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Transcript

Teaching Critical Thinking to Students: How to Design Courses That Include Applicable Learning Experiences, Outcomes, and Assessments

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Editor's note:

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Hello, and welcome to *Teaching Critical Thinking to Students, How to Design Courses That Include Applicable Learning Experiences, Outcomes, and Assessments*, co-sponsored by Magna Publications and *The Teaching Professor* newsletter. I'm Chris Hill, and I'll be the moderator today. And now, I'm pleased to introduce today's presenter. Dr. Linda Nilson is director emerita of the Office of Teaching Effectiveness and Innovation at Clemson University.

Dr. Nilson's career as a full-time faculty development director spans over 25 years. In this time, she has given hundreds of keynotes, webinars, and live workshops at conferences, colleges, and universities, nationally and internationally. She is the author of *Teaching at Its Best—A Research-Based Resource for College Instructors*—now in its fourth edition—as well as many other articles and books on teaching and learning. Before coming to Clemson University, Linda directed teaching centers at Vanderbilt University and the University of California, Riverside. Welcome, Linda Nilson.

Thank you very much, Chris. Hello to everybody. We have a very large audience, today. So let's get right to it, get to, specifically, what the outcomes are for you, today. And this includes, also, with the next steps. That is, all the homework you're going to have to be doing. Because gosh, we only have an hour together. So here's what you're going to be able to do, to design a discipline-based course that incorporates critical thinking. And this means you can take an existing course and infuse critical thinking into it. You're going to be able to write and organize assessable student learning outcomes that target critical thinking. You're going to be able to assess students' progress in achieving those outcomes and to develop and integrate student learning experiences that advance critical thinking skills. In other words, you're going to be able to teach it.

So let's look at where critical thinking applies in your courses. It's where a claim may be questionable. That is, a claim may or may not be the most valid, the most complete, or the best possible. So what's a claim? Well, it's many, many things. It can be anything from a hypothesis to an inference to a conclusion to a viewpoint to a generalization, as long as it's not a fact or an agreed-upon definition. Oftentimes, you will find definitions that are disputed. Those are fine for critical thinking. But not the definitions that are not disputed at all. And in fact, the definition of critical thinking is one that is disputed. But don't worry about that, at this point.

OK. So why might a claim be questionable this way? Well, there are some reasons there. It's certainly not all the reasons. But oftentimes, the evidence is shaky or unclear. There might be a number of perfectly reasonable conclusions out there, so there might be disagreements or controversy. The source might be suspect. The evaluation process just might not be really clear or determined. And so think about what some of those reasons might be. But right now, what I want you to do is identify one claim in your discipline that you want your students to question and think about critically. So I want you to think about, possibly, some areas of uncertainty or controversy in your discipline that you will be looking at in your course, and you want students to dig into them.

OK. Ah, "That leaders must be extroverts." That's very, very good in leadership. Yes. They don't have to be, at all. "Stem cell research." Yes, a lot of people think it's an absolute miracle

when maybe there's some limitations to it. "All teacher grading is subjective." Thank you for coming up with that. We know it's not. "Sexual orientation, gender identity." Certainly. "Lecture is a necessary evil." Not necessarily. There's a time and a place for every method under the sun. "What qualifies as a historically significant, event or movement?" Absolutely. "Professionalism in teaching. Exams are not?" Well, exams are simply one choice. "Parameters of good teaching." "Good teaching means that all students pass a course." Maybe not.

OK. Let's move along. Now, a lot of people are confused about what critical thinking actually is. And here's why. There are at least seven critical thinking frameworks out there. And what's interesting about them is that they're siloed. They don't cite each other. They don't seem to talk to each other. They're going on in their own little world. And so what you don't have in critical thinking is cumulative improvement in the sub-discipline. So you have Stephen Brookfield, and he focuses on assumptions. I know that I talked about claims, and claims are just about anything. Well, he uses the term assumption that way. You have Diane Halpern. She comes from the viewpoint of cognitive psychology. Paul and Elder—Richard Paul passed away very recently. They set up The Foundation for Critical Thinking. Peter Facione and the Delphi Report—this is the basis of CCTST—is the California Critical Thinking Skills Test, which is probably the leading test out there. And it's also very efficient to give. And it is automatically scored.

Susan Wolcott and Cindy Lynch—they put out steps to more complex, or more critical thinking. And we all know—most of us anyway—know about Bloom's higher-level cognitive operations. And some of us know about William Perry's Stages of Undergraduate Cognitive Development. Now these came out before the term "critical thinking" was truly coined. And so neither one of these frameworks refer to critical thinking, but there are people who contend that they are critical thinking frameworks. And in fact, it's hard to talk about critical thinking without drawing somewhere along the line on Bloom's Levels of Thinking.

So what I'm trying to do here is to simplify the world of critical thinking for you. So I studied all of these and looked for points of overlap among at least several of them. So this is what I came up with. Critical thinking involves interpretation or analysis, and then some kind of evaluation or judgement. You can't get around these. All the frameworks agree on this. There's another thing. Critical thinking is difficult and unnatural. So it certainly takes students time and effort to learn it. So it's not going to happen in a week. It's not going to happen in a semester, even. It's best if you integrate critical thinking into multiple courses, and you get at least some of your colleagues to do it, as well. So you're constantly reinforcing each other.

