



# Transitioning from Face-to-Face to Online Instruction: How to Increase Presence and Cognitive/Social Interaction in an Online Information Security Risk Assessment Class

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## ABSTRACT

*This article briefly reviews two important goals in online education: interaction and presence. These are important goals in online education because they are linked to learning and motivation to learn. The article provides guidelines and an extended example of how to design an online course in information security in a manner that will enhance interaction and presence. This article's contribution is to provide guidelines with a corresponding extended and concrete example for those who are tasked with designing and delivering online courses. Although the guidelines and example were targeted to the field of information security, they can be readily adopted by other disciplines.*

*Keywords: distance education; interaction; instructional strategies; online learning; presence*

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## INTRODUCTION

Although online education can offer convenience and flexibility for learners, it is not without challenges. Frequently, online education is no more than instructor notes and lecture materials posted on a Web site, perhaps with some required discussion. Much online instruction is designed, developed, and delivered without careful consideration of foundational instructional design principles. Research has shown that online courses that lack substantive and meaningful interaction, coupled with a sense

of presence (feeling as though belonging in a virtual environment), contribute to a sense of isolation, unsatisfying learning experiences, and high dropout rates (Aragon, 2003; Bennett, Priest, & Macpherson, 1999; Glickman, 2003; Moore & Kearsley, 1996). The goal of this article is to provide a set of online course design guidelines based on research findings and best practices to enhance interaction and sense of presence, which are two critical factors that impact learning and motivation to learn in online courses (Moore, 1992; 1993; Muirhead,

1999; Richardson & Swan, 2003). Finally, an example is provided for applying the guidelines to transition a face-to-face class to an online class, using an information security risk assessment class. In order for these guidelines to make sense, we start with a brief discussion of interaction and presence.

### **Interaction**

Moore (1989) identified three major types of interaction: a) learner-content, b) learner-instructor, and c) learner-learner. Learner-content interaction refers to the amount of substantive interaction occurring between the learner(s) and the content. Content could be in the form of text, radio, television, and/or audiotape. Participant interaction (learner-learner and learner-instructor) refers to the engagement of the learners and instructor in the learning and teaching process. It also refers to dialogue between and/or among different participants in online learning environments. Thus, interaction is more than a communication exchange; interaction occurs when objects, actions, and events mutually influence one another (Wagner, 1994). Instructional interaction is meaningful communication that challenges learners' thinking, shapes the acquisition of knowledge in meaningful ways, and changes learners, moving them toward achieving their goals. Effective interaction is not necessarily more interaction, rather it is interaction resulting in learners thinking in new and more profound ways. While the literature and research confirmed the importance of interaction in the learning process (Muirhead, 2001), online learners frequently do not interact at sufficient levels and/or in substantive ways with the instructor or other learners in online courses. The lack of appropriate and deep interactions is a common inadequacy of current online courses (Bennett et al., 1999).

### **Presence**

Closely related to interaction is the concept of presence. From the learner's perspective, presence is the "sense of being in and belonging in a course and the ability to interact with other students and an instructor although

physical contact is not available" (Shin, 2002, p. 22). Presence also refers to the "involvement, warmth, and immediacy" (Danchak, Walther, & Swan, 2001, p. 1) learners experience during communication and interaction with others in the online learning environment. According to Picard (1997), an online course that conveys affective or emotional information to learners will lead to a higher sense of social presence and interaction. Leh (2001) found lack of interaction, originally due to lack of physical and face-to-face contact, in online learning environments leads to a sense of isolation (or lack of social presence). On the other side, an appropriate level of interaction promotes a better sense of social presence (Rovai, 2001). Research also has shown social presence is positively related to learner satisfaction, perceived learning (Richardson & Swan, 2003), and learning success (Rifkind, 1992; Tu, 2000). In other words, a good sense of social presence influences interaction and interaction influences students' sense of social presence. Together, appropriate interaction and presence lead to increased cognitive activity and also cognitive activity at higher levels, resulting in more meaningful learning in online learning environments. While these relationships are known, many designers, developers, and instructors of online courses do not consciously implement instructional methods and techniques that will effectively increase interaction and social presence. We asked ourselves why. The answer, we believe, is that they have not had access to pedagogically content-based guidelines grounded in research. With this information, we turn to the guidelines.

