

Colorado Technical University



**Technical Report
Computer Science**

**Teaching and Learning with
CTU's Professional Learning Model (CTU PLM™)**

David E. Leasure, Ph.D.

**Technical Report Number
CTU-CS-2004-001**

Introduction

CTU professional courses use the construction of professional deliverables as a teaching method. CTU PLM™ engages students in complex, real-world situations that require them to organize, research, and solve problems. Essentially, it allows students to practice skills in near-real world situations. The CTU PLM™ naturally answers the student question, “How will I use this in the real world?” It allows students to easily establish the connection between what they learn in the classroom and real world issues and practices.

This learning method encourages students to use higher levels of thinking skills by having them look critically and creatively at problems that don't have one right answer. Students will learn about information in situations that are similar to the professional situations in which they will use the information in the future.

In Practice: CTU PLM™ *places students in the active role of collaborative problem-solvers and project-initiators confronted with the task of producing a deliverable that mirrors a real-world context and assessment.*

The key aspects of the CTU PLM™ approach to teaching and learning are:

1. Rapid achievement of real-world skills
2. Instructors as coaches
3. Classmates as collaborators
4. Content as resources
5. Authentic assessment

Rapid Achievement of Real-world Skills

One aspect of CTU PLM™ that you will hear again and again is the focus on accelerated learning and real-world skills. By situating the learning processes with concrete deliverables, CTU puts its students in a very high status in the classroom. The students drive their learning process and are on equal footing and recognition in the classroom as any participant -- including you, their instructor. You will notice that the structure of our courses reflects this understanding - giving students access to their fellow students, their designated small group, and their instructor within our **Learning Partners** section. The traditional role of the instructor as the “Sage on the Stage” is gone- we will look at more about this later.

Why is this approach so successful? Research has consistently shown that students can achieve knowledge and skills much more rapidly and effectively if:

- Students have a high status in the learning environment
- The learning environment is engaging
- Concepts are immediately connected to real-world and personal experiences
- Students engage realistic projects
- The subject matter is of immediate value
- The instructor and student should engage in an active dialog

Instructors as Coaches

CTU PLM™ learning shifts the roles of the student and instructor. The student becomes an active participant in their own learning. In other words, the student becomes the director of his or her own learning. The instructor serves as the tutor or facilitator of the learning process. Instead of directing the learning, instructors assist the students in their self-directed learning. This shift in roles allows instructors to build relationships with the students and facilitate collaboration among students. Classmates play an important role in the student's learning process as well, since peers mentor and collaborate with one another.

It is important to remember that, although we are putting students into the role of problem-solvers and project initiators, your students are novices in regard to this content domain. The deliverables are designed to situate students' learning within a context that *approximates* the context students will operate in during their careers. By and large the projects and scenarios that surround them are far less complex than projects in the marketplace might be. Their projects are more defined in scope and application than they will face later in their careers.

Important: Your students' initial understanding and sophistication in the process of undertaking their deliverables will be limited. Students are undertaking complex activities without benefit of your expertise and experience in this content domain. Your role should not be focused on evaluation, but rather support and guidance. One of the key aspects of your coaching will be to provide formative feedback. Traditionally, instructors provide students only with summative feedback- that is once a test is taken or paper handed in, students are evaluated and receive an appraisal of their mastery. With summative feedback, there is not an opportunity to improve upon your deliverable, you can just determine to "do better next time." While CTU professional courses certainly do have aspects of summative feedback (final grades for example) we emphasize the importance of providing feedback during the learning process as well. So, for example, if students are directed to post to a discussion board - an instructor might take the opportunity to provide formative feedback throughout the week, posting replies to the students' initial posts, provoking further thought and interaction with the postings of other students. The recursive process allows learners to mature their understanding, driving them towards integration, application and reflection on key concepts and competencies.

Reflection is an integral part of the learning approach in CTU PLM™. As an instructor, you will see assignments that are specifically designed to foster reflective learning. The following is an example of one such assignment:

In the last phase, you wrote a brief presentation to be given to user department managers about security concepts in the operating system level.

The objective of this project was to apply the principle security mechanisms within an operating system and understand the importance of these mechanisms. Do you feel that you met this objective when you completed this task assignment? Why or why not? Post your response on the discussion board. Be sure to respond to your classmates' postings.

This is a reflective assignment in which you evaluate your experience in completing a task assignment for this course. The purposes of this assignment are for you to:

- *gather the lessons learned so that you may apply them to future endeavors*
- *reflect on your assignment to take your learning and understanding to a higher level*
- *learn from your classmates and help your classmates by sharing your knowledge*

Remember this is an opportunity for you to reflect on what you have learned, not an opportunity for self-critique. The grade that you earned on your task is NOT a factor in this discussion board question.