Why is critical thinking unnatural? Because the way our brains are wired, we try to confirm what we already think we know or believe to be true. So we have what's called "confirmation bias." This comes out of cognitive psychology. So we don't want, really, to hear things that might go against what's already in our head, the way we think of the world. Well, critical thinking is, in part, about looking at our assumptions, looking at our conclusions, looking at our belief systems, and examining them with an eye towards possible revision. So this is difficult. It's not the way our brains are wired.

There's another thing. Critical thinking has not only to do with cognition, with thinking, but also with character and mental health. Now, this is an interesting phenomenon, here. And you'll see the way the different frameworks sort of package this insight. So you have Paul and Elder's "Intellectual Traits," really, of character. So you have traits like intellectual humility, autonomy, integrity—that's character, right? Courage—that's character—perseverance, curiosity, confidence and reason, fair-mindedness. This isn't just about thinking. This is deeper than that.

Now, you might say, well, "confidence and reason, yes, everybody has some sort of confidence and reason." But never forget that reason has competition. Some people put greater confidence in authority, others in tradition. Some people in revelation. So don't believe that reason is the only thing out there. It is challenged by other forms of knowing or other ways of knowing. Now, that's one framework.

Then we have Peter Facione and the Delphi Group. They call them "Dispositions Towards Critical Thinking." And there's a lot of overlap here with Paul and Elder's "Intellectual Traits." For instance, inquisitiveness, the desire to be well-informed. Well, that's curiosity, isn't it? Trust and reasoned inquiry is confidence and reason. Open-mindedness, that's part of fair-mindedness and intellectual autonomy. Flexibility in considering alternatives, that's also fair-mindedness. Honesty with oneself about one's own biases, prejudices, that's intellectual integrity, courage, and humility. Willingness to revise views when warranted, this really is getting into self-regulated learning that we will touch on in a few seconds.

So there are a lot of different, I think, character traits here. Now, my contribution to the literature in critical thinking had to do with pointing out that emotional health is also a component of critical thinking. And what I did was wrote an article on, not only the logical fallacies, but the "Psycho-logical Fallacies," or otherwise known as psychological defense mechanisms, that we are all vulnerable to—for instance, denial. If we are in a state of denial, we don't want to believe certain things are true, obviously. This is going to get in the way of our critical thinking. Projection—if we project, let's say, our way of thinking onto our leadership, that's certainly going to get in the way of our thinking about what our leaders—what our cultural leaders and political leaders—are saying to us, what they're trying to communicate to us. Selective reception and recall—very much putting blinders on and not seeing everything that we should feel.

I see a question out there. "Does fair-mindedness require empathy?" And I would say it does. I would say it does because we have to identify with where other people are coming from. And so when we hear a point of view that's represented out there somewhere, we have to think, "Where did that point of view come from in people's lives?" That's only the fair way to look at these different points of view. And yes, this is a kind of character trait.

Here are some other things about critical thinking we need to keep in mind. Critical thinking requires background knowledge of some kind of subject matter. We have to be able to critically think about something other than critical thinking itself. The critical thinking courses that have been put out as standalone courses do not work very effectively. The students learn critical thinking, and they don't transfer to any subject matter in any courses that they take from then on out. So that's pretty much a failure.

Here's another thing. Critical thinking requires explicit and intentional integration into a course, or students are not going to learn it. And every framework will agree on that point. And in fact, Paul and Elder did research on this. And if you look in the handout—on one of the last pages in the annotated bibliography under Paul and Elder—you will see that one of the papers that's listed there—that's number 598—is a study of exactly how faculty perceive themselves to be teaching critical thinking when they're not. Or at least let's put it this way, students aren't picking up on it because faculty are not teaching it explicitly. It's critically important that you integrate critical thinking into your course explicitly and intentionally, and you tell students you're doing it.

And then, here is another point of overlap. Critical thinking requires that the thinker be self-aware of one's thinking, that the thinker be metacognitive that is, think about one's thinking, and be self-regulating as a learner. And I will show you one of the frameworks, Diane Halpern's dispositions. And most of these dispositions reflect self-regulated learning.

Now the first one, the willingness to give effort to and persist, that is intellectual perseverance. But the next one, conscious planning and follow-through and suppression of impulsive activity, classic self-regulated learning. Same thing with the last one, willingness to self-correct and abandon ineffective strategies. Now, what's self-regulated learning? We know metacognition is thinking about thinking, and that's a component of self-regulated learning. But self-regulated learning also includes an emotional and physical component. So ultimately, self-regulated learning is the conscious planning, monitoring, and evaluation of one's learning. It's talking to one's self while one is learning, and after either the learning task, to see if one has, in fact, accomplished it and met one's goals. So self-regulated learning is very much a part of that self-awareness component.

How do you design critical thinking into a course? The first thing you have to do is to formulate solid, assessable, critical thinking outcomes. What is an outcome? Probably know this, but just want to put this out so we're all on the same page. Outcomes are statements of what students should be able to do by the end of some period of time, or some course unit—day, week, unit, or the end of the course. And we often think of outcomes at the end of the course. But in fact, there are outcomes that are through the course that are somewhere infused into the beginning or the middle of the course.

Now, if you're going to have students being able to do something, that is that students are going to have to perform, right? We're talking about a performance here. You have to be able to observe it through one sense or another. Maybe you can watch it. Maybe you can hear it. Maybe you can read it. If you're in the culinary arts, you can taste it and smell it. So you have to be able to observe it. Otherwise, how could you assess it? How could you set standards for something that you can't sense? So what you have to use are higher level active verbs.

