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Reflective Practice Series: Selected Instructional Models Using Synchronous Video Conferencing Software

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Reflective Practice Series: Selected Instructional Models Using Synchronous Video Conferencing

Software

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Introduction

With the vast array of resources available to instructors, one would think that instruction and teaching would yield success for all learners. Now, well into the 21st century has much changed in the classroom? Certainly, movable desks and chairs, advanced audio and visual equipment, and a plethora of all types of technologies which might be able to enhance training and education. Over the last several decades research on individualized instruction, cognitive science, educational psychology, and multimedia instruction (to name a few) have permeated the literature on instruction. With all the research and the vast array of studies on improving instruction, how many of these have been used within the classroom?

In 1998 twenty-four programs of instruction were evaluated by the American Institutes for Research, three received the highest rating, with one of the three being Direct Instruction (Miller, 1999). **Direct instruction (DI)** is a general term for the explicit teaching of a skill-set using [lectures](#) or demonstrations of the material to students developed by [Siegfried Engelmann](#) and Wesley C. Becker (Direct Instruction, 2018). They analyzed three components of cognitive learning: behavior; communication; and knowledge systems. They proposed that the way in which humans learn involves two attributes: (1) by examples given to the learner and (2) then the ability of the learner to generalize from the examples (Engelmann & Carnine, 1991).

Features of Direct instruction include:

- Explicit instruction based on lesson plans, often with specific teacher "scripts."
- [Ability grouping](#). Students are grouped based on their rate of progress through the program.
- Emphasis on pace and efficiency of instruction. Lessons are designed to bring students to mastery as quickly as possible.
- Frequent assessment.
- Embedded professional development/coaching. Program developers recommend careful monitoring and coaching (Direct Instruction, 2018)

Models of Synchronous Instruction

The following section includes models of synchronous instruction which employ some of the elements of *Direct Instruction*. Many of these models are frequently used in the traditional college classroom environment, but without synchronous video conferencing software. The first is the lecture-based model, and the second is the discussion-based model. From my own development in the classroom over the last several years, careful planning and backup plans are necessary for successful implementation. What I have done are to take the best elements of direct instruction for the necessary instructional tasks at hand, and then using the cloud-based videoconference software, design and develop it into a classroom session. Lastly, I have found that the transfer of modern technology's instructional methods works best for the individual instructor when they simulate (with the technology) what they already do best in their own on the ground classroom course.

Over the last several decades, I have used Blooms Taxonomy (1956) which places the way people learn into three domains. The three domains are cognitive, affective, and psychomotor. (Please note that there is an updated version of Blooms Taxonomy (Anderson & Krathwold, 2001). I prefer to use the previous version of Bloom's Taxonomy because I have used it successfully over several decades. However, the updated version could also be used in much the same way). This domain is

further divided into six categories with the lowest being Knowledge which is usually just simple recall and the highest - Evaluating information.

The Lecture Model

In the lecture-based model, I like to use the first three levels of Bloom's taxonomy: The *Knowledge* level of focus in the lecture is to recall facts, terms, basic concepts and to provide answers to questions. So as a follow-up to a lecture presentation virtually, real-time online, you might follow-up with questions: what; where; why; when; how this is...? etc. At the second level *Comprehension* students should demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, and giving descriptions and stating main ideas. Some of the keywords used in this level are: classify, compare, contrast, demonstrate, etc. At the *Application* level is usually where I finish off in a lecture depending upon what topic and what subject I am teaching. At this level the Application level, the focus is for students to solve problems in new situations by applying the acquired knowledge and demonstrated comprehension of the facts, techniques in new situations, and maybe in a new unique method. Such words as apply, build, show, construct, make use of, etc. are relevant for this level.

The traditional lecture-based model finds the instructor usually at a podium with a chalkboard, whiteboard, talking and illustrating/developing concepts and ideas using the blackboard-whiteboard and word-of-mouth in an oral presentation. Many professors have excellent presentation skills, use appropriate body language and facial expressions to make their points on the major concepts on the lesson at hand. The task for automating this important instructional mode is quite simple. The first step is to plan your lesson and have an appropriate backup plan if you have failure such as electricity failure, battery failure, etc. Let's assume that the learners are scheduled into your course. The first thing to do is to determine if there are any prerequisites that they need to know prior to the lecture and are there any limitations to the lecture itself such as time? I have found, that around a two-hour session online real-time is appropriate for most lecture sections. During this two-hour time block, I usually give a five-minute break in between. Now, I will give you what I do the lecture session.

The first thing I do is to schedule a session electronically, and/or provide a course link which can be clicked by the student and then they follow the on-screen directions to log into the class session. Depending upon the group that you are instructing, you might be able to record the entire lecture session for playback later. There are various issues that are associated with recording such as privacy, copyright, etc. You may need consent from each participant to allow you to record the session. Once I send the link or the appropriate time for login has come about, I take attendance online. There are many ways to do this but take advantage of the software. I usually open a chat window and say hello to the class and I asked them to respond in the same fashion. This same chat window in the lecture becomes the medium for questions and answers (Q&A) during the virtual, online lecture.

