

This interview with Jim Morgan, Associate Professor of Civil Engineering, took place on the campus of Clemson University on March 19, 2001.

Susan Ledlow: How long have you used cooperative learning?

Jim Morgan: Seven or eight years.

Ledlow: Why did you start?

Morgan: I was concerned that my students weren't learning as much as they could. I went to a couple of seminars that piqued my interest; and then I started dabbling, I guess. Then NSF [National Science Foundation] started paying me, and it became more interesting.

Ledlow: Could you compare your experiences using cooperative learning versus traditional learning strategies such as lecture?

Morgan: It's more interesting. I think it's more interesting for [the students]. The enthusiasm level is higher, whether they're talking about me or they're talking about the subject—at least they're more engaged than they used to be. It's more tiring than it used to be to just go lecture. I guess I'm surprised at how easy it was to just walk in and deliver a prepared lecture and then leave, not really knowing whether anyone got anything out of the class.

Ledlow: How did you learn to do cooperative learning? Did you have formal training or discussions with colleagues? How did you acquire your skills?

Morgan: I went to several seminars, both at conferences that I attended, and. . . . [on] campus. I started reading a little bit. But, probably, I've learned the most from teaching workshops with some of my colleagues to try [to] convert other colleagues to try [cooperative learning] a little bit.

Ledlow: You need to be able to do different things as a lecturer than you do as a facilitator or manager of a cooperative learning classroom. What skills do you feel that you really needed to develop that you didn't have before?

Morgan: Probably the one that's changed the most is being able to listen and not say anything. I think I was like most lecturers—I would ask a question and wait ten or fifteen seconds. When they didn't answer, I would be happy to start talking again—not taking time enough for them to process and for them to really decide what it is that they needed my help with. That was the hardest thing. Faculty generally like to talk, and learning not to talk was the hardest [thing for me].

Ledlow: Do you explain to your students why you're using cooperative learning?

Morgan: Briefly. And if there's a lot of resistance that continues into the semester, then I bring in more [explanation]. Usually, what I show them at the very beginning is a little bit of the data—such as the data that Richard Hake has published on active engagement versus passive classroom—and I do a few exercises which, when they work, show the students that their retention level, or their comprehension, goes up if I don't tell them and they discover [things on their own].

Ledlow: What methods do you use to set up teams in your classroom?

Morgan: I assign the teams. You want to know how I assign the teams?

Ledlow: Yes. How do you assign the teams?

Morgan: I teach mostly freshman classes. At least for the past six or seven years, I've taught mostly freshman classes. In those classes, I use the data from the applications that the university gets—data such as high school rank, grade point average, SAT scores. I also [take into account] how big the high school was [that] they went to, because A&M is a huge place, and we've found that transition to the university is one of the things that causes students problems in the first year. Then I try to make the teams as diverse as I can except that—because they're mostly seventeen, eighteen year olds away from home for the first time—I pair women on teams. I pair minority students on teams so that they don't feel quite as isolated. They're already underrepresented in the class, so I try to give them some [kind of] support system in the team.

Ledlow: As a follow-up to that, I've heard wildly different things about [pairing]. Some people are religious about pairing up women and underrepresented students. Other people say, "No! It makes them feel self-conscious because they know what I'm doing." How have students responded to that in your class?

Morgan: There's a mixed response. There are [a] few people who feel uncomfortable, and, in those cases, when I reform the teams, I make a conscious effort not to put those particular students on teams where they're paired. So I guess I would say I try to respect their wishes, but, in the beginning, I don't give them a choice. I base it on an experience I had. I was lucky enough for several years . . . [to participate] in a pilot program. We have classes of a hundred, but [in that program] we had the same students fall and then spring. We made a conscious decision in that pilot program to pair the students in the fall, while the students were adjusting; but then, in the spring, to remove the constraint and to treat gender and ethnicity as . . . well, to ignore those when we formed the teams. . . . I had the group that was women students because we were collecting some data for NSF. What the students told me at the end of the spring semester when they finally decided to ask me why I did teams the way that I did [was], "Okay. We know what you did in the fall. We know that you paired us. We're not sure why." And I basically told them, "I have two daughters and wouldn't want them isolated the way that some of the literature says students from underrepresented groups are in teams. And in the spring, I felt that the students were all more comfortable because they were in a class of people they all knew [and] had been with for a semester." And

one of the women said, “And they wouldn’t have dared treat us any differently in the spring semester.” So, it was based on really that group of students that I interacted with a lot . . . I’ve continued doing the same thing. When I teach upper-division classes, and I use teams, I don’t put that constraint on; but it’s largely because I don’t have the option. The numbers get so small in some of the groups that I can’t.