Now, active verbs like analyze, classify, critique, evaluate, infer, verify, test . . . these are things that you can have students do. And they can do it in writing, they can do it visually, they can say how they are evaluating a certain phenomenon. What you have to avoid are internal states of mind like "know." Well, we all think, "Well, we want our students to *know* certain things." We want them, possibly, to feel certain things, to understand, appreciate, these sorts of things. Well,

how do you know they know? In other words, how do you want them to manifest that knowledge? That's a critical question there.

Do you want them to be able to recognize definitions, let's say, on a multiple-choice test, or do you want them to be able to reproduce these definitions? Or really, in the final analysis, do you want them to be able to apply something, use something to solve a problem? Understand. Well, what do you mean by "understand?" Do you want them to be able to explain a certain phenomenon, a certain process, a certain procedure? What are you looking for? How will you know whether they understand or not?

Now, after you write your outcomes—and you're going to be seeing examples of critical thinking outcomes in just a few minutes—you're going to want to sequence those outcomes. Because, really, in the final analysis, we are trying to portray learning as a process. This is what course design is really all about. It's the learning process we are setting out for our students. So there are some outcomes that students have to be able to achieve right away, very early in the course, or they're never going to be able to achieve the outcomes that you have set out for them later on in the course, in the middle of the course, at the end of the course. Outcomes will tend to build on each other.

So let's look at some foundational outcomes. These are outcomes for early, early in the course—the basic abilities—as in the ability to define what critical thinking is and what those skills are, those skills that you're going to be looking at in your course. This might include the ability to identify logical fallacies, or to identify parts of an argument, or to abandon misconceptions. Students will come in with misconceptions about what critical thinking is like, "Well, it's negative thinking," or "It's anti- the way things are. It's anti-establishment, it's critical," or "Critical thinking is reproducing expert opinion." No, that's not what critical thinking is, either.

So you have to look at what students might be thinking. Ask them what they think critical thinking is on the first day. They'll be happy to tell you. But the problem is, if you don't weed out those misconceptions quickly, your good knowledge is not going to hook on to their invalid knowledge very well. And they're going to be making mistakes in the whole process of critical thinking.

Let's look at mediating outcomes. These are outcomes that are probably building on your foundational outcomes, but these outcomes that you might be setting up for. Let's say if you've got a semester—pretty well, let's say week two to week three through the grand middle of the semester, but before the end. So you're looking here at seeing students progressing through a developmental model. And I'm going to look at those in a second. For instance, William Perry's, or Wolcott's, or Paul and Elder's. Or your students being able to interpret, analyze, and evaluate progressively more advanced or more challenging claims or cases or arguments.

So here you might be looking at, too, students' progress through, let's say, the scientific method, or their progress through being able to do a research project. So you set it up in steps. And that would definitely be a way of designing critical thinking into your course. Now, there are some developmental models out there. Some of you might be familiar with William Perry's, and who

used to talk about students coming into your class as being dualistic thinkers, black and white thinkers. Essentially, your discipline is a list of facts and a list of undisputed definitions. And that's what knowledge is all about.

No uncertainty.

Now, when students come to understand that, "Uh-oh. You folks," (that's us) "don't know everything." Well, that leads them into another stage, multiplicity. But in this stage, the uncertainty is strictly temporary. Eventually, we'll know everything. OK. Well, that's not really getting it either. When students come to understand that uncertainty is inherent in knowledge, in any kind of body of knowledge, because the body of knowledge is human created. What our knowledge is, really, is it's a collection—an organized collection—of principles and concepts, like a grid, that we put over a messy reality. So we can do things with it. So we can find patterns in it. To be mere pattern identification animals, as are other animals. But we are, at a very sophisticated level.

So when then, students start to understand that and they say, "Uh-oh. OK." Then, they get into relativism, and this is not good news for them. It's OK to the extent that they realize that some models, some grids, are better than others. But if they just start thinking one grid is as good as the next, they are not going in the right direction. They need to understand that there are standards that we use to evaluate the grids. Some have better predictions than others. Some make more sense than others. Some represent reality better than others. So once they get into that, they get into the fourth stage, tentative commitment.

Wolcott's model is a very good model, in that it takes students through five different stages, starting with the confused fact finder—which is very much like the dualistic thinking that Perry talked about. And these people just are looking for the correct answer. The biased jumper is the next stage. And that's similar to multiplicity. From the biased jumper, students progress into the perpetual analyzer, which is the relativistic sort of thinking. Then, to the pragmatic performer, where students are really realizing that they are starting to prioritize. And they understand that there are different standards. And so they're choosing, they're making the commitment to the best grid, the best perspective out there.

But there's also another stage called the strategic revisioner. This person is extremely tentative about commitments to truth and is always seeking to essentially disprove one's best thinking at the moment—always looking for something better. And then finally, there's Paul the Elder's model. And you can find these models in the bibliography that I include in your supplemental materials. Here, we have six different stages of thinking. And these really are representative of the degree of awareness of one's thinking. So here, we're getting heavily into metacognition and one's ability to improve one's awareness, to see and correct those problems—very, very metacognitive, very much in the self-regulated learning.

So I invite you to check out those stages, if they would fit with your particular course, your particular subject matter. So those are the mediating outcomes. And then, finally, we have the ultimate outcomes that you're aiming for students to be able to achieve by the end of the course.

