MODULE TWO
Transcribed 05/04/05

Planning for Outcomes

Ruth: We come up with maps which actually map how courses are connected so it's no longer just a litany of courses that are in a catalogue you can choose from, but rather is a pathway. And so that if I'm teaching a specific course, I can assume they've had other kinds of courses that can feed into mine, I know what are the results that other instructors expect out of my course. I think it's really important to think of ourself as part of a more complex system.

Woman: I wonder if it's like a lot of the other schools where we have to remind them that they've actually done it.

Man: Yeah, and I think the reminder, I mean, just like the measuring with the plenimeters, and I'd say, when they'd say, "We don't know how to use this," and I said, "Well, you should because you did it in two labs in Kate's class and one lab in Joan's class.

Phil: Curriculum planning gains clarity when faculty members understand how their courses contribute to the departmental program outcomes.

Woman: How to take all the terminology and use it.

Man: Yeah.

Woman: Right.

Woman: Discussing problems and trying to overlay skills they're learning in one class into another class is one of the things we've actually been working on heavily in the last couple years.

Man: It… I think it's useful to let them know that, or to remind them that this is the same thing that you did in intro. This is the same thing.

Woman: Right.

Man: We said, what are the key skills that we want students to get out of the whole curriculum? And by mapping that out, we could say in this course that's taught by an adjunct instructor, we want to make sure these concepts are introduced, these concepts are practiced, these concepts are applied.

Woman: What we need to do is be specific in intro that we're going to start with several model articles that we want… everybody reads, the whole idea of everybody reads the same two or three articles, and so we can select those based on what terminology or emphasis we want them to have.

None of us feels like we're doing it by ourselves. Because we communicate so frequently, we can take that communication into our classroom and basically support our student learning by the interface and the inner workings that the faculty have together.

Later on in this class, probably the second to the last week, we're going to integrate GPS with aerial photos and maps.

I start with what are the outcomes that I expect the students to demonstrate at the end of the class. I have to know where I want to end up before I can start.

So you'll be out in the field and we'll see how well the GPS unit works.

The class I teach is aerial photo interpretation, and all students in the natural resources program take it. In this class, I'm reinforcing skills and knowledge they got in their first year, and they'll build on that next term and the final term when they actually are expected to use aerial photos just as they would use a pencil.

So this morning, you used GPS with Wally?

Students: Yes.

Woman: Cool.

Man: The satellite is sending a signal down to us telling us where the satellite is. The GPS interprets that signal and says, okay, if that satellite's there, that satellite's right here, the other one's over here and I got one behind me, then it's triangulating my location.

The course is called mammal biology and techniques. In today's lab, it was to introduce them to techniques for field data collection.

You know, what's amazing is there're somewhere between five and 20 satellites overhead right now, and those are just the ones that are sending location signals.
My interaction with the other members of the team here is really enhanced by that whole process of mapping the curriculum. I know what material's been covered in Kate's class in aerial photography. So when they tell me they don't know how to measure area, I can remind them that they've measured it in aerial photography.
And what is the latitude?

Student: 45.

Man: What is the fundamental knowledge that you want the students to get, and design the course around that knowledge, and then realize that you want to take them beyond them.

Student: Do I got it set up right?

Man: Yeah, right over there?

Woman: In the first class, we introduce the students to basic field skills—how to use a map, how to use a compass, navigate through the forest, how to take some elementary measurements of trees, how tall are they, how, uh, what's the diameter of the tree?
So you have the stereoscopes over there. You also have a contour map here the you can use, but that's one of the things we have to do before we leave, is assign strips to everyone, so I want you think about…
This class prepares them for jobs where they might be inventorying the forest to characterize the forest, or inventory the forest for appraisal: what's the value of the wood on the land.

Man: Downhill's actually kind of like this, so we're going to probably want to walk it that way so we get the variabilities, because if we go this way, we're going to be walking the slope.