Ledlow: Do you use any sort of formal teambuilding activities after you’ve set up your teams?

Morgan: I do some. We do some in-class activities. The two that we use probably the most often came from an ASU team training manual. One is called Space Survival and the other one is Desert Survival. Basically [I do this] to try to demonstrate to the students that there is some value to having a discussion with other people and that diverse backgrounds can help them [make] better decisions. Probably the most interesting one we used—that we don’t use anymore—was a scavenger hunt where we gave the students instructions in a team. Each of the four students on a team had to go to a different location and receive additional instructions, and then they had to collect items from campus. The pretense was, “You’re freshmen, and we want to help you learn about Texas A&M’s campus and find things, because we all know freshmen walk around campus with their map, stumbling over things, because they’re just trying to find where they’re going.” And then we had the students assigned to bring everything back to the classroom at a specific time. Then we would do a follow-up activity. [The] idea was basically just [to teach] them process. If they’d plan to work as a team, they could do some things much, much better than they could do individually. And, of course, we made the list too long for them to do if they just proceeded to divide up and try to come back at the end—they couldn’t succeed. They also had to—at intermediate times—meet and strategize on how [they were] going to get the best score.

Ledlow: Why don’t you do that anymore?

Morgan: The various offices on campus that we sent the students to got tired of being bombarded by hundreds of freshmen in the first week.

Ledlow: Do you explicitly, as part of your teambuilding, or as a separate activity, teach communication skills like active listening, constructive criticism, developing consensus?

Morgan: We don’t explicitly teach that in the class, but, as part of our team training, we do point out that communication skills are a very common source of the problem in teams, and we provide some resources on the web [where] they can go to get hints as to how to improve.

Ledlow: What sorts of skills do you feel are important to developing teams of engineers? The goal is [that] they are going to go out in industry and be able to function as a member of a team. What sort of skills do they need to be successful in industry?

Morgan: They need to learn to listen to other people. They need to learn to resolve conflicts because they're going to have those on the team. Probably, mostly they need communication skills.

Ledlow: When, and under what circumstances, would you choose to use cooperative learning, rather than some other teaching strategy? When do you say, "I'm going to do this as a cooperative activity?"

Morgan: Every day. Somewhere, four or five years ago, I finally decided I was tired of dipping my toes in the swimming pool, and I just jumped in. I don't ever go to class anymore expecting that I'm going to lecture that day. I go expecting that it's going to be an active classroom. Some days it turns out not to be very active, but, most of the time, it is active.

Ledlow: Is it active in other ways, though? Have you incorporated other things like problem-based learning or case teaching or any of those other sorts of strategies?

Morgan: We do case studies in our freshman course. I don't personally do those, though; we bring in representatives from industry to help us with the case studies. And that day I act more as a peer teacher, helping facilitate the team discussion. We do some things [that] I call problem-based learning, but I've discovered from workshops that they don't meet all of the criteria that people who preach problem-based learning cover.

Ledlow: When you do those [problem-based activities], you still do them with teams?

Morgan: Yes. I do.

Ledlow: Is preparing for cooperative learning different than preparing for a lecture in terms of time it takes or skills it takes or thought processes or materials?

Morgan: I think it's mostly different in the mental preparation, as opposed to the preparation of materials that I take to class. At the beginning it was very hard going into class realizing that I had no idea how the class was going to turn out. I didn't know what their concerns would be. I didn't know which areas they would struggle in. And I tried to prepare materials for all of the alternatives. I discovered very quickly that I wasn't very good at predicting what they didn't understand and which things they would struggle with. So, finally, I came to a point where I would say, it doesn't matter if they . . . take the class in a direction [in] which I'm not comfortable that I can answer their questions; I'll simply tell them, "I don't know. We will revisit this later." And I developed some activities, which I think the students see through, but [which] are at least a way for the class to proceed when we get to a point where I can't use any of the materials I took with me to class.