So this might be your target stage of development, if you are using a developmental model. It might be, let's say, if you are looking at students progressing through the research process, the ultimate outcome that you have is for students to be able to present their results coherently and articulate their limitations. OK. Or, you might identify what the most challenging or advanced claim, or case, or argument might be, that you want students to be able to achieve, that you believe that they can achieve. And so their ability to interpret, analyze, and evaluate that is what you are seeking your students to be able to achieve at the end of your course.

Ultimately, what you want to do is to map out an outcome's map of your students' learning process—of your student learning outcomes—in a flowchart fashion. And by the way, students would be very interested in seeing this. So let's look at some discipline-relevant critical thinking skills, or outcomes. They're the same thing. Outcomes are skills. And here you want to go to your handout packet. And you want to go through the first three pages, the first three pages of actual text, where you will see that I have grouped the outcomes according to disciplinary clusters.

The first cluster has to do with the basic and applied sciences. So what I'm saying is, critical thinking is not necessarily the same across all disciplines, certainly not the way critical thinking is operationalized. The outcomes need to be relevant to your particular discipline. So here we have the question which fit your prospective critical thinking course. So some of these, even if you're teaching a science, some might fit your course. Some might not fit your course. And you might have to adjust them to fit your particular discipline. And there's space for you to add more. The next disciplinary cluster is for the technical, problem-solving fields, that you might want to add to those in the sciences.

The next group are in the rhetorical fields, the humanities, and there are some areas of the social sciences. There's a group suggested there. But certainly, it's not meant to be exhaustive. And the last group on page three is for the arts, and very broadly defined "art." But you will see that, yes, some of these would fit your course if you're dealing with an applied art. Some, if you're dealing with more the history of the art. So keep this in mind. And again, add all you would like. So whatever cluster is reasonable for you, I want you to look at that group. And by the way, the social sciences, when they are being scientific, they belong to that first group, to the natural and physical sciences. Because they are really aiming for the same skills.

So what I want you to do, take out your disciplinary cluster, and eventually, as homework, you're going to have to write more of these as necessary. And then, ultimately, sequence them in the order in which you want your students to achieve them, because they can't achieve all of them all at once. So this is something for you to put into the chat box when you are ready. Put your discipline and one, just one, of your critical thinking outcomes. And they can be one of these suggested lists, if you'd like to use those. So just take a few moments, and just type out some that make sense to you, some that would make sense in one of your courses—particularly the one that you'd like to add critical thinking to.

Ah, here's one from a fine art, "To identify alternative, artistic interpretations." Excellent. Speech: "Communicate complex ideas effectively." So a rhetorical one. And with speech,

effectively means possibly for persuasion, or information, whatever the purpose of the speech is. “Summarize, analyze, and communicate complex ideas effectively.” Yes. Ah, “infectious diseases.” “To make a differential diagnosis.” Excellent. Excellent. That’s exactly what you want your students to be able to do at some point in the course.

“Identify and evaluate implications.” Yes, this is in dentistry. OK. Certainly history, “Identify and evaluate implications.” OK, yes. “Identify implications of a universal health system.” Yes. Curriculum design. Clinical pathology, “Identify new information that might support or contradict a hypothesis.” These are all excellent critical thinking skills, critical thinking outcomes. “Alternative treatment approaches, and pick out the optimum one.” Yes, given the needs of the patient. “Capital punishment.” Ooh. “Is it a means to reduce crime, or not effective at all?” And that would take research.

OK. All kinds of great ideas, here. This is wonderful. This is absolutely wonderful. So keep thinking along these lines. Keep adding to the list. And by the way, on page four, and we will return to this issue. I just want you to see that there are examples of questions or tasks to give students practice in critical thinking skills. And these are just a few. These are just a few. So these could make assignments. They could make the backbone of a major assignment. They could be discussion questions. They could be all kinds of things.

OK. So let’s move along. Let’s look at assessments. Assessments should mirror outcomes. And what this means is that if you want your students to be able to do XYZ, you have them do XYZ, and assess how well they can do them. It’s really simple.

So how do you assess critical thinking skills? There are two different sorts of tools that you use. And the first one, a stimulus-based, multiple choice, or multiple true/false item or set of items. So what do I mean by a “stimulus”? Well, this can be a text, a graphic, an audio file, a video. And I just give examples here of a short case, a graph, a map, a spreadsheet, a schematic, just about anything. But you’re giving them something out of your discipline that you’ve already given students experience in interpreting, or analyzing, or evaluating. So this shouldn’t be something new.

So what is a stimulus-based item? It’s a series, not just one, but a series of multiple choice or multiple true/false items—I’ll explain what those are in a minute—or both, around a new—for the student—realistic, stimulus that students must interpret or analyze correctly to answer the items accurately.

So let’s look at multiple true/false, and you will see an example in a moment. There’s one in your handout packet. What does it look like if you’re not already familiar with these? Each option below the stem is a true/false item. So at first, it looks like a multiple choice, but really, every option is a true/false item. Students have to make a choice at each juncture. There can be no process of elimination, or anything like that going on. It is more flexible, more efficient, and more reliable than multiple choice. Because reliability depends on the number of decision points that you’re giving your students to make.

Well, with a multiple true/false item, where you might have had a multiple-choice item with, say, five options, but only one of them is correct and the students know that. Here you have five options, but there's a decision point at each one, so it's really like five items. These are much easier and quicker to develop than good multiple choice items. There's, again, more challenge. It's just that the stem must be clear, but that's not really difficult to do at all.

