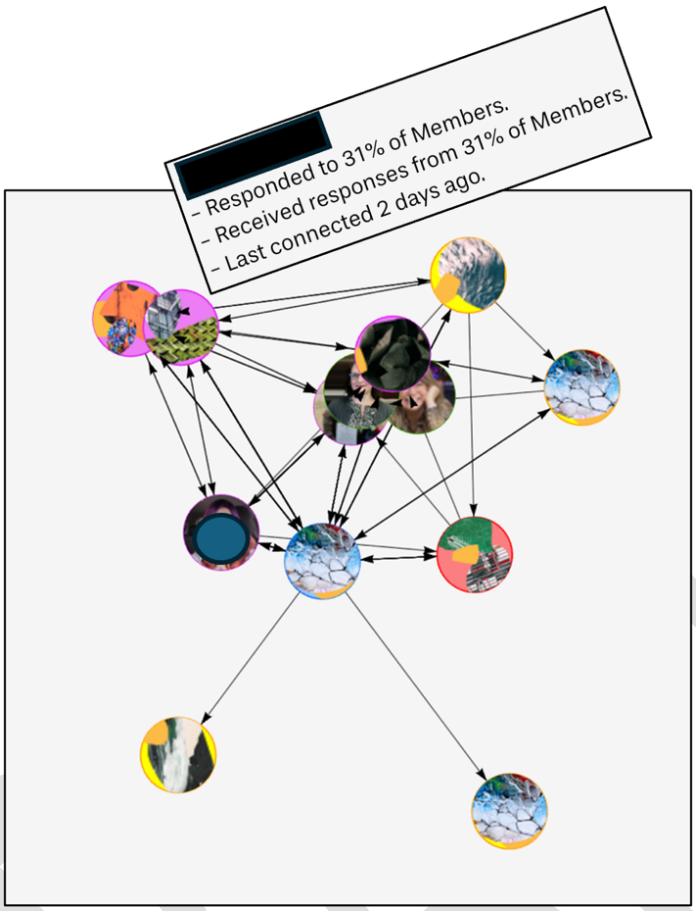

Figure 13: Course level of engagement

This snapshot in time within the course community indicates that two students are not connecting with their peers, while others are connecting at varying rates. The pop-up data window shows the connection data for one student. This student is connecting with one-third of their classmates with one-third of their classmates connecting with them. In addition, they have been active within the last two days. The instructor might consider using the @ functionality to connect the student with another student by referencing posts. In addition, the facilitator may make a post about connecting with a variety of students to engage in varied conversations.

Conclusion and Implications

PENDING AS COURSE IS ONGOING AND SIMULATION YET TO BEGIN! STAY TUNED.

References

Arora, Bela. (2019). “Teaching Cyber Security to non-Tech Students.” *Politics* 39(2): 252-265. doi: 10.1177/0263395718760960Artyukhov, A., Volk, I., Dluhopolskyi, O., Mieszajkina, E., and Myśliwiecka, A. (2023). “Immersive University Model: A Tool to Increase Higher Education Competitiveness.” *Sustainability*, *15*(10), 7771. doi:/10.3390/su15107771.

Asal, Victor. 2005. "Playing Games with International Relations." *International Studies Perspectives* 6 (3): 359–73. doi: 10.1111/j.1528-3577.2005.00213.x

Baranowski, Michael, and Kimberley Weir. 2015. "Political Simulations: What We Know, What We Think We Know, and What We Still Need to Know." *Journal of Political Science Education* 11 (4): 391–403. doi: 10.1080/15512169.2015.1065748

Bratt, Duane, Anderson, Greg, Kukucha, Chris and David Sabiston. 2023. “Teaching Trade During COVID: Conducting a WTO Simulation through Remote Delivery.” *International Studies Perspectives* 24: 248-264. doi: 10.1093/isp/ekac011

Brown, Joeseph M. 2018. “Efficient, Adaptable Simulations: A Case Study of a Climate Negotiation Game.” *Journal of Political Science Education* 14(4): 511-522. doi: 10.1080/15512169.2018.1431129

Caskurlu, Secil, Yukiko Maeda, Jennifer C. Richardson, and Jing Lv. 2020. "A meta-analysis addressing the relationship between teaching presence and students’ satisfaction and learning." *Computers & Education* 157. doi:10.1016/j.compedu.2020.103966.

Chan, S.L., C.C. Lin, P.H. Chau, N. Takemura, and J.T.C. Fung. 2021. “Evaluation online learning engagment of nursing students.” *Nurse Education Today* 104. doi:10.1016/j.nedt.2021.104985.

Da Vinha, Luis. 2021. “Using Hybrid Simulations to Enhance Student Learning of International Relations Theories.” *Issues in Educational Research* 31(3): 739-759. Doi: 10.3316/informit.190870490005319

Dewey, John. 1938. *Experience and education*. New York, NY: Macmillian.