Ledlow: Do you use any pre-designed cooperative learning strategies like Think-Pair-Share, Jigsaw, or Academic Controversy?

Morgan: I use Think-Pair-Share a lot. In fact, if you poll my students, I think they will tell you that the only thing we do is Think-Pair-Share in class. . . . I think that's because I was a reflective learner and so the "think" part of Think-Pair-Share is very important for the students who might be like I was and [who might] need some time before they're willing to talk to their classmates and show that they don't really know what's going on.

[The] most common activity is to "think" about . . . the reading. I've finally convinced the class that they have to read before they come to class instead of after. . . . Then, the activity for the start of class is "What don't you understand about the material we're going to talk about today? If I were going to answer only one question, what should it be?" And then they "pair" with their teammates, and . . . I have them add a question, so that now, theoretically, they have at least three—but . . . usually . . . half a dozen—questions that they want answered. Then I put them in their teams in the "share" to prioritize that list. The activity in the team is [not to] generate more questions but to cross off the questions that one [student] can answer and decide [which question is most important]. There are twenty-four teams. [I tell them], "If I'm going to answer twenty-four questions today, what's the question you want answered, because I may not answer any other questions." The students get a lot out of that activity, I believe. One thing they get is . . . a . . . much better understanding than I could give them otherwise of . . . the strengths of the individuals on their team. They also get the sense, or the perception, that I'm not trying to waste their time. I want to answer their questions. It's not just: "I have to cover this because it's in the syllabus."

We publish learning objectives for each class, and I tell them that, "Those things will be on the exam. Whether I talk about them, or I don't talk about them, those things will be on the exam. What we're going to talk about in class is what you want to know." [With] those classes, I go in with just a sheet of paper to record . . . their questions. The contract I made with the students the first time we did this in the semester is "If I don't answer your team's number-one question today, it will either be answered on our website, or in a subsequent class—but before the exam. Anything else I'm assuming you can take care of as a team."

Ledlow: When you're not using a pre-designed strategy, how do you go about planning to structure [cooperative learning] so that it will be successful? For example, do you do things like assigning homework or readings to ensure preparation, assigning roles, giving problems out in stages?

Morgan: All of our teams are told that they have to have roles. We give them several required roles. . . . They have to have a "meeting coordinator." We don't call them "team leaders" because Aggies [students at Texas A&M] interpret the word "leader" in a disruptive way, as far as the team function is concerned. They have to have a "timekeeper" and they have to have a "recorder." So, when we're doing activities in class, most of the time, we're calling on people. When we randomly pick teams to call on, we're calling on someone by the team role. We tell the students that, during the first part of the semester, they have to rotate the roles, and some of roles have to continue

to rotate, mostly because of my own biases. No one can be the recorder forever. They have to continue to rotate that role. As far as the preparation, every day we have assigned readings. We use the RAT, or Readiness Assessment Test, at the beginning of class—not every day, but almost every day, [and] sometimes more than once a day to ensure that the preparation for class takes place. . . .

Ledlow: Is this RAT—I'm not familiar with it—something you've developed?

Morgan: No. It's something we borrowed from a man who came and gave a seminar on our campus. His name is Michaelson. He's at Oklahoma. Larry Michaelson.

Ledlow: A really common question—as I'm sure you've heard from faculty who don't use cooperative learning—is “What are you doing while the students are working in groups? Are you just hanging out up front?” . . .

Morgan: I'm walking around the classroom, listening to what the teams are doing, eavesdropping on the teams to see what they're struggling with, talking sometimes with my peer teacher or my TA to see what they've observed.

Ledlow: Do you ever intervene if teams get off track?

Morgan: It has to be pretty serious. . . . There [are] normally three of us in the classroom—we team-teach our classes at the freshman year. . . . Sometimes there are four of us, but there [are] normally three of us in the classroom. And if we all have noticed that the teams are straying, then I'll intervene, stop the class, try to redirect them in a more productive path. Unless it's pretty widespread, I don't.