## **GUIDELINES FOR PROMOTING INTERACTION AND PRESENCE IN AN ONLINE COURSE**

There are four main components to consider when transitioning a traditional face-to-face course to an online version: a) introductions, b) organization, c) instruction, and d) feedback. There are techniques to use for all four of these

components that will allow students to be more socially and cognitively interactive and present in an online course.

## Introductions

Much of the current literature on online courses emphasizes the value of creating a learning community among the online participants. According to Hanna, Glowacki-Dudka, and Conceição-Runlee (2000), "a learning community is a group of people who have come together to form a culture of learning in which everyone is involved in a collective effort of understanding" (p. 14). This sounds great, but as an instructor you are probably asking what techniques can be used to accomplish this task. "You need to build a climate that will foster professional learning or collaboration by crafting communications that support a sense of safety in the discussion areas" (Collison, Elbaum, Haavind, & Tinker, 2000, p. 30). You want students to share their experiences with each other, but this is difficult unless they feel comfortable with each other. There are a number of strategies that can be used to foster this feeling of community.

In the course content discussion area, start with a social icebreaker for students to introduce themselves. This should be a non-threatening type of interaction that "breaks the ice of using technology to communicate," (Conrad & Donaldson, 2004, p. 47) is participant focused versus academic content focused, and requires reading and responding to other postings (Conrad & Donaldson, 2004). Conrad and Donaldson (2004) list and describe a number of different types of ice breakers. For example, BINGO requires everyone to post a short biography on the discussion board. The instructor then e-mails everyone a bingo card with something from everyone's posting in a box. Students must then determine which box belongs to which student and fill in the correct name. Another possible icebreaker is TWO TRUTHS AND A LIE. Students post two truths about themselves and one lie. Other students then try to determine which is the lie. This is

most fun when the truths are so outrageous it is hard to distinguish them from a lie.

Another method to help foster the feeling of community is to have a page dedicated to the biographical sketches and pictures of the students. This could also be a social space with a title, such as lounge, hallway, or water cooler, where students can discuss any off-content topics. Students need a space provided just for "social dialogue or simple chitchat" (Collison et al., 2000, p. 20). This helps prevent clutter in the content-discussion area and encourages students to contact each other via e-mail, instant messaging, or chat.

As the facilitator of this community, you will want to send an opening message to each student or post one on the content-discussion board. It should be a warm, welcoming message, perhaps with a friendly photo. The opening message should include a question requiring a response from students. This first message will set the tone for the class; it also can serve as a model for online discussions.

## Organization

There are a number of organizational strategies to use to help increase interaction and presence in an online class. As the instructor, you will want to hold "online" office hours. This can either be a specified time when you will be answering e-mail or using instant messenger to "chat" with students either synchronously and privately. Another strategy is to provide job aids on how to use the technology employed in the course, which allows the technology to become invisible as students become more familiar with using it.

The course syllabus should consist of more than taking the face-to-face paper copy and making it digital. In an online course, the syllabus needs to include things such as guidelines for discussions, definition of roles, and so forth, and to function as a contract between instructor and students. In addition to content traditionally included in a syllabus, you should include contact information for student technical difficulties. Instead of listing "participation"

or “online attendance” and the point value, define what participation entails. For example, we suggest the participation grade be based on the quality of the postings and not just the quantity. Participation could include posting on an asynchronous discussion board, showing up for a synchronous chat, working on a team project, and so forth.