So what I want you to do is just look to see an example of this sort of thing that's in the supplemental materials on page 5, right after that list of questions. These are graphs from a government agency. And it says, "The following item is multiple true/false. To the left of each statement, put a 'T' for true, 'F' for false." And so the question is—and this is the stem that you can use over and over again—"which of the following statements is or are valid conclusions you can draw from the graph above?" So it's a very, very clear stem. And it happens to be that two of these are true, and the rest of them are false. So the stimulus, you can see graphs.

Now, this would make a lot of sense, let's say, in, possibly, in a demography course, in an economics course. There might be other courses, as well, that this would make sense in. Presumably, students have seen these graphs in the past, otherwise it's not fair to spring on them something new on a test.

So we looked at the stimulus-based objective items. There are also the student-generated product, or student-created, student-constructed work. And as you can see, these are all sorts of things. Anything from a paper to a project to an artistic work to a debriefing of a role play or a case or what have you. Plus, something you need to include when you have students writing something, or otherwise creating something, multimedia presentations.

This is what gets students to be metacognitive, to be self-regulated learners. You want to give them what you might call a meta-assignment, or assignment wrapper, which includes a reflection on how the students did what they were doing. So if you're asking students, let's say, to go through a research process, you have them do a little assignment on the side where they talk about the steps that they went through to do this research project. So you have them being aware of what they are doing and recording what they are doing.

OK there's a question here. "What is your response to those who believe that student-generated work is the only authentic type of assessment?" I don't necessarily agree, because when you give students a stimulus-based response, they are interpreting stimuli that they're likely to encounter in the real world, in their occupations, but just, also, in everyday life. And if they don't know how to interpret a table, or a case—the description of situations—accurately, they're going to have a lot of trouble in life. So that's my response. I do not agree with that.

OK. A few words about the prompt for a student-generated product. You should, of course, ask critical thinking questions and tasks that match your targeted critical thinking skills. So when you're thinking about what to ask, what this prompt should be, go right back to your outcomes. Always go back to your outcomes. You want to make the question or task focused and well-defined. You can even suggest types of thinking and types of content to use. It's OK to give hints, OK to give hints.

It's best to place the question or task in a realistic situation or problem. This is what makes this sort of product prompt authentic. And of course, you want to assess with some sort of rubric. And by the way, there are URLs with access to various critical thinking rubrics. If you need to look at some critical thinking rubrics, you can look at them there. Now, so what do I mean by situating the question or task in a problem? Well, instead of asking students to just recount patterns of human behavior after natural disasters—that the research assignment—have students manage a disaster recovery effort. So you want to describe a disaster and put students in the position of responsibility for managing the disaster recovery.

Instead of asking students to solve textbook type engineering problems, you want to give them a real engineering problem to solve, like planning a bridge over, let's say, a river rapid. So this gets them to think that, yes, "What I have been learning is truly useful." And this is what you ultimately want students to be able to do, anyway. You want to be able to transfer what they're learning to apply to a real situation. But always, before you assess formally—that is, for a grade on some form of test or in some form of major assignment—you want to assess students informally. That is, for low stakes or no stakes, just to give them practice in performing your outcomes—students need practice—with some form of feedback. It can come from you. It can come from other students. It can come from a computer program. It may come from experts or colleagues of yours that you have in some sort of online discussion board, or that you have them coming into the class to hear student presentations.

But they need feedback. Otherwise, students can do the same thing over and over again, incorrectly. They need to have that help in improving. And of course, you get feedback for yourself on their particular progress in learning, which brings us to teaching critical thinking. Here are some teaching guidelines for when you get to teaching it, when you are designing your course, your method in your course. You want to ask students critical thinking questions and assign critical thinking tasks that match your targeted skills and content. And you want to make sure that students get feedback from you or each other on their responses.

Now, I showed you on page four, there is a list of such questions, or tasks, to start you out. But ultimately, you're going to have to develop your own, because certain cases, you might want to put these questions or tasks in assignments. Other times, you're going to want to put them in class for discussion. Other times, you might want to make them short writing assignments. But some form of feedback is absolutely essential.

And for practice, there have been certain methods that have been identified that are more effective than others, especially for giving students practice in applying critical thinking skills, or transferring them—far transferring them—to something that is authentic. Class discussion is a meat and potatoes method for critical thinking. So you want to give students questions about cases, about some sort of problems that you're giving them to solve, about some sort of argument.

Another method that is truly basic, truly important, is having to do with debates and structured controversy. Debates are very good, so is structured controversy. Structured controversy is a debate that goes on in a small group, but particularly, when students argue against the side they

agree with. That might be the quickest way to get students to think critically, is when they have to look at the other side. Inquiry-guided activities, another way to give students practice. As in, giving students a bunch of data, and having them make sense out of it. Or, to figure out how to solve problems on their own. These inquiry-guided activities make excellent lab activities where the students are not just following some sort of cookbook procedure. And you're having them figure out how to get to the results on their own.

Journaling and writing-to-learn exercises—if you are asking students to answer questions that come from a critical thinking list, or that reflect your critical thinking outcomes. Worksheets, same thing. With worksheets and thinking, like in chemistry, there are what you call POGIL exercises. This is Process Oriented Guided Inquiry Learning—POGIL. And so, what you're doing is you're having students figuring out things on their own. But they have worksheets for the small groups to figure out on their own.