Ledlow: So, you wouldn't intervene with an individual team that's way off base?

Morgan: I don't, except occasionally. If there's someone that doesn't seem to be engaged in the process of the team, I will pull them aside and ask them how are things going with the team and where they are. That's more of what I would call an individual accountability, where the students need to know that I want them all to be participating and I want them to believe that I'll notice whenever they don't.

Ledlow: What are some tips for ensuring individual accountability? You just mentioned pulling one student aside from the team and seeing if they know what's going on. What other ways do you have for checking for individual accountability?

Morgan: At the end of team exercises—not all of them, but after many exercises—we have a reporting out from teams to see, what did they come up with as their solution or as their strategy. We do that as a random call of students so no one knows exactly who's going to have to report for their team so at least at the base level, they have to have . . . an idea of what's going on. Sometimes we trick them. We say, “Will all the team reporters stand up.” [Then] they do, and the person who's standing up is the one who likes to talk. . . . Then we say the person sitting next to them needs to give the

report for this team. At least you've eliminated one of the variables. We also give quizzes and sometimes team activities followed by an individual quiz. And if the quiz is close enough to the activity, then every individual should be able to do as well as the team did. And if they don't, then the team's score drops to the lowest individual. Students really hate that, but it at least gets the point across that they are individually accountable for what the team does.

Ledlow: You just mentioned quizzes after teamwork and randomly calling on people. Is that the main way that you debrief, or are there other ways that you debrief after the teams are working, to kind of pull it all back together?

Morgan: Most often, it's probably not anything as formal as a quiz. It's more [that] we randomly select some member of the team and ask [that person], "Where did you end up, and what were the findings of this exercise?" After we've done several—my typical class has twenty-five teams, so we rarely do all of the teams—then we'll ask if there's a team that has something significantly different or something that they really want to share with the class. Sometimes there's a team that does.

Ledlow: Do you have any special tips for managing teams effectively? Do you use any sort of team-folder system or classroom management software like Blackboard or Web CT? How do you deal with the mechanics of setting up, doing the points, and getting the papers back?

Morgan: I'm very lucky: I have a TA. All of my TAs have effectively used the same system—they use an Excel spreadsheet. It has a team page, and it has an individual page, so that they can keep track of which assignments are team and which ones are individual.

Ledlow: How is managing your class in general different, now that you use cooperative learning?

Morgan: I am able to keep track of the students who are struggling much better than I could before, because I have not only my teaching assistant and peer teacher, but also the other members of the team who frequently will report someone on their team who's struggling. And, sometimes, it's that they're struggling in a calculus class or a physics class instead of in engineering. But I think probably the biggest difference is I have a better feel for who in my class is struggling with "where-we-are-now," and so I'm probably more frustrated than I ever was before about keeping new things [until later], to [first] try and bring those people back to the class.

Ledlow: How do you assess student performance, especially in terms of things like ratio of group grades to individual grades?

Morgan: My ratio of group to individual grades varies by class. It varies from twenty percent to thirty percent. Probably twenty-five percent is the normal situation. At the

end of the semester, twenty-five percent of their grade depends on team-based activities, and seventy-five percent depends on individual activities.

Ledlow: Do you grade every in-class, problem-solving assignment or team assignment?

Morgan: No. I couldn't possibly grade everything they do. In fact, I grade very few of them. The TA grades most of them. But even good graduate students can't grade as much paper as the students generate in the activities.

Ledlow: And does that make a difference? Some people feel "If I'm asking them to do it, I should grade it." How do you feel about that?

Morgan: I think it's irrelevant as far as whether I grade it, as long as I provide the students feedback on how well they did—which I do in terms of providing them my solution to problems if I don't collect them. I think what is important, though, is that the students not know whether something is going to be collected, because a significant fraction of them will disengage and say, "Okay. We're doing another activity, but he's not going to collect it anyway, so we just won't write anything down."

Ledlow: How do you get feedback on whether or not a lesson you've designed and implemented is successful—from students, from colleagues, from your own experience, or [from] some combination?