Woman: So what we need to think about doing before we leave for the field is to get everything set up. Remember, I like complete data sheets and then I also want the crew chiefs to make sure you have all the equipment that you need, and that it's working.
I try to build upon or reinforce the skills that they've learned in their first class, and then add to them. So we add to them both in the techniques that they learn and also in the culture of field work. They're going to be expected to know how to do certain things in terms of just getting around. Can you arrive at the field site? You know, do you get where you're supposed to get to? And then how do they work just in the field?
You kind of look at your surroundings, compare it with your map, sort of figure out where your strip is going to start.
A lot of what I try to reinforce or emphasize in this class is not just the technical skills but also the, um, ability to do the field work.
Amanda, your crew measure this tree right here.

Amanda: This one?

Woman: Yeah, just height and diameter.

Man: You tape it. We get to come out in the woods and just get outside the classroom, and this is what a lot of us came to do. We have resources around here where we can come out and get hands-on experience.

Woman: So you are collecting the information. You are not allowed to look at the random numbers table while you're estimating. So you…

Woman: Put that away.
I think the best part about it is it's hands-on. We always have… almost all of my classes are field trip classes where we go out in the field and we actually get hands-on experience.

Man: 66.
Classes that we have taken over the past year have set us up for interviews for numerous different jobs—fire jobs, uh, log scaling, timber cruising—and it's a great all-around program.

Woman: So they're getting technical skills that will help them perform their work better, and also we hope… we're trying to give them some workplace skills that will actually help them be a better employee.
With the winds blowing the way, ours are usually a little bit shorter for the diameter.

Man: Right. That's crazy. That's good.

Woman: That's a good thing to know about regional differences amongst trees.

Ruth: What is it that we expect students to be able to do when they've finished my course that's really relevant to their life out there? If you don't have that answer, then you're just going to cover the stuff that somebody told you to cover. And that's not what it's about anymore. It's about envisioning the results and then working to get those results.

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Preparing for Industry

Woman: This one is the supernate, right?

Woman: That's the supernate, and that should go blue-green as well.

Phil: Working with samples of genetically engineered DNA proteins is the kind of activity that prepares students for research technician positions in the field.

Woman: I'm learning good practical skills, and those are like, um, especially cloning, I really interested in doing, you know, genetical engineering field, so that's why I'm here now.

Woman: You see any green?

Woman: No. Maybe other than GFP.

Woman: Right.

Woman: Yeah, that's what she told us.

Woman: In terms of the real world, what this course does is it provides them with the knowledge and also the research skills so that they could go into a research lab, say at the University of New Hampshire or elsewhere, where there's an ongoing molecular genetics project, and they would be able to step right into it, technically.

Man: The disposal is autoclave then drain.
In this environment, the way it's presented, it's allowing me to get a hands-on introduction to all phases of the business, and the things that we are doing are paralleling what is being done in the industry.

Woman: Leslie's class is the research phase. They're at the bench, they're trying to figure out what proteins are involved in a certain disease. Once they've identified a protein that can be used as a treatment, it would then move into the manufacturing phase, and that's where our class picks it up.
Okay, so let's test and see how well you remembered what Phil and Bill went over last week.

Phil: Students in Deb Audino's biomanufacturing lab develop skills and teach each other to understand advanced technological assembly procedures.

Woman: All right. And let's… you know what? Let's go around the table so that we can put (coughs) spot.
We're going to be assembling the bioreactor which is… it's a process-controlled fermenter.
Bill, choose anything here that's on the table and identify it and tell us what it's for.

Woman: The bioreactor that we have, it's going to show the students exactly what it is that the industry does when they have a cell (sell?) line that they're mass-producing.
Hold it up. Okay. Sparger, great. Um, we have to ask our subject matter experts if he's right or not.

Man: Correct.

Woman: Each student picks a piece of equipment. They become the subject matter expert.

Man: Minimizes the, uh, bubbles in the…

Woman: In the biomanufacturing industry, you always need to have someone that verifies that a task has actually been done.
Bill?