The software that I use allows me to mute each person upon entry. Also, I tell the students to shut their video off and mute themselves as well. If you are not familiar with band width of video communications, then do not use video with more than 10 students at one time. In the lecture mode, I use almost exclusively the "screen sharing" capability of the videoconferencing software. You "share" your screen only with the entire class, they can see and hear on their device what you present.

As the moderator and/or lecturer I have my audio on... which you should test before the class session. Most software packages allow you to adjust the audio of what you can hear and what you can speak. I suggest that you should invest in a pair of headphones which can cost anywhere from

\$20 to maybe \$50. Headphones are essential to block out background noise. If your student participants use audio through their smart phone and/or their computer without headphones or ear buds they will bring into your session background noise interference (more about that in the discussion section).

Now you need to get on with your lesson or lecture. This getting started phase is very important. You might relate to past classes or past topics... where you were last time etc. In the electronic environment you probably have two basic choices to start: the first, is the whiteboard or possibly a PowerPoint presentation. I would recommend that you do either one of these or both. If you use a whiteboard and/or want to annotate a PowerPoint presentation, then I would suggest you use the process of "Inking." This process can be done with various software products, probably the easiest is to buy a digital pen set such as Bamboo Company™ sells. With a digital pen you have a small board next to your computer keyboard, so you can use it as you would with a dry erase board and/or chalkboard. I have found that this is an essential tool in the lecture method in the synchronous real-time virtual environment.

Most software packages for videoconferencing allow some type of screen sharing, what you want to do is to screen share your screen, so your class can view (your screen) on their electronic device. That is what we mean by "screen sharing." You now show your screen and tell what you are displaying and whatever you do on the ground classroom lecture, you try to simulate as best you can in this electronic, virtual, environment. You keep your eye on the chat window for possible questions and respond as you desire. A quick note here on online etiquette, this is not social media, so you must possibly tell the students what appropriate online behavior is and what is not. Somewhere around 50 or 55 min. into your lecture, I usually give a five-minute break where everyone stays online, and we resume after the break.

Once the five-minute period is up I do a quick check to make sure the students can see my screen and hear me. Then I proceed with the second part of the lecture which may take on the same format as the first portion, or there may be a change of pace and we do something a little bit different. Sometimes there is a need to further discuss a previous question and feasible alternative solutions. I will also use the whiteboard as a breakout and elaborate a detailed description of a process or procedure where there were questions. The good thing if you are recording the session, students can playback and review later. I will also use PowerPoint presentations along with my audio narration and annotation using the digital pen in a similar fashion.

As you become more familiar with this environment you might want to try a streaming video presentation. Once again there are certain issues involved with streaming video; copyright, fair use policy, and the ability of your videoconferencing software to deal with streaming video. The streaming video presentations could be your own which you designed or from another source. I have learned through experience to limit streaming video presentations to no more than 10 minutes preferably five to 10 minutes. You must use discretion with the streaming videos as you don't want them to become "edutainment", meaning you are not trying to entertain the students, but you are trying to delve deeper into a lecture concept and/or to reinforce the lecture. A note here about changing pace from one activity to another without causing confusion or chaos. This takes a little practice you must be patient; most videoconferencing software allows you to screen share, but you must open a new share each time you change an activity. I usually have several alternatives that revolve around the same lecture topic, which I use as needed. However, I do provide access to all of them via asynchronous the learning management system (LMS).

I usually close a lecture by telling them what they need to do as far as assignments i.e., need to keep track of, and due dates. I also tell them what the next steps for the topics are or the lecture topic for the next session. Then I asked the entire group if they have any questions about anything

that we covered in the lecture, and I wait observe the Q&A chat window for a brief period to see if anything comes up. After this I close a lecture wish everybody well and tell them the date and time of our next scheduled meeting.

Tips and techniques

The lecture method it usually a one-way communication process. The instructor is the sender and the students are the receivers. One of the downsides of the lecture is it really doesn't develop problem-solving skills. However, you can "break out" online and assigned problems to be done in whatever time frame is appropriate and then report back to the whole group. I usually make myself available 10 minutes before class and 10 minutes after class. I use the chat box chat window for questions and answers during a class which greatly enhances the whole lecture process. I usually give a questionnaire or maybe a survey about the lecture content to get some feedback from the students of what can be improved, and they can voice any concerns.

