

Tips for Teaching and Working Together Online

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Overview

This article describes, based on my experiences, what has worked and not worked for me when teaching and collaborating online. It is important to note that I am not making recommendations, but simply articulating what has worked for me when teaching online and working across distance. Anyone reading this should consult with other experienced colleagues about this and make their own decisions.

My Background

I am a professor of information technology and analytics and have taught online a few times. I taught a class at Carnegie Mellon where I had students both in the classroom and online simultaneously. I also taught Kogod's MS Analytics online program (American University). I am the lead architect of the MS Analytics programs (campus and online) at the Kogod School of Business at American University. I am also the designer and developer of a course on Predictive Analytics, both on campus and online--I designed and implemented, and now coordinate all online sections of this course in the program. In addition, one of my main areas of research expertise is globally distributed collaboration and global team coordination. Prior to becoming a professor, I worked supporting information and financial systems in Africa and Latin America for 13 years at an international non-profit organization.

Teaching Online

Most professors have suddenly been thrown into the online world of educating students. Some of us are lucky to have had experience teaching online, but for others it is a big challenge. I offer some tips to enhance the online teaching experience for both instructors and students. Here are some tips to enhance your learning environment online:

- Putting together an effective online course requires a great deal of planning and design upfront. Once all the materials are developed, the delivery becomes more efficient. However, the initial investment is critical and costly, but it most definitely pays off.
- The support of a professional online education company brings the student learning experience to another level. At Kogod, we worked with 2U, which has been a great experience for me personally, and I have learned so much about effective online education working with their talented staff.
- It is very important to script your sessions. For our online courses, we have minute by minute scripts with the sequence of lectures, discussions, document reviews, exercises, Q&A, etc. You really can't start an online session without a well-rehearsed script. When teaching classes on campus one can improvise in the classroom, but this is not so easy online.

- There are two main interaction formats for online instruction: **(1) Asynchronous** – involves everything students do on their own before and after class; and **(2) Synchronous** – involves live class sessions online. Instructors need to decide how much of their instruction will be asynchronous vs. synchronous. In our online program we use a 50%-50% approach.
 - The **asynchronous** format includes recorded video lectures, homework, readings, quizzes, exams, etc. Today's students are accustomed to social media and short bursts of communication. Students usually lose patience and interest very quickly with professors' lectures. This is exacerbated online, when there are so many distractions around them. In our MS online program, we have recorded all the lectures in a professional studio and the videos have audio captions for the hearing impaired. It works much better for students to have all lectures **pre-recorded on video**—this format allows them to view the lectures at their own pace, with the ability to pause, rewind, forward, etc.
 - It is really important that students do the asynchronous work diligently before coming to the live sessions. Otherwise, the live sessions will not be productive. To motivate students to view the recorded lectures before the corresponding live session I do a couple of things: (1) give a simple 5-question, multiple-choice quiz associated with each video lecture, which is due before the live session. Tools like Blackboard make this very easy to set up up and self-grade; (2) conduct graded, in-class exercises based on the material covered in the recorded lectures.
 - This is a good process to follow for the students: watch recorded video lecture → take quiz → come to live class → follow up with post class exercises.
 - For video lectures, it is best to divide the material into several short lectures, 10 to 15 minutes each. Students process the material better this way. Also, video files are very large, so you want to keep each video lecture file short.
 - If you do not have access to recording studio facilities, it is really easy to record videos with tools like Blackboard's Kaltura. My favorite tool is **Camtasia** because you can record anything you do on the screen (e.g., web browsing, software programming, etc.; you are not limited to just PowerPoint slides), and then do video editing to add captions, callouts, notations, circles, effects, etc. I do all my own recordings with Camtasia.
 - For homework, exams, gradebooks, communication with students etc., we use **Blackboard**, which is an effective Learning Management System (**LMS**). You really can't teach online without some form of LMS to interact with students asynchronously. There are open source LMS tools like Moodle. You can explore them with a Google search, for example: <https://blog.capterra.com/top-8-freeopen-source-lmss/>
 - The **synchronous** format is for live, real-time classroom sessions. This type of format is not effective for lecturing, but is excellent for class discussion, exercises, Q&A, etc. There are some excellent synchronous interaction tools out there. American U uses Blackboard's Collaborate. The advantage is that it is easier to make available to the class roster. Our MS online uses Zoom, which is my favorite platform. It can support large classrooms and you can setup breakout rooms, take attendance, let students raise their hand, etc. Microsoft Teams is a new tool that I understand will replace Skype for Business. It looks intuitive and simple, but I have not used it yet.

