

RESEARCH SUMMARY

SUPPORT FOR SOLVING PROBLEMS FOUR WAYS

Tennessee Technological University

COOKEVILLE, TENNESSEE

Steelcase Education Active Learning Grant Recipient, Cycle 2

Tennessee Technological University had already used the “Renaissance Foundry” teaching framework that emphasizes multiple methods of creative problem solving in several of its STEM classrooms across campus. With a Steelcase Education Active Learning Center (ALC) Grant, the University’s chemical engineering department had the opportunity to create a space designed expressly to facilitate this student-led, team-based pedagogy.

INTEGRATED APPROACH, MULTIPLE METHODS

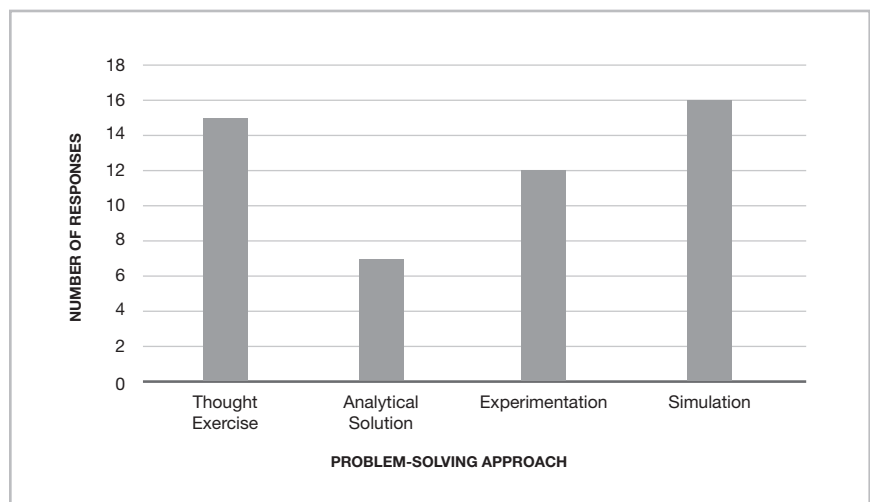
The Tennessee Tech ALC was designed to support a variety of individual and team-based activities with mobile furniture, a computer and projection station, smartboard, and shared as well as personal and portable whiteboards.

In the Foundry method, student teams are challenged to identify and solve a problem using multiple lateral thinking techniques,

including a thought exercise, an analytical method, experimentation and simulation. Students practicing this in the ALC indicated that the space served all