Simulations and role plays, drafts of projects, presentations, papers, that are critically thinking oriented, that demand critical thinking. And Stephen Brookfield also has some critical thinking exercises that you might be able to use. A lot of them are in-class activities that tend to be particularly appropriate for smaller classes, or for smaller groups. So keep those in mind. They are out there among his workshop materials.

So here are some mistakes to avoid. Do not ask lower-level questions and tasks, like rephrasing, regurgitations. Don't ask those sorts of questions and expect to develop students' critical thinking skills. You must ask them higher-level questions. Now, there's a time and a place for recognition and reproducing and memorization. There really is a time and a place for these cognitive operations, but critical thinking isn't one of them. Here's another mistake that people make. They give students claims that aren't questionable. It's critical that those claims are questionable.

Faculty will sometimes give students insufficient wait time. We have to stop expecting instant answers. Students need time to think, particularly with critical thinking questions. They need time. Give them wait time. If you throw out a question for discussion, give them at least 10 seconds, have them jot down some thoughts before they answer. Have them work in small groups to come up with an answer. And those higher-level questions tend to be higher risk, as well. So keep this in mind. Give students time. Give them help, the opportunity to get help from each other.

And not giving students feedback.

Again, in a discussion, you hear an answer. You don't have to give the judgment on that answer. You could toss it out to the rest of the class and say, "OK, what do you think of Joseph's answer? What do you think of it?" And just let other students comment on it. And it could be a lovely answer. But you want students to be able to come to that conclusion on their own.

So here's a little demonstration. I want you to answer a question here. This is in quotes. I asked you to do this before. "What is a claim in your discipline that you want your students to question

and think critically about?” A little task you had before. So this is a question about that task. Is this a critical thinking question or task? And so is it, “No, it wasn’t for anybody,” “Yes, it was for those who thought of a new one,” and “Yes, it was for everyone in this seminar.” This is interesting. And by the way, this isn’t an easy one. This is not an easy one.

And this was what I had in mind. For those who thought of a new one: yes, they were engaging in critical thinking. For those who were saying, “OK, what are the things that I already do in the course,” this was a recall question. So if you thought of a new claim in your discipline, a claim that you hadn’t really asked your students to think critically about before: Yes, it was a critical thinking question.

OK, one more. I want to give you an example of a good critical thinking prompt. Now, this is something that would be a good critical thinking prompt for you right now. So this would be if I was giving you a homework assignment aside from working on your course. “Evaluate these two quotations that interpret education differently. Which do you think is more valid and why?” “The result of the educative process is capacity for further education,” or “Colleges are places where pebbles are polished and diamonds are dimmed.” Now, these are not necessarily opposites, but they are very different ways of looking at education, aren’t they?

So this would be a critical thinking question, a critical thinking assignment, for you, if I was giving you this sort of homework. And somebody says, “I think it’s really a combination of both.” OK, argue that. Right? It would take critical thinking on your part to do that.

I have included a number of teaching resources for you. They are in your packet. You can find them in your packet—some of them, anyway—certainly, access to them, where you can find them. And another thing in your packet that I want to point out to you—and this is in your supplemental materials. It’s right before the bibliography. And what it is is a list of questions or tasks you could give your students on how they are doing the task, how they came to their conclusions, how they approached the task. So this is an assignment wrapper, or meta-assignment.

So the first one is, “How did you arrive at your response or solution?” This would be something that you might want to ask students repeatedly in a discussion. “Well, how did you come up with that answer?” There are other ones. “How did you define the task or problem?” If you’re giving students a task or a problem, if it’s not clear what it is, as with a case. Right? “What’s the problem?” “Whose problem is it?” “How did you decide which principles and concepts to apply?” “How did you develop alternative approaches?” “How did you narrow down these alternative approaches?” “What goals and strategies will guide your revision?”—having them do a revision. So these are just examples of the kinds of reflective meta-assignments that you might give to your students.

So these are the next steps for you. Look at those teaching resources. Finish writing your critical thinking related student-learning outcomes, and adjusting them—if you’re taking some of them off the list. Decide on their sequencing. Then, you might as well write assessments, because your assessments ought to be reflecting these outcomes. Finish drafting these questions and tasks that

will provide students with practice in the outcomes. So there you have it. Those are all the steps to infusing critical thinking into one of your courses.

Well, thank you, Linda Nilson, for a really stimulating presentation, today, and a great discussion with our group. Complete information about our upcoming seminars is available at www.magnapubs.com. Thanks, again, for joining us, and have a great day.

Your opinion matters to us. Please fill out our survey at:

<https://www.surveymonkey.com/r/111516>

Adobe Chat Transcript

Tarrant County College 3: Tarrant County College (3) SE Campus here.

Greg Waddell: Hello everyone.

Patricia Ackerman: Kansas State University here.

ATSU-MO: ATSU-MO campus is here!

Catawba Valley Community College: Hello from Hickory, NC!

Helen Mayer: Michigan State University College of Veterinary Medicine.

Baldwin Wallace University: Baldwin Wallace University is here too.

Viola Olsen: Hello from Southern Oregon. Vi Olsen is here.

ASU Mary Lou Fulton Teachers College: Hello from Arizona State University.

TCCnw: Tarrant County College Northwest Campus is here.

Western University - TSC: Western University in Ontario, Canada is here.

David Woodard: Hello from Saint Paul, Minnesota.

USF College of Nursing: USF College of Nursing is here.

Tarrant County College 5: Hello from Tarrant County College–Trinity River.

Ella Abela: Ella Abela from Central Oklahoma is here.