- If possible, use a wired Internet connection, rather than a wireless one. Even very small amounts of blurriness, pixelation, latency, and voice static will dramatically diminish the quality of the experience for students.
- Invest in high-quality equipment, which is not expensive these days, but can make a huge difference in terms of voice and video quality. I use a ClearOne Chat 60-U (<https://www.amazon.com/dp/B006W6V4KQ/>) desk speaker/microphone, which is excellent for small groups and individual broadcast. I also use a high-definition web cam: Logitech HD Pro Webcam C920 (<https://www.amazon.com/dp/B006JH8T3S/>), which I bought a very long time ago, so there are probably much better ones. I also bought a small desk tripod for the web cam, which is very handy to adjust the position of the camera. Finally, I also have a document reader IPEVO CDVU-03IP (<https://www.amazon.com/gp/product/B002UBPBTC/>).
- Set up the live sessions at least 10 to 15 minutes before the actual session and let students know so that they can test/adjust their audio/video settings.
- Ask students to log in with their full name. Students often use nicknames or screen names, but you want to identify who is in the classroom to avoid “[Zoom Bombing](#)”. You may also want to add a password and ensure you can control who is admitted into the room.
- Maintain eye contact with the students. The most common mistake is to look at their faces on your screen. Look at your webcam instead and you will connect with the students better.
- Ask all participants to mute their microphone when entering the class. In Zoom, you can set a session so that all participants are muted when they enter the room. Unmuted microphones consume a lot of bandwidth and can be annoying if participants are rustling paper or rattling objects near the microphone. Ask students to un-mute only to speak or ask questions, and then mute again. Some platforms like Zoom allow you to automatically mute all incoming participants.
- Ask students to display their webcam video. Being connected with students visually keeps everyone engaged and with businesslike behavior.
- Keep students engaged and informed between live sessions. Send frequent emails with announcements, tips, recommendations, interesting readings, etc. And, by the way, email your students constantly with announcements, interesting articles, readings, etc. If a student misses class, write to ensure they are okay. Students appreciate your being in contact with them and also knowing that you care.
- Keep the synchronous live sessions short, light, and interactive. My live class session is 1:30 to 1:45 hours long. The equivalent campus classroom time would be 2:30 hours with lectures and a 10-minute break. Our online courses have 1:50 hours of asynchronous lectures coupled with 1:50 hours of live sessions.
- The technology can get in the way when teaching online. Ensure that all the technology is working fine and that you are familiar with the necessary features. It is very inefficient to troubleshoot technical issues during class time.

Collaborating Online and Telework

Many businesses are conducting their business online, where possible. Some businesses can continue seamlessly online, others cannot, and the majority are somewhere in between. There are a few concepts that may help figure out telework strategies.

Working Across Time Zones

Working across time zones is a more complex topic and an entire subject on its own, so I do not cover this here. But my colleague Erran Carmel and I have written extensively about this. Most of our work is summarized and referenced in our self-published book (Carmel, E., J.A. Espinosa. 2011. I'm Working While They're Sleeping: Time Zone Separation Challenges and Solutions. Nedder Stream Press, Washington, D.C.); <https://www.amazon.com/dp/B006DKCVMQ>).

Information Intensity

Porter and Millar wrote a seminal article in 1985 ("How Information Gives you Competitive Advantage, Harvard Business Review, July 1985; <https://hbr.org/1985/07/how-information-gives-you-competitive-advantage>). Despite being dated, the principles articulated in this article remain relevant today. There are many good ideas in this article, but for this discussion I would like to focus on P&M's Information Intensity Matrix. The main idea is that every product or service has a physical component and an information component. Similarly, the value, production, or supply chain necessary to produce and deliver the product or service also has a physical component and an information component.