Discussion and Case Method

The second model is one commonly used in colleges and universities... a discussion and/or case model. There are many options with this model. Some instructors have students read and study a case pertaining to a discipline or topical area prior to a classroom session (on the ground). There are usually a series of questions pertaining to the case which instructors will present during a classroom session. Each question is then thoroughly discussed, and usually several alternatives are given for viable solutions and/or courses of action. Some instructors require students to prepare written answers to case studies prior to an on the ground classroom session for discussion. Whatever the case may be, the new videoconferencing technologies facilitate the discussion and case method.

With the case study method and discussion, I like to use the upper levels of the original Blooms Taxonomy (1956). The upper levels are analysis, synthesis, and evaluation. So, the basic idea at the *analysis* level is to break the information of the case into parts and identify the motives or causes of the embedded problems within the case itself. Subsequently, students make inferences and find sound evidence within the case to support generalizations (supporting direct instruction). At the *synthesis* level they compile the information together and maybe develop a new pattern in the information contained in the case, proposing alternative solutions. With the *evaluation* level students present and defend their opinions making judgments about the information and the validity of their ideas and the quality of their work based on a set of standards or criteria. Listed below is a general outline for the case study method:

- I. Identify the key issues and problems
- II. Analyze and evaluate the key issues or problems
- III. Recommend effective solutions and alternatives/strategies
- IV. Link any literature and/or course readings

Much like the lecture method, you can open your classroom session in much the same way. If you need to take attendance you can easily do that with the online software. If the students already know the case at hand you can proceed to analyze the case. Or, you can present a new case with screen sharing and an audio description by you as the moderator/presenter. Students would take notes as you present the case and then subsequent questions would ensue. My personal method of presenting the case for discussion (online, real-time) is to present the entire case to the group with screen sharing. Then, I like to break the online classroom into small group discussions and case study analysis. I consider a small group of five people or less, I usually limit the groups to 3 to 5 persons per group. The videoconferencing software that allows group breakout rooms will allow you to either automatically assign students to room or randomly assign students to rooms. Or, you can

designate persons into a room one by one if you wish. With the videoconferencing software you can distribute files, documents or questions to each room. Students can prepare written answers with one person as a recorder for the group and then after discussion and collaboration prepare written responses to the discussion questions, group by group. Then a group by group discussion can take place with a spokesperson for each group giving the results of that group (chat or audio). At the end of the session each group would “pass in” they’re prepared answers electronically. Another alternative is to use the chat window for whole group discussion on the case. However, many of the chats serial record (one after the other) and if a substantial number of persons respond at the same time it is sometimes hard to determine who said what. Lastly, you could present to the entire case via screen sharing and entertain questions through the chat window as you present the case. Then you could distribute electronically questions to be answered from the case discussion online. These questions could be turned later. Maybe students could go to the literature and/or course readings and enhance their responses. This is more like the lecture method; however, you must freely entertain questions from the students. From the student end of things, you might be asking yourself why don’t you let them speak through the audio? If you are going to have many discussion sessions online, real-time then I suggest each student has headphones or earbuds. This eliminates much of the background noise which comes in from various locations when using video conferencing software. You also will get echo effects from the participants without headphones or ear buds. You might consider headphones to be a course requirement if you are exclusively using the discussion method totally online. (Note also: when students are assigned into a room by group they can chat and speak within their group only until you bring the entire group back together again electronically.)

My favorite discussion-case method are video cases. The video case is presented by streaming video. There are many out there...YouTube can be used, etc. The problem with video cases real-time online is that your software for video conferencing must allow streaming video for all the users. With real-time videoconferencing software you can present a case and stop and start the video during its presentation asking the students to respond to certain questions that you present or just questions for thought. It is quite a rich environment for student learning and “alive.” I try to limit the streaming video presentations to 10 to 15 minutes. Once again you can distribute questions at the end of this session for written response.

Tips and techniques

Class discussions can help students internalize or retain information. Experts also agree that areas of motivation, communication skills, problem solving, and decision-making are greatly enhanced. This is because there is usually active learning taking place rather than passive learning. Some of the advantages of discussions:

Internalization – discussion offers the opportunity to question and probe until she or he sees a new fact into meaningful context.

Attitude adjustments – sometimes students need to readjust or change his or her value system, discussion permits more time experience for these readjustments.

Learning rates increase – when material is discussed and when the learner talks (chat or audio) about it is usually learned more rapidly and remembered longer.

Motivation – a vibrant (online) discussion often provides motivation and reinforcement learning. I have found that the chat window allows for great discussions, you must monitor the chat however and either change or moderate if the topic goes amiss. Many students that never participate actively in an oral discussion in a self-contained classroom, well participate in the chat window (Rollins, 1987).

Revisiting Direct instruction and Technology Applications

Now, let's examine each of the five elements of direct instruction and give a simple example of each using technology:

- A. Explicit instruction based on lesson plans, often with specific teacher "scripts."