Sandhills Community College: Sandhills Community College in Pinehurst, NC is here.

NMHU Center for Teaching Excellence: Hello All from New Mexico Highlands University (Las Vegas, New Mexico).

Nathan Cox: Hi from Anderson University, SC.

Lakeland College: Hi from Lakeland College, Alberta, Canada.

Deborah Dunn: Hi from Kwantlen Polytechnic University, Langley, British Columbia, Canada!

ATSU Saguaro Confrm: Hello from ATSU (Mesa).

Thomas P. Werner: Hello from the University of St. Augustine in Austin, TX.

Unitec 2: Hello all, regards from Unitec, Tegucigalpa (Honduras).

Erica Odendaal: Hi there. Erica from University of the Free State, South Africa!

kayla brownlow: Hello from Georgia Military College in Milledgeville, Georgia.

Jo Mucci: Hello all! Jo from Middlesex Community College in Massachusetts.

Lynn: Greetings! Dr. Lynn Miller from Phx AZ. I teach at ASU, and also provide online prof dev courses for professional athletes and coaches. <http://careerinsportsda.com/>.

Sask Polytech: Hello from Sask Polytech, Saskatoon, SK Canada.

Scott Johnson: Scott from Alberta, retired.

Grenfell Campus: More Canadians checking in...

Grenfell Campus: Grenfell Campus, Newfoundland.

Greg Waddell: Field of Leadership: Leaders must be extroverts.

Nathan Cox: "Art is of significant value to our society."

Erica Odendaal: Assessment.

Tarrant County College 3: One cannot "cannot" communicate.

kayla brownlow: PSY: From where do gender stereotypes originate?

NDCL: Stem cell research.

Albert Johnson: Fostering respect for diversity.

Brianne: Quality Assurance in laboratory analysis.

Catawba Valley Community College: Should student attendance be mandatory in class?

Patricia Ackerman: All teacher grading is subjective.

Baldwin Wallace University: Effects of climate change.

Leslie: The best type of evidence based treatment approach to use.

Catawba Valley Community College: Sexual Orientation/ Gender Identity.

DMU: Lecture is a necessary evil.

kayla brownlow: HIS: What qualifies as a historically significant event or movement?

ASU Mary Lou Fulton Teachers College: What does professionalism look like in today's classroom?

Erica Odendaal: Exams or not?

Thomas P. Werner: The parameters of good teaching—good teaching means that all students pass a course.

NDCL: Common good/individual needs.

Unitec 2: What is teaching excellence?

Catawba Valley Community College: Does lack of collaboration between framework designers show lack of CT?

Tarrant County College 3: The CCTST is one test that Tarrant County College uses for its QEP assessment.

Erica Odendaal: What is the best tool for marking performance-based assessment?

Dr. Tino: how do we assess and evaluate informative claims as far as content and sources are concerned?

Greg Waddell: This is why the “smart” people miscalculated the election.

Deborah Dunn: What do you mean by mental health?

Lynn: Greg is right about that.

Albert Johnson: Does Fairmindedness require empathy?

Dr. Tino: The people who conducted the polls were more biased and were not good critical thinkers.

Gateway Seminary: Slides?

Scott Johnson: Polls as wishful projection?

kayla brownlow: Can you still have a course that familiarizes students with these things so that they can then apply these to the content knowledge that comes in the general education program? Is this advisable?

Greg Waddell: Kayla: I hope so ... I'm teaching such a course in the spring.

Patricia Ackerman: I have taught a stand-alone course for 18 years. I have to bring in content relevant for college students to process.

Dr. Tino: Students can very familiarize themselves or identify with critical thinking when you show them how it applies to their personal life which it does up to a certain extent. I teach a course about critical thinking and once you relate it to their personal experience then they clearly understand the concept.

kayla brownlow: Dr. Tino, agreed. When students can internalize something and apply it, the outcomes and probability for success are better.

Erica Odendaal: Thank you Dr. Tino! More tips?

Scott Johnson: Developing a way to measure the world in a reliable manner seems vital. Not to be made of fool of by your own mind.

Greg Waddell: How about: Be able to recognize the type of logical fallacy that is being committed in an argument? I think that would be a good outcome.

Dr. Tino: if a student decides to miss a class, and the teacher gives a drop quiz, then the student misjudged his absence and did not really think critically about whether he should have attended

or not. or if a person decides to drive at a very high speed and then crashes, this is a bad critical thinking mistake. So the point here for the students is to think very carefully ahead of time what the end result of their action is.

Patricia Ackerman: It is about considering possibilities.

Greg Waddell: So thinking about future consequences of today's actions.

Erica Odendaal: Thanks!

kayla brownlow: Metacognition is so vital to this. If a student cannot reflect on the thinking he or she undertakes, challenges to that way of thinking will never really work. I love the work of Dr. Sandra Macquire in focusing on metacognition.

Greg Waddell: Love that definition.

Dr. Tino: Even in their way of writing students should be able to distinguish between semantical claims and syntactical claims which play a very big role in critical thinking and clear writing.

This would definitely apply to the way they answer their exam questions. This a student can relate to.

Scott Johnson: How about metacognition being able to solve a problem in the world rather than simply to resolve a problem in your own mind?

Thomas P. Werner: The ability to reflect is key here . . . I find that I must take the time to teach my students how to reflect; and how to differentiate reflection from reporting.

Erica Odendaal: Reflection, yes!