Fazal, Tanisha and Maria Sanchez. 2023. “A Course-Long Online Simulation: The International Relations of COVID-19.” *Journal of Political Science Education* 19(2): 297-306.doi: 10.1080/15512169.2022.2136095

Frank, Richard W. and Jessica Genauer. 2019. “A Classroom Simulation of the Syrian Conflict.” *PS: Political Science & Politics* 52(4): 737-742. doi:10.1017/S1049096519000556

Ghai, A., and Tandon, U. 2022. "Analyzing the impact of aesthetic visual design on usability of e-learning: An emerging economy perspective." *Higher Learning Research Communications*, 12(2), 1–22. https://doi.org/10.18870/hlrc.v12.i2.132

Garrison, D. Randy. January 2019. "Editorial: Design Principles." The Community of Inquiry [Webpage]. https://www.thecommunityofinquiry.org/editorial18.

Garrison, D. Randy, Terry Anderson, and Walter Archer, W. 2000. "Critical inquiry in a text-based environment: Computer conferencing in higher education." *The Internet and Higher Education* 2 (2–3): 87–105. doi: 10.1016/S1096-7516(00)00016-6

Godo, Yoshiko. 2024. "Design and facilitation to balance Social, Teaching, and Cognitive Presence." In *The Design of Digital Learning Environment. New York: Routledge* 84-104."

Hasani, L.M., HB SAntoso, and K Junus. 2022 "Designing asynchronous online discussion forum interfactace and interaction based on the community of inquiry framework." *The International Review of Research in Open and Distributed Learning*, 23(2):191-213.doe: 0.19173/irrodl.v23i2.6016

Kempston, Tanya and Nicholas Thomas. 2021. "Creating Simulations: Pseudo-Reality and Learning Environments." *Journal of Political Science Education* 17(2): 253-268. Doi: 0.1080/15512169.2019.1616550

Khmelivska, Svitlana. 2024. "Formation of Students' Personal Reflection in Higher Educational Institution During Project-Based Learning." *Scientific Journals of the International Academy of Applied Sciences in Lomza*. 91. 53-59. Doi:10.58246/5rqdhk53.

Kovač, V. B., Nome, D. Ø., Jensen, A. R., and Skreland, L. Lj. (2023). "The why, what and how of deep learning: critical analysis and additional concerns." *Education Inquiry,* 1–17. doi:10.1080/20004508.2023.2194502

Krain, Matthew, and Christina J. Shadle. 2006. "Starving for Knowledge: An Active Learning Approach to Teaching About World Hunger." *International Studies Perspectives* 7 (1): 51–66. doi: 10.1111/j.1528-3577.2006.00230.x

Johnson, C.M. 2016. "Rethinking online discourse: Improving learning through discussions in the online classroom." *Educ Inf Technol* **21**, 1483–1507. doi:10.1007/s10639-015-9395-3

Lim, Jieun and Jennifer C Richardson. 2022. "Considering how disciplinary differences matter for successful online learning through the Community of Inquiry lens." *Computers & Education* 187 104551. doi:10.1016/j.compedu.2022.104551

Lipman, M (1991). *Thinking in education*. Cambridge: Cambridge University Press.

Lu, Kaili, Pang, Feng, and Rustam Shadiev. 2023. "Understanding College Students' Continuous Usage Intention of Asynchronous Online Courses through Extended Technology Acceptance Model." *Education and Information Technologies* 28: 9747-9765. Doi: 0.1007/s10639-023-11591-1

Liubchak, V., Zuban, Y., Artyukhov, A. 2021. "Immersive learning technology for ensuring quality education: Ukrainian university case." *CTE 2021: 9th Workshop on Cloud Technologies in Education.* doi: 10.55056/cte.124

Marion, Jon. 2023. "Community Health Dashboard." *Data Analytics & Reports* [Blog]. March 20. https://support.yellowdig.co/hc/en-us/articles/14092354435988-Community-Health-Dashboard

Marion, Jon. 2023. "Network Graph." Yellowdig [Blog], March 20. https://support.yellowdig.co/hc/en-us/articles/14092352782356-Network-Graph

Martin, Florence, Tong Wu, Liyong Wan, and Hui Xie. 2022. "A Meta-Analysis on the Community of Inquiry Presences and Learning Outcomes in Online and Blended Learning Environments." *Online Learning* 26(1): 325-359. doi: 10.24059/olj.v26i1.2604

Martin, Mary C., Michael J Martin, and Andrew P. Feldstein. 2017. "Using Yellowdig in marketing courses: an analysis of individual contributions and social interactions in online classroom communities and their impact on student learning and engagement." *Global Journal of Business Pedagogy* 1 (1): 55-73.