One strategy to help foster quality asynchronous postings is to ask the students to send private e-mails for single comments, such as “I liked your last posting” or “I agree.” According to Moore and Kearsley (1996), this helps prevent cluttering the discussion board; they encourage only postings that will contribute to the “community’s pool of knowledge (p. 151).” Do not discourage positive comments like this, because they contribute to the social presence of the community.

Another strategy is to group students into teams of three or four and have them write up what they believe are good ground rules for discussions and participation. For example, what to do if someone reads all the postings, but does not post any. These could be posted in a forum that explains discussion board procedures and guidelines. Guidelines that include a posting with “emoticons” for students unfamiliar with how to express text-based emotions are helpful (e.g., ☺ means smiling or happy). In addition, some students might use abbreviations that are now common in Internet-based chat, such as LOL or “laughing out loud.” These small additions can add personality to the text-based “voices” of the participants. In a face-to-face classroom, physical presence is displayed through “voice, body language, intonation, expressions, [and] gestures” and helps communication (Ko & Rossen, 2004, p. 12). In the online environment, participants rely solely on text-based communication and need to avoid words that could be misinterpreted, such as sarcasm, inappropriate jokes, and so forth. Thus everyone in the community must demonstrate a culture of respect, so participants “feel what they say matters and is valued by the other members of the community” (Collison et al., 2000, p. 30).

An additional aspect of the syllabus that needs to be addressed is the schedule. The schedule is the lifeline of the online course. Students will look to this to effectively manage time. Therefore, it is critical to present course content in a consistent manner, either all up front or on a regular schedule. This will reduce confusion and promote consistent checking of the site by students. Keep in mind not everyone is logged on when an assignment is posted. Give approximately a week for assignments, to allow for those who log in later in the week. This is one of the advantages to online learning: the ability to log on anytime of the day or night. You could require everyone to log in every two to three days to ensure they have the most up-to-date information. Supplying information, such as due dates, in more than one location on the course Web site is also a good idea as some students might look in different locations for information.

### **Instruction**

There are a number of different instructional techniques to use when attempting to increase presence and interaction in an online class. Collaboration can be fostered in small or large groups of students. If you choose to have large class projects, there are grouping considerations. Before grouping the students into teams they will work with for the large class project, consider pairing them up for a smaller assignment, such as an article critique or peer review. This helps foster feelings of comfort when learning how to work with others over distance. When assembling teams for a large class project, groups of four are typically the optimum number. Encourage collaboration to prevent the group from splitting up the work, then putting it together to turn in; you want them to “construct their learning together” (Palloff & Pratt, 2005, p. 39). Also, explain to the students why it is important that they work collaboratively and that it is a requirement.

Palloff and Pratt (2005) discuss the importance of collaboration, saying it promotes critical thinking skills and helps to foster the feeling of community. There are a number of

ways to do this online. Students first can do the work individually and bring it to the group for critique and to certify the correctness of the papers. Then the instructor can pick one student randomly to answer the questions studied by the group or choose one paper from the group to grade with everyone in the group receiving that grade. A second technique is to provide different team members with the charge of finding different information. This is called information interdependence, or the jigsaw strategy, where students have the different pieces needed to complete the puzzle. In order for all the team members to do well on the assignment, they need to rely on the information the rest of the team members have learned. Hence, the students are held accountable for teaching the material to their team members. Another technique is to have the team devise a "charter" or team agreement delineating the different roles individuals will play, how they will interact, and different project deadlines. It is helpful to provide a sample charter, so students know what is expected of them. Some possible roles are secretary, liaison to the instructor, organizer, discussion board poster, and so forth. These roles might change during the project's phases. Have the team create a team name; this helps with team identification on the discussion board and also with a sense of community. To encourage team buy-in, give the team choices in determining project topic. Monitor the team's progress and intervene if there are participation problems. Johnson, Johnson, and Holubec (1991) state that there are three reasons an instructor should intervene:

1. to correct misunderstandings or misconceptions about task instructions and the academic assignments they are completing;
2. to correct the absence, incorrect use, or inappropriate use of collaborative skills; [and]
3. to reinforce the appropriate or competent use of collaborative skills. (pp. 6:29)

In addition, tips for online conflict resolution could be included as a job aid (Palloff & Pratt, 2005). When assessing the collaborative assignment, perhaps include peer evaluations in the grading criteria. This can help prevent noncontributing team members. In addition, ask each team member to write a reflection on what they did to contribute to the project, and how they tackled their role and task throughout the process.