(HiProd-HiChain) Industries like banking, news, education, etc. rely on **high information content** and require a lot of **information** in the supply chain **to deliver**. Naturally these industries also require physical aspects to function-- cash, ATM's, classrooms, etc. But because a good portion of the products and services have high information content, they are ideally suited for telework.

(LowProd-HiChain) Industries like retail, oil, air travel, healthcare, etc. rely mostly on physical products and services, so they **have low information content**. But the **supply chain has high information intensity** can be highly automated and with things like online shopping sites, electronic commerce, mobile applications, etc. So, the product or service production is not suitable for telework, but the supply chain can be more easily managed via telework. However, the products and services require substantial physical resources (e.g., airplanes, merchandise, hospitals, etc.)

(HiProd-LowChain) Industries are more rare. Products with high information content can usually be produced and delivered electronically.

(LowProd-LowChain) Industries (e.g., cement production, farming, etc.) score low on both information intensity dimension and, therefore, cannot really be operated without strong physical resources. Telework will not help much.

Interaction Mode

There are two main modes of communication, synchronous and asynchronous. I discussed above the implications of this for online education, but this requires further thinking for telework. **Asynchronous** interaction is something we do on our own for our own work and for things that don't need to be shared on a real-time basis (e.g., email, letters, documents, reports, analysis, etc.). **Synchronous** interaction happens in real-time (e.g., physical meetings, online meetings, phone calls, etc.). Organizations adopting telework need to analyze the work that needs to be done and understand the types of tasks required to

complete the work. For online education in the business school we generally use a 50%-50% mix of asynchronous (videos, homework, discussion boards) and synchronous (real-time classes). But MOOCs (Massive Open Line Courses) are entirely or almost entirely asynchronous. Other disciplines like fine arts and physics will require more co-presence for things like rehearsals, access to labs and resources, etc., so they may need more synchronous interaction. But for telework, each organization needs to figure out the best mix of synchronous vs. asynchronous interaction needed for effective task work. And then, for the synchronous portion, the organization needs to decide how much can be done online and how much needs to be done physically, based on the information analysis above. The specific do's, don'ts and tips for effective asynchronous and online synchronous work are the same as for online education.

Dependencies

The right mix of synchronous and asynchronous work will be influenced by how much coordination is needed to get the work done. And, how much coordination is needed will be influenced by the level of dependencies among workers.

A dependency exists when the work of one individual cannot be completed without the involvement of another individual. James D. Thompson wrote a classic book titled "Organizations in Action", published in 1967, with very insightful analysis of the behavior of complex organizations, most of which are still relevant today. He was the first to articulate a taxonomy for the various types of dependencies in organizations: (1) **independent** – members can work alone and don't need each other to get the work done; (2) **pooled** – members don't depend on each other to get the work done, but they depend on pooled resources that need to be managed (e.g., infrastructure, budgets, labs, equipment). For example, two construction workers may not need to work with each other, but they both need to use the same bulldozer; (3) **sequential** – member A (e.g., software developer) is dependent on member B (e.g., software requirements analyst), but B does not depend on A; and (4) **interdependent** or **reciprocal** – members have a mutual dependency on each other.

Another important aspect of dependencies is understanding the type of dependencies. As I articulated in an article published in 2007 (Espinosa, J.A., S.A. Slaughter, R.E. Kraut, J.D. Herbsleb. Team Knowledge and Coordination in Geographically Distributed Software Development. *Journal of Management Information Systems* 24(1) 135-169.) dependencies can be of three types: (1) technical – i.e., the parts or services produced by member A need to integrate with the parts or services of member B; (2) temporal – i.e., analysis cannot be completed until data collection is finished; and (3) process – i.e., one aspect of the process (e.g., software modification) cannot continue until a pre-requisite aspect of the process is completed (e.g., software review board approval).

Coordination

Coordination was defined by Kevin Crowston from Syracuse U as "the management of member dependencies" (Malone, T., K. Crowston. 1994. *The Interdisciplinary Study of Coordination*. *ACM Computing Surveys* 26(1) 87-119.). That is, if the work can be done independently, there are no dependencies to be managed, and therefore, there is little need to coordinate. In contrast, as we move from 1 to 4 in the dependency framework above, dependencies get harder to manage, which is what coordination is all about. How we manage dependencies will be dependent on which of the three types of dependencies above, or a combination of them, you need to manage.