Mills, M. and F. Laubepin. 2022."The Effect of Autonomy and Choice on Learner Engagement in an Online Role-Playing Simulation. Distance Teaching and Learning." https://www.researchgate.net/profile/Monica-Mills-3/publication/362456922_The_Effect_of_Autonomy_and_Choice_on_Learner_Engagement_in_an_Online_Role-Playing_Simulation/links/62eaef5b505511283e89d40c/The-Effect-of-Autonomy-and-Choice-on-Learner-Engagement-in-an-Online-Role-Playing-Simulation.pdf

Ngubane-Mokiwa, S.A. and S.B. Khoza. 2021. "Using community of inquiry (CoI) to facilitate the design of a holistic e-learning experience for students with visual impairments." *Education Sciences*, *11*(4): 152. Doi: 10.3390/educsci11040152

O'Flanagan, Sinead and Jester, Michellana. 2025. "Experiential learning amid disequilibrium: Attuning to student emotions." *Management Learning*. doi:10.1177/13505076241306061.

Pilotti, Maura, Stephanie Anderson,, Pamela Hardy, , Pamela Murphy, , and Pamela Vincent. 2017. “Factors Related to Cognitive, Emotional, and Behavioral Engagement in the Online Asynchronous Classroom.” *International Journal of Teaching and Learning in Higher Education* 29(1): 145-153. http://files.eric.ed.gov/fulltext/EJ1135992.pdf

Rahmatalla, Fatima, Jamalludin Harun, and Hassan Abuhassna. 2024. “Exploring the Impact of the Community of Inquiry (CoI) Framework on Student Engagement in Online Courses.” *International Journal of Academic Research in Business and Social Sciences* 14 (1): 872-895. doi:10.6007/IJARBSS/v14-i11/23597

Raymond, Chad. 2010. "Do Role-Playing Simulations Generate Measurable and Meaningful Outcomes? A Simulation's Effect on Exam Scores and Teaching Evaluations." *International Studies Perspectives* 11 (1): 51–60. Doi: 10.1111/j.1528-3585.2009.00392.x

Richardson, Jennifer C., Adrie A. Koehler, Deepti Tagare, Lucia Urena-Rodriguez, Qian Xu, Zhuo Zhang, Holly Fiock, Yishi Long, and Mohammad Shams Ud Duha. 2024. "Community of Inquiry design decisions across disciplines." *Journal of Computing in Higher Education*: 1-42. doi:10.1007/s12528-024-09417-1

Richardson, Jennifer C., J. Ben Arbaugh, Martha Cleveland-Innes, Philip Ice, Karen P. Swan, Garrison, D. Randy. 2012. “Using the Community of Inquiry Framework to Inform Effective Instructional Design.” In *The Next Generation of Distance Education,* eds. L Moller and J. Huett, 97-125. Boston, MA: Springer. Doi:10.1007/978-1-4614-1785-9

Richardson, Jennifer. C., Yukiko Maeda, Jing Lv, and Secil Caskurlu. 2017. “Social presence in relation to students’ satisfaction and learning in the online environment: A meta-analysis.” *Computers in Human Behavior* 71, 402–417. doi: 10.1016/j.chb.2017.02.001

Roberts, Joseph W. 2021. “Rapidly Moving Online in a Pandemic: Intentionality, Rapport, and the Synchronous/Asynchronous Delivery Decision.” *PS: Political Science & Politics* 54(1): 183-185. doi:10.1017/S1049096520001596

Schiff, Jennifer. 2019. “The WRIS System: A Framework for Designing and Implementing Simulations in an Online Course Environment.” *Journal of Political Science* Education, doi: 10.1080/15512169.2019.1574229.

Sears, Nathan Alexander. 2018. “War and Peace in International Relations Theory: A Classroom Simulation.” *Journal of Political Science Education* 14(2): 222-239. Doi: 10.1080/15512169.2017.1403436

Shanks, Spencer and Jiakun Jack Zhang. 2024. “Disentangling Perception and Performance: A Natural Experiment on Student Engagement and Learning in

Simulations." *Journal of Political Science Education* 20(2): 292-317. Doi: 10.1080/15512169.2023.2245511

Swan, Karen, D. Randy Garrison, Jennifer C. Richardson. 2009. "A Constructivist Approach to Online Learning: The Community of Inquiry Framework." In *Information technology and constructivism in higher education: Progressive learning frameworks,* 43-57. IGI global.

Uz Bilgin, C., Gul, A. 2020. "Investigating the Effectiveness of Gamification on Group Cohesion, Attitude, and Academic Achievement in Collaborative Learning Environments." *TechTrends* **64**, 124–136.doi:10.1007/s11528-019-00442-x

Whiteside, Aimee and Suzanne Ensmann. 2023. "Leveraging Yellowdig to Foster Motivation, Engagement, and Cognition." *The Teaching Professor* [Blog], February 13. https://www.teachingprofessor.com/topics/teaching-strategies/teaching-with-technology/leveraging-yellowdig-to-foster-motivation-engagement-and-cognition/?_rt=MnwxfHllbGxvd2RpZ3wxNzM3OTE5OTI1&_rt_nonce=2218cc0514

Whyte, Christopher. 2021. "Using Mini-Games to Teach Cyber Issues to Social Science Students." *Journal of Political Science Education* 17(S1): 215-225. Doi: 10.1080/15512169.2020.1737537