Man: It's, um, it introduces, um, gases into the culture, air and oxygen.

Woman: So actually that sparger, through tubing, is eventually hooked up to those tanks behind you. The yellow tank is air, green tank is oxygen, and so the gas is going to flow from the tank out into that sparger which is a hollow tube, and it's going to bubble out those four holes. John?

John: This right here is a condenser and it attaches to the exhaust port of the vessel or the head plate. And, uh, what it does is that when gases are released from the, um, the vessel, they're caught in here, the steam's caught in here and cold water's run through the condenser and it turns the steam back into liquid so that you don't lose any of your sample, um, through condensation. Also at this end of the port is a filter that, uh, filters all the air leaving the vessel.

Woman: Would this be a filter?

John: Yeah.

Woman: Yeah.
Also, as the sort of supervisor for that instrument as well, they need to make sure each student has had enough hands-on time with the piece of equipment.
So when they're done with that, we're going to take this vessel and put it onto the heat exchange vessel.

The thing about our students is, in terms of the real world, we will teach them a whole array of skills that they'll need when they get into the workplace.
So you think it's all set, Phil? Let us know and we'll have John check the screws.

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Integrated Project Based Learning

Man: I have given you a checklist for the house insulation project.

Woman: Today we were going over the final integrated project that we do for the communications class, the physics class, the math class and the engineering technology class.

Man: I don't want you to just tell me that, uh, "I'm going to put R15 there or R21 there." I want you to tell me why.

Phil: Regular faculty meetings keep members from multiple disciplines informed when dealing with an integrated problem-based project on home insulation.

Man: If you put in this insulation, what is the loss now?

Man: This project scenario is just like a storyline to make students see how does it relate to the real world. Why do we have to do this? Why do we have to learn this math skill? Why do we have to learn that physics principle?

Man: On Tuesday, I gave you a handout of the project. We are looking at thermal insulation. We begin by looking at how our sense interact with the environment.
We say everything that we are going to discuss will be centered around this project. And the students, when they are given the project, they go through what we call the "Need-to-Know" chart. The students, whenever they come into the class, they have some prior knowledge, and sometimes we miss out if we don't tap into that. We need to find out what is it that they know so that we can build on it.
In our "Need-to-Know" chart, we started looking at the concept of temperature and heat. What we are going to start looking at is what is temperature?

Man: The problem-based scenarios that are taught in the integrated curriculum mirror the real world in that the problem drives the solution.
You've got your CAD drawing in progress. Everybody should be through phase two. Uh, if you've gotten a chance to start phase three with the isos (?) you can continue that work as well.

Phil: Technology students gain computer graphic design skills, plotting blueprints that will be used in the final home insulation project.

Man: Now, we talked about there, the one change was that instead of dimension that edge, I can dimension to the cut and dimension to the center. So that way you're looking at, uh, that center-line dimension there.

Man: So I'll write the explanation of the values we got, and I'll come up with the formulas.

Woman: We integrate technology with writing and speaking. Communications classes pull all of that together and give them the prerequisite skills they need so that they can produce a formal report.
In your had, you have an example of the executive summary. This is how much insulation you need. This is how thick it needs to be. This is what your cost is going to run. So the big picture is condensed and offered to the decision-maker right there in that little piece. The second thing that you're going to worry about is your title page. We need to know what it is—title—and once again, your title needs to be indicative of what we're going to get.
We integrate the physics, the math, the communication and the technology so they're using all of those skills in every project that they do.

Man: Once you've got the minimum R value, insulation requirement…
(all talking at once)

Woman: I don't know the codes either.

Woman: To do that, we have to really communicate well with each other, the faculty do, and that's a challenge.

Man: You want to do a before and after, like…

Man: That's right.

Man: An as-built with that insulation (inaudible) just to show how much loss inefficiency…

Man: And what the justification is for using this type of insulation.

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