As many online courses are taught using mainly asynchronous discussion boards, there are discussion strategies and activities that encourage interaction and a sense of presence online. A main goal is to ensure there is a high level of interaction and dialogue. This can be facilitated by using different types of questions, activities, and presentations.

### *Questions*

When posting discussion questions, the instructor does not always need to be the initiator. After the instructor has modeled question facilitation, allow students, or pairs of students, to take turns facilitating different discussion topics. This allows students to see that each participant in the community is as valuable as the instructor because every participant shares personal experiences to help the community learn. It also allows participants to see multiple perspectives. During online discussion, it is important to provide the discussions with a distinct beginning and end to prevent information overload and frustration among students (Conrad & Donaldson, 2004). Different types of questions can help encourage critical thinking, such as questions asking for more evidence, questions asking for clarification, open-ended questions, hypothetical questions, cause and effect questions, and summary and synthesis questions (Palloff & Pratt, 2005). In addition, you or the discussion topic facilitator should write a wrap-up paragraph summarizing the main points of the discussion, including students' names and the different points they made, which contributes to the feeling of presence.

### *Activities*

Different types of activities can take place on a discussion board. The typical threaded discussion can get boring to students who read numerous posts. Some activities to increase interaction are the following: a) role playing, b) debates, c) simulations, d) case studies, e) outside experts, f) sharing related personal/professional experiences, and g) electronic virtual field trips. In addition to these asynchronous activities, consider having a few required synchronous discussions. It should be noted, however, synchronous discussions tend to be more social; therefore, they are usually more effective at fostering social interaction than cognitive interaction. Guest lecturers via audio or video conferencing and synchronous large group sessions, where the instructor uses a whiteboard to demonstrate a problem, also can be used. If the instructor must present some sort of lecture to provide information to the class, include meaningful interactive links, discussion threads, and other activities to make the lecture interactive.

### *Presentations*

Online course technologies often allow for different types of presentations. Individuals can post papers, PowerPoint presentations, and other documents in discussion threads. However, how do you have a group do a presentation to the entire class? If the students have access to software, such as Breeze, Camtasia, or Articulate, they can create multimedia presentations the class can watch. If this type of software is not available, students can prepare a discussion thread led by the team to present their project. Teams also can create simple Web sites to showcase their projects.

### **Feedback**

The final component we are going to discuss is the use of feedback, which is essential to fostering interactivity. Online feedback should consist of both instructor-to-student and student-to-student (or peer) feedback. Responding to individual e-mails asking the same questions can get redundant; therefore, encourage students

to post questions on the discussion board, so everyone will benefit from the response. In addition, provide a discussion forum that allows students to provide feedback about the course; perhaps these are recommendations for improvement or lessons learned that can be shared with future classes.

No matter the activity students are involved in, provide opportunities for individual as well as group practice and feedback; this may be the first online class they have taken. In addition, the instructor should respond to all student queries. Make sure responses are prompt if it is a technical question. If there is a delay in responding, explain the reason. Instructor feedback should offer detailed analysis of student work and suggestions for improvement, along with additional hints and information to supplement learning. These can be private, via e-mail, or public to a team via the discussion board. If a student is not accessing the site enough, the instructor can send informal e-mails to see if the student is having problems in terms of the technology. The instructor should send encouraging supportive e-mails to individuals on an ongoing basis. Include questions that require the student to respond, thus drawing them into active participation.