With lesson plans or with a script you plan of what you are going to instruct. Experienced instructors have various methods which they employed to do this. What I will do often is use a PowerPoint presentation as a script and then proceed to give audio and video (Inking) comments throughout the whole presentation.

- B. [Ability grouping](#). Students are grouped based on their rate of progress through the program.

This can be measured (ability grouping) either using academic standards and/or software reporting capacities. Much of the videoconferencing software will allow you to track individual and group progress during a specified time interval.

- C. Emphasis on pace and efficiency of instruction. Lessons are designed to bring students to mastery as quickly as possible.

One of the beauties of software applications for instruction is the repeatability and drill and practice capabilities of it. As the software does not get tired, students can drill practice and repeat lessons repeatedly until a desired mastery level is attained. Online testing will allow these functions with easily modifiable pages. Respondus™ allows instructors various settings to customize quizzes, testing, and exams.

- D. Frequent assessment.

Once again software applications allow for frequent assessment and testing. These can be set up for drill and practice, and/or for testing and exams. Many instructors give some type of assessment after each major module or chapter in a course and/or textbook. Exams can be assessed, graded (whenever the instructor wishes disclosure), averaged and automatically recorded with the software or LMS.

- E. Embedded professional development/coaching. Program developers recommend careful monitoring and coaching (Direct Instruction, Wikipedia, 2018).

This is a given component when using software applications for instruction. The instructor can personalize each students' experience within their course. One straightforward way to do this is to have each student keep digital journal (the "app") which most software learning management systems (LMS) contain. Or depending upon the size of the group that you're instructing, you might have one-on-one videoconferencing coaching sessions with the student. As far as monitoring the learning and instruction learning management system software allows for various methods to assess time on task, time on components of the course content, etc.

More Models

Instructors in many courses require students to give an oral presentation on a topic or problem area to the entire class during the semester. The instructor has a couple of options to do this with online video conferencing software. Over the last several years I have had students present an oral presentation on a topic from the course content. They perform this by using the videoconferencing software (a free version) and I limit them to a five to no more than a 10-minute presentation. I require them to produce a PowerPoint presentation related to the topical area. From that script they narrate and explain the topic to the audience. They can practice and practice until they are satisfied with their presentation. In the absence of time I have asked them to produce this oral presentation with a given due date. They submit this electronically. You have the liberty to have other students peer review at any time they wish. Or, you can view and use some type of evaluation, rubric or what have you to grade each oral presentation. I prefer the saved version rather than the real-time online presentation. However, you could also present oral presentations one by one real-time, online virtually using the videoconferencing software.

Another spinoff from the original model is the use of oral examinations. Using the videoconferencing software, you can also give oral examinations on a topic, discipline, and/or major field of study. These would probably be one-on-one, or you could give an exam where you specifically or randomly choose students to respond to questions that you give orally. Currently I have tried this with only make up exams, but I'm confident in the discipline or specific major field area that require some type of oral and written exams, this could easily be performed using a video conferencing software platform. Also, these responses could be recorded for playback later. Once again, if you record audio or video proper consent from students and the organization might be necessary.

I have taught an applied statistics course for the last several years. The videoconferencing software can assist you in such courses where procedural knowledge is needed, and you need to show by example step-by-step procedures. Many of the mathematics, sciences and other disciplines require instructors to show by example and demonstrate proper procedures for successful problem solving or outcomes. What I do in the applied statistics course: "I show, I tell, and I do" with the videoconferencing software. I use a calculator in this course and there is an emulator which is available for this calculator. So, with screen sharing I can show procedural steps on the calculator to solve given problems or procedural steps leading to the solution. As a plus, if you have many procedures which you commonly teach on a chalkboard or whiteboard, you can record these procedures and save them for future use. The good part is once you do it you have them recorded for future use.

Tentative Conclusions

Whatever you do exceedingly well in an on the ground, face-to-face classroom environment try to simulate in the "virtual, synchronous" environment. This is the best advice I can give for anyone desiring to teach in this modality. You may need some technical support to be able to do this or help tutorials on the software package with whatever videoconferencing software you have available. You must remember that students need to learn how to use the software and how to act and behave in the real-time, virtual environment. Many of the software applications have all types of functions which can be used in online learning management system. I would warn you not to try to employ too many of these functions in one course. Do a few things very well and then as you gain more experience add distinct functions to enhance your instruction. Also, you can deploy online surveys to gather feedback from the students on their impressions of your instruction.

Final Thoughts

Perhaps the entire “online” learning environment and movement is a “disruptive innovation”, where a small, new market over time eventually disrupts the existing market (Christensen, Baumann, Ruggles, & Sadtler, 2006). Historically, going back to England in 1848 with correspondence education through land mail, and then in the 1980s, where 300 BAUD modems were used over a land line telephone system to deliver “distance education”, the mix of education and technology have been evolving over time, i.e., creating new structures for teaching, instruction, and learning.

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