There are various forms of coordination, but in my research I have narrowed it down to two main kinds of coordination: (1) **behavioral** – the things people do to coordinate; and (2) **cognitive** – the shared knowledge that people have that allows them to coordinate implicitly.

Behavioral Coordination. March and my hero Herb Simon wrote about behavioral coordination way back in 1958 (March, J., H.A. Simon. 1958. *Organizations*. John Wiley and Sons, New York.) and this is still relevant today. There are two main types of **behavioral** coordination can be further classified as (1.1) **mechanistic** – or by plan, which is about things people do to reduce their direct dependency with each other, which works well for more routine aspects of the task (e.g., division of labor, plans, specifications, rules, processes, collaboration tools, a traffic light, etc.); and (1.2) **organic** – or by feedback, which is about communications (one on one, in groups, phone calls, meetings, etc.), which is more wasteful in terms of people’s times, but more necessary as tasks become more equivocal, complex and uncertain.

Cognitive Coordination. It is about using knowledge people share to coordinate implicitly (i.e., based on expectations about what others are likely to do). The shared knowledge that people need to have to work together can be of many types, but there are two primary types for organizational work: (2.1) shared knowledge of the **task** (to get the work done) and (2.2) shared knowledge about the **team** or each other (to collaborate more effectively) (see seminal article: Klimoski, R.J., S. Mohammed. 1994. Team Mental Model: Construct or Metaphor. *Journal of Management* 20(2) 403-437.)

Implications for Effective Telework. When collaborators are separated by geographic distance and time zones, the synchronous portion of the work becomes more challenging. The asynchronous portion of the work is not as affected. Therefore, mechanistic coordination can be quite effective at keeping the group performing well. Of course, all this depends on the level and structure of the dependency relationships among collaborators. A thoughtful design and implementation of mechanistic coordination methods is of paramount importance for telework because these not only help improve coordination, but can also reduce the amount of dependencies among members (e.g., division of labor). Naturally, for less routine aspects of the task the team will need to resort to organic coordination, which is more challenging online, but with effective synchronous collaboration tools like Zoom and Microsoft Teams, it is a lot easier to overcome these challenges.

Cognitive coordination is not only a very effective coordination method, but it can also enhance mechanistic and organic coordination. When mechanistic coordination artifacts (e.g., plans, specifications, rules, etc.) are adopted for collaboration, members need to learn and internalize them. What good is a plan or specification if most people don’t understand it or are not aware of it. Group cognition also enhances organic coordination. Members with shared knowledge have more common ground, which leads to more effective communication. For example, the shared knowledge that members of an airplane crew have enables them to get the work done with minimal communication and their communication is very efficient. Group cognition develops and strengthens by working and training together over time. Group retreats and visits to each other’s sites to get to know one another are excellent ways to promote this type of work approach.

Communication Types

The last piece of this equation has to do with the nature of the content of what needs to be communicated. In a recent article (Espinosa, J.A., N. Nan, E. Carmel. 2015. Temporal Distance, Communication Patterns, and Task Performance in Teams. *Journal of Management Information Systems* 32(1) 151-191) we adapted Dennis et. al.'s media synchronicity theory (Dennis, A.R., R.M. Fuller, J.S. Valacich. 2008. Media, Tasks, and Communication Processes: A Theory of Media Synchronicity. *MIS Quarterly* 32(3) 575-600) to the interaction synchronicity of the individuals collaborating, not the technologies. According to this work and the related theories, communication between individuals can be classified into two main types: **conveyance** – the transmission of information; and **convergence** – the extraction of meaning from the information conveyed. Any task requires a sequence of conveyance-convergence episodes between task participants.

Implications for Telework. Asynchronous interaction is quite effective for conveyance. It is easy to convey information via text, email, written documents, etc. But if the task is complex, non-routine and equivocal, collaborators will need to converge on the meaning of the information exchanged, and this is more effectively accomplished synchronously.