Students should complete peer reviews for student-to-student feedback. This provides the reviewer the opportunity to focus on others' interpretations and the original writer to receive multiple perspectives. Provide guidelines and the rubric to be used for grading. Both the instructor and the students should use "track changes" in Microsoft Word documents to provide feedback, so everyone can see changes made, comments, or notes that include questions. Also try to get feedback from participants about their progress. This can be done through direct questions, assignments, quizzes, polls, and questionnaires.

### **THE ONLINE INFORMATION SECURITY CLASS EXAMPLE**

This section of the article begins with a brief overview of how to introduce and organize the online information security course. Next,

there is an in-depth focus on three weeks of instruction, explaining how the course was transitioned from face-to-face instruction to an online format. While this specific example focuses on an information security course, the purpose of the example is simply to enact the guidelines. The guidelines can be generalized to other topics and fields in technology education.

### **Introductions for Building a Learning Community**

When building a learning community in a face-to-face security assurance class, the instructor tends to have class introductions and perhaps an ice breaker activity. For an *online* security assurance class, the instructor needs to facilitate a learning community in a similar, yet different way. The instructor needs to provide a Web-based orientation to both the online environment and the course materials. An opening message should be sent by instructors, including a question requiring a response from students. In order to allow students to get to know each other early in the course, online ice breaker activities that are via discussion boards as well as having students work in virtual teams to produce a visual presentation about the team are useful. In addition, a space is provided on the class Web site for students to post their digitized images. The instructor also should encourage students to contact each other via e-mail and chat.

### **Course Organization**

When organizing a face-to-face security assurance class, the instructor has a syllabus that includes a schedule, required textbook, and office hours. In the online version of the security assurance class, the instructor needs to go further. In addition to the online syllabus, the instructor needs to post a schedule with hyperlinks to that day's information as well as discussion and participation guidelines and requirements. Links to online readings, in addition to the listed textbook, are included. Furthermore, the instructor needs to hold online

office hours when the students can be sure to reach him or her immediately.

### **Instruction—Week One**

#### *Perform Asset Identification and Classification*

In the first week of the face-to-face security assurance class, the instructor provides the students with readings on the risk assessment process and various models. She also presents a lecture to provide them with additional information. A discussion ensues about asset identification. They look at the different authors and different information provided in order to compare and contrast what each author said. They also discuss the purpose in the risk assessment process. In addition, the class brainstorms assets in the k-12 setting. The instructor assembles small groups and has the students apply asset identification to the k-12 setting. The groups then compare their new list to the other groups' lists. As a class, they then group information assets (types of data, part of classification). FIPS 199 is discussed as a classification scheme for sensitivity of assets. For homework, students are asked to apply FIPS 199 to their list and write a critique of the usability of FIPS 199. They can revisit the first readings to discuss their classifications.

In the online security assurance class, the instructor provides the students with links to readings and Web sites about the risk assessment process and various models. She also posts a short lecture (approximately 10 minutes) with a PowerPoint presentation via Breeze to provide them with additional information. A discussion forum is started in which the instructor poses an initial question about asset identification. The students have two to three days to respond. The instructor assigns different students to read different authors to gain different information about risk assessment models. Concurrently, the instructor creates a new discussion forum for students to a) post a summary of their article, b) then compare their article to other postings, and c) discuss the purpose of models in the risk assessment process. The students again have two

to three days to respond. The instructor creates a new discussion. The instructor creates a new discussion thread to brainstorm information assets in the k-12 setting and posts an initial question. She has students individually apply asset identification to the k-12 setting then post their responses. She organizes students into groups of three or four and provides them group discussion forums. She has each group create one new list and has groups compare/contrast lists with each other. She also has groups apply a classification scheme to their list as well as write a group critique of FIPS 199. Groups also discuss their classification, according to the first readings they did. The students have four to five days to respond.