Dr. Tino: I agree with Thomas. it is important to reflect because reflection unlike reporting is deeper and might not be subject to changes or influences or bias or prejudice. it is a much deeper exercise of the mind.

Thomas P. Werner: Well-stated Dr. Tino.

Thomas P. Werner: Thanks.

Nathan Cox: Fine Art—Identify alternative artistic interpretations.

Tarrant County College 3: Speech—Communicate complex ideas effectively.

Patricia Ackerman: Summarize, analyze, and communicate complex ideas effectively.

ATSU-MO: Discipline: Infectious Diseases Outcome: Make a differential diagnosis.

Unitec 2: Finance: Interpret the financial position of a company.

LECOM: Identify and evaluate implications—dentistry.

Thomas P. Werner: Health Sciences—Identify the implications of a universal health system.

kayla brownlow: History: Identify and evaluate implications.

NMHU Center for Teaching Excellence: identify the use of satire in a film and be able to explain how it's being used.

Grenfell Campus: Evaluate hypotheses.

Nathan Cox: Fine Art—Create a respectable piece of art. ...? (Defining “respectable” would be a CT outcome in and of itself.”

Greg Waddell: Cultural Anthropology: Given an example of strange behavior from another culture, identify the function behind the behavior.

Erica Odendaal: Curriculum design and development—guiding writers to develop learning material. Outcome: Design an assessment for this activity.

Brianne: (sciences) Clinical Pathology—Identify new information that might support or contradict a hypothesis.

Lynn: Coaching staff—Assess alternative solutions and implement the optimal one for player development.

Leslie: SLP—Assess alternate treatment approaches and implement the optimum one per specific needs of a patient.

Dr. Tino: Capital punishment: Is it a means to reduce crimes or not effective whatsoever???

kayla brownlow: Psychology: Explain the limitations of correlational data.

ATSU-MO: Identify 5 different diagnoses based on your patient's signs and symptoms.

Ella Abela: Ella Abela: Nursing: Assess alternative solutions and implement the optimal one(s).

Albert Johnson: Social Work: Defend how differences in race/ethnicity, age, gender and sexual orientation enrich the learning experiences of our global society.

Dr. Tino: Humanities: Is religion subject to critical thinking debates?

Tarrant County College 3: What do you suggest for students who may be resistant to critical thinking because of personal/religious belief systems?

Scott Johnson: For problem solving, being able identify reflections as biases, well developed assumptions or just something agreeable.

Greg Waddell: Can you show us an example?

LECOM: If students are not given feedback on their assessments, can critical thinking skills be learned

DMU: Feedback is a critical aspect of developing critical thinking skills. However, that doesn't mean it *can't* happen without it. Comes down to the characteristics of the students and their ability to be reflective. That “expert” notion is important.

Sask Polytech: References for writing these types of t/f questions (don't see on the supplemental material).

Tarrant County College 3: What is your response to those who believe that “student-generated” work is the only authentic type of assessment?

Dr. Tino: it is very important here to understand the ability of students to really think critically is limited because of age and relative youth. critical thinking is a process that takes a long time and entails experience, reading, research, and analysis from things they encounter in everyday life. So at this age, students should be introduced to critical thinking without us believing that they can delve really deep into it.

kayla brownlow: This is where modeling comes in as a teaching method. Examples: provide students with a graded paper with the student's name redacted. That way, students can see how to properly evaluate a paper or work from a critical standpoint. That, in my opinion, is a technique that can be used to start the ball rolling.

Karen: There's nothing in the packet on feedback—that word isn't in the packet.

Scott Johnson: Responsibility is an important part of developing CT. Realization that the problem matters and your resolution has consequences.

NMHU Center for Teaching Excellence: She mentioned links to rubrics that can be used

Greg Waddell: We recently had a class perform a trial of two opposing philosophical perspectives. This was done in a campus-wide meeting.

Dr. Tino: What were the opposing philosophical perspectives and what was the result?

Greg Waddell: It was free will versus determinism.

Greg Waddell: It was great ... not only did the students learn but we all got to enjoy the trial. The audience served as the Jury.

ATSU-MO: Nilson Quote: “Classroom discussion is the meat & potatoes of teaching critical thinking.” Alternatives for large groups??

Dr. Tino: Greg, was the audience made up of real good critical thinkers?

DMU: @ATSU Why does a large group prevent discussion?

Greg Waddell: Well it was mixed ... each group had some great thinking and some poor ones.

NMHU Center for Teaching Excellence: Large group solutions—tweetdeck, or group and share out summary of each group, or take online into a discussion board.

Dr. Tino: Does the end justify the means as Machiavelli claimed?

Greg Waddell: I thought of the question as a simple fact question.

Dr. Tino: I think it is really a combination of both.

Greg Waddell: It is talking about validity and you can't do that with metaphoric language like that.

Greg Waddell: Referring to the second statement.

Scott Johnson: Dewey indicates a preference for continued growth.

Dr. Tino: I believe it is a combination of both because there is a lot of differences between issues developed or discussed at ivy league universities as opposed to any southern baptist university or a west coast university such as berkely or stanford. makes me believe it is a combination of both depending on where you are.

Catawba Valley Community College: Thank You.

Tarrant County College 3: Thank you.

Grenfell Campus: Thanks!

Deborah Dunn: Merci!

Dr. Tino: Thank you.

Erica Odendaal: Thank you!

Baldwin Wallace University: Thank you.

Scott Johnson: Students need to function as independent people regardless of their job or location.