Morgan: Yes. It's from all of those things. Like I said, I have a peer teacher. Our peer teachers are typically sophomores or juniors who took the class and did well. I think I've had the best luck when it's people who've taken the class from me, so they have a comparison—not just for the content, but also for a comparison of how I've done on other things. Also, I ask the student several times during the semester which of the activities we've done they found the most effective or the least effective. I do that in a Plus/Delta system, where if they found something not very effective, I try to help them get to the point where they can, instead of telling me how much they hated something, tell me how I could have done it differently that they would have liked better. And I tell the students very directly at the beginning of the semester—and I remind them if it seems necessary—"When I try and do things, I'm going to be giving up old things. So if there is an effective thing, make sure you put it on a 'plus' so it doesn't go away when I'm trying these new experiments."

Ledlow: What's your ratio of in-class to out-of-class cooperative learning activities? How do you decide how much time they're going to spend in class versus out of class?

Morgan: Well, the in-class, I guess, is because I decided that the classroom needed to be active. Every class has some activities. My classes are two hours long, so some classes have four or five activities. As far as out-of-class, I try to balance that between homework and suggesting that activities such as studying for exams. . . [could be done] as a group—and projects. We only do a couple of projects during the year that

require very much out-of-class time. But, I'd say every week the team has something they have to do out of class for an hour or two.

Ledlow: How do you design those out-of-class projects and assignments so that you don't get the common complaint that one student did all the work, or one student didn't do anything, or one student dominated?

Morgan: Well, there [are] two things that I do. One of them is, on the assignment itself, I try to give more open-ended assignments. It's more difficult for one student to come up with alternative ways of solving the problem and then decide which one is the best. So, it's a more obvious benefit to involve the team, and that's the during-the-semester intervention that I make. At the end of the semester, my students all are required to do a peer evaluation [that] affects their grade. And, then there's the more drastic—but almost never used—mechanism that the students have. [Every] team assignment has a cover page on it, and the team has the ability not to allow a member of the team to sign a particular team document, and, if they don't, their grade for that is a zero because they didn't participate, or they didn't engage in the activity.

Ledlow: How do you handle conflicts within teams? If a student comes to you and says, "I want to be out of my team. I hate my team. It's not going well," what do you do?

Morgan: The first thing I do is cut them off—when I realize that they're coming to complain about their team—and I tell them, "I need to know what your team number is." I email the team and say, "I would like to meet with you at the earliest possible time." Usually, I suggest several times. I have a schedule for every team when they've agreed to meet, and, if possible, I pick one of their agreed team meeting times and say, "I need to know where your next team meeting is so that I can attend." Then we do a facilitation meeting. Usually, that [means] simply having the team reflect on how they're doing and [having] each member of the team give a report, in front of their teammates, on how well . . . they think the team is doing and [what] things . . . they could individually do to make the team function better. I'd say most of the time—maybe as much as eighty percent of the time—that meeting is all that is required to bring the team back to [where it can] function. Occasionally, there's a person who really has decided to disengage. So, I remind the students that there is peer evaluation and that students who don't participate in assignments shouldn't receive credit for those assignments. We have teams in our class of three and four. So, as long as it's a team of four that had one person who decided to disengage, they're not disadvantaged compared to other students in the class. If it's a team that's dropped below three, then I try to come up with a way to resolve the problem. And, usually, I leave it up to the team how they would rather resolve the problem. [For] teams that go down to a base size of two, I give them the option of staying together—because we usually have projects that are in progress—or I can split them up and add them to other teams of three to solve the problem. But, I leave the decision up to them. Members who are disengaged . . . have the option of re-engaging or becoming a team of one.

Ledlow: How large are your classes?

Morgan: All of our freshmen classes are about one hundred students. It ranged from high-eighties to one hundred.

Ledlow: How do you see class size affecting cooperative learning? Are there certain class sizes for which it's not appropriate?

Morgan: I've never taught a class bigger than a hundred, so I don't know about very large classes. But in a class of one hundred, if there's at least one other person to help me facilitate or observe the activities, then I'm comfortable that I can do active learning in a class of one hundred. I think [this is] because we use the team structure with teams of four. The way I tell my colleagues is "It's just like the old days when we got to teach classes of twenty-five students. Now, it's twenty-five teams instead of twenty-five students."