### **Instruction—Week Two**

#### *Perform Threat Identification*

In the second week of the face-to-face security assurance class, the instructor provides the students with readings on information security threat analysis and classifications of threat types. As a class, they discuss how different threats might correlate to different assets. This is done first in small groups, then together in one large group discussion. The instructor also presents them with information on methods for identifying types of threats. She provides them with existing reports (FBI CIC Survey to Crime Data) and tells them where they can get this type of information for typical threats in other organizations. She asks the students if they can try to generalize to their organization, and how they would monitor their own employees/network/system. She poses the question, “How are you going to get clients to think about modeling their threats before we go out to the client? Where we do actual threat identification?”

In the online security assurance class, the instructor provides the students with links to readings on information security threat analysis as well as Web sites about classifications of threat types. The students have two to three days to read this information. The instructor creates a new discussion forum about how dif-

ferent threats might correlate to different assets. Students are first assigned to small group discussion areas to answer a posted question. Then students discuss their findings in a large group discussion area. Students have two to three days to respond. Another discussion thread is created about methods for identifying types of threats. The instructor posts open-ended questions about the following: existing reports (FBI CIC Survey to Crime Data); where to get information; typical threats in other organizations; how the students could generalize to their organization; and how to monitor their own employees/network/system. In addition the instructor posts a fourth question: “How are you going to get clients to think about modeling their threats before we go out to the client, where we do actual threat identification?” Students have the same two to three days to respond.

### **Instruction—Week Three**

#### *Perform Vulnerability Identification*

In the third week of the face-to-face security assurance class, the instructor provides a lecture and PowerPoint presentation on the three types of vulnerabilities— people, policy, and technology—and about establishing criteria for assessing vulnerability. She asks the students to individually develop an evaluation checklist (for policy) to take into a company. The instructor presents information about technical vulnerability. For example, she discusses the reporting tools companies and schools are likely to have as well as passive scanning tools. The class goes to a computer lab as a group and experiments with a variety of these tools. The students are provided criteria to evaluate different types of scanning tools: purpose, when to use, cost, and advantages/disadvantages; this is done in small groups. For homework, students are put into small groups and asked to select a tool. They are then provided with a flawed system with known vulnerabilities to run their tool against. They must then take, analyze, and report their findings.

In the online security assurance class, the instructor provides the students with links

to readings and Web sites on the three types of vulnerabilities—people, policy, and technology—and about establishing criteria for assessing vulnerability. She also posts a short lecture (approximately 10 minutes) with PowerPoint presentation via Breeze to provide them with additional information. She asks the students to individually develop an evaluation checklist (for policy) to take into a company and submit this to the online assignment drop box. Students have two to three days for this. Students are then put into small groups, where each student presents his/her checklist to the other group members. The small group is then tasked with coming up with a “Best of Breed” checklist, using their individual checklists. The instructor presents information about technical vulnerability via an audio presentation. For example, she discusses the reporting tools and passive scanning tools that companies and schools are likely to have. The instructor provides links to demonstration software for students to experiment with different types of these tools. She posts a list of criteria along with an example for students to evaluate different types of scanning tools: purpose, when to use, cost, and advantages/disadvantages; she assigns this to be done in small groups and posted within three days. The students also are requested to select one tool per small group. They are then provided a flawed system with known vulnerabilities to run their tool against. This system is accessed via a virtual private network (VPN). The groups of students must then take, analyze, and report their findings on the discussion board within three days.

### SUMMARY

The goal of this article was to provide guidance to faculty who are tasked with transitioning face-to-face instruction into distance learning. More specifically, these guidelines for an online course and the example of one are meant to provide readers with action steps that can be taken to improve the level and nature of interaction as well as students' sense of presence. The ultimate goal, of course, is to produce equally, if not more effective, results from online learning. Our hope is that faculty

who attempt to use these guidelines will see increased learning and motivation to learn among their distance learning students.

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