Here are some questions that will help you think about your experience with your assignment. You may use these questions as a starting point for developing your discussion board response to the question above.

- *What did you do well?*
- *What would you change if you did this task again?*
- *What things or resources helped you?*
- *What barriers did you find in completing your task?*
- *How did your own experience and knowledge contribute to the experience?*
- *What advice would you give to others who are completing this type of task?*
- *How will you apply this to future experiences?*

Notice that we specifically direct students' reflection away from their grade, to reflect on their process and towards improving their process of learning in the context of project completion. These reflective assignments give students and you, as their coach, the opportunity to identify barriers, increase efficacy and improve outcomes going forward.

Subsequent topics in this training will explore aspects of your classroom facilitation more fully, but below are a few key aspects of your role as a learning coach at CTU:

- 1 Anticipate barriers to learning
- 2 Motivate, motivate, motivate
- 3 Monitor learning
- 4 Manage group dynamics
- 5 Keep the process moving
- 6 Keep students involved
- 7 Have fun, make it fun for students

Classmates as Collaborators

The traditional classroom effectively isolates learners. The clear expectation is that each student must sink or swim on their own. At times, students forming study groups, or other support strategies have had to do this on their own- and at times fearful that the instructor might find out!

CTU takes a very different approach. We understand that each learner brings a rich history of knowledge, experience, expertise and insights into the classroom. We believe that students have as much to contribute as they do to acquire in the learning process. We intentionally make our classrooms into "communities of learning" taking full advantage of the social aspects of learning that researchers have confirmed is a vital aspect of learning.

Content as Resources

The CTU PLM™ again contrasts the traditional classroom where “content is King.” As you explore the course shell and syllabus, you will see that the content is positioned as a resource to students- it is, in a sense, behind the competencies we seek to establish and assess. In this way, we again emphasize the importance, not of knowing about something, but knowing how, knowing when, and knowing where knowledge can be applied. In one of his many seminal works *New Approaches to Learning: Because Wisdom Can't be Told*- John Bransford and his fellow researchers at Vanderbilt's Cognitive and Technology Group documented the power of using of problem-oriented learning environments rather than the mere presentation of factual information to develop expertise.

In the CTU PLM™, CTU students utilize abundant, multimedia resources in ways that fit the needs in the learning process as they build the competencies for each course.

Authentic Assessment

In CTU PLM™, the assessment is “authentic assessment”, which means that there aren't any multiple choice tests. Students demonstrate their skills through the completion of real world projects. In the real world, projects are not simple and they don't have one “right” answer. Through real-world, professional learning, students experience the complexity of real world projects and learn to select an appropriate approach to a problem that has more than one solution.

At CTU, CTU PLM™ is structured into a scenario format. Each course is grounded by a real world scenario that serves as the foundation for the course deliverables. The deliverables are broken into phases and each phase is divided into tasks. Each phase includes a list of resources that provides students with the information they need to complete the tasks. Each student determines the approach he or she wishes to take and which resources to utilize. As students work on their deliverables, they receive guidance and insight from the instructor and their peers, who are their partners in the learning process. Assessment is integrated into the learning by defining the professional standards of performance. Faculty, peers, and the learner use these standards to nurture the professional knowledge and skills required in today's workplace.

Project-based learning allows students to become engaged in and direct their own learning. The process is supported by the student's instructor and peers, and allows student to practice skills that they will be able to transfer over to future real world situations.

For Further Reading:

How Adults Learn Best

Knowles, M. (1984). *The Adult Learner: A Neglected Species (3rd Ed.)*. Houston, TX: Gulf Publishing.
Knowles, M. (1984). *Andragogy in Action*. San Francisco: Jossey-Bass.

Experiential Learning

Rogers, C.R. & Freiberg, H.J. (1994). *Freedom to Learn (3rd Ed)*. Columbus, OH: Merrill/Macmillan.

Minimalism- Focusing learning on what is needed

Carroll, J.M. (1990). *The Nurnberg Funnel*. Cambridge, MA: MIT Press.

Building Understanding that Transfers

Bransford, J., Franks, J., Vye, N. and Sherwood, R. (1989). New approaches to instruction: because wisdom can't be told. In: Vosniadou, St. & Ortony, A. (eds.): *Similarity and Analogical Reasoning*. Cambridge, Mass.: Cambridge University Press, pp. 470-497.