Ledlow: Do your methods or strategies differ, though . . . in a class of a hundred as opposed to a class of twenty to forty?

Morgan: I think once you get to forty, it may not matter. But, in a class of twenty, it's not so important that you have instituted ways to control the class as it in a class of one hundred. In a class of one hundred, you have to get an agreement and participation with the students [as to] how we are going to come back to focus from a team activity . . . The noise level in the room is enough that I can't possibly get their attention simply by shouting them down or turning off the lights or whatever. I have to have their cooperation. In a class size of twenty, that wouldn't be a problem.

Ledlow: So what do you do to get them to come back to attention?

Morgan: It depends on the classroom . . . I usually use what we call the touchdown signal. I raise both of my hands. The students that see me are supposed to raise both of their hands, finish their sentence, but not continue beyond that. Anyone who sees [other students] raise their hands is supposed to raise their own hands. Then everyone turns toward wherever they think I'm going to be so that they can see what we're going to do next or why we're doing this. Occasionally, students will do that just to see if everyone will respond to them, and usually they do. Probably, every other semester, I have a class that decides they really don't like that signal. They feel very self-conscious. So, we have a team activity which is "You decide how we're going to get control back, and, as long as it's something I wouldn't mind doing in front of my children, I'd be happy to change my system to yours."

. . . I had one class that bought me a little canister with an airhorn on top of it. That worked pretty well, except other people that taught in the building were pretty upset. Every other class has decided that the signal is as good as any other one. Or [we] simply raise one hand. That's not quite as bad as having to raise both of them. In our new classroom, we have one other aid. We have a switch on the wall which turns off

computer monitors. Not the computers, just the monitors. That brings in the students who are the slowest to come in otherwise, because they are off doing unrelated activities on the web.

Ledlow: As you've gotten more skilled as a cooperative learning teacher, what has changed? How have you evolved over the years? Are you still doing the same kinds of things you did when you started out, or are you doing things differently now?

Morgan: When I first started, basically what I did was [go] to the parts of my class in which I knew the students weren't doing very well, based on exam performance. I said, "I don't have anything to lose. I'll try some activities, and, if that doesn't work, well, my lecture didn't work either, so it's okay." I think that was a defense mechanism between my colleagues and me so that we could justify this experiment. And when I found out that those performances improved, then it started to spread. What really has changed is that the times when I go in prepared to lecture have shrunk to zero. I hope that I don't ever end up talking for fifty minutes at a time anymore. In the middle, I had some lectures that were really good, and I just hung onto them until I just couldn't bring myself to do it anymore.

Ledlow: If another engineering faculty member came to you and said they were considering using cooperative learning, what kind of advice could you give them?

Morgan: Go to a workshop. Start slow. And I would tell them to pick the thing [they] know [the students] are not getting, and [they] will see the biggest change there.

Ledlow: Have you had any sort of problems or difficulties that you might warn them about?

Morgan: There's a lot of student resistance when I'm teaching a course that has other sections that are taught more traditionally. There are students who are perfectly happy being anonymous scribes in a lecture, and they're not very happy about the requirement in my class of being actively engaged. . . . What I do is make it very clear in the first class, and in the syllabus, how they're going to be assessed in terms of grade. I remind them that there are those other sections. If they want to have a different environment in class, then I won't be sorry to see them leave.

Ledlow: Could you share some of your best experiences using cooperative learning—either a particular example that comes to mind, or just in general? What's positive when you think about how you've changed as a teacher? What comes to mind?

Morgan: I taught our freshman engineering course which was in a lecture/lab format before we moved to our new, more active system, and I taught in lectures of one hundred, so the class size was essentially the same. Probably the best thing is that when I walk across campus now, I know essentially every student I run into. I'm not very good with names, but I do recognize that the student was in my class; and we have a more personal interaction than I ever had in lecture. In lecture, the room could be

empty and the environment would be essentially the same. So, I have a lot more social interaction with the students than I did before, and it makes me feel better about what I do. Students come to me and tell me that they are going to graduate, or how they're doing in this next class. Sometimes they come to me and say, "Maybe you could try to convince this professor that they could use a little more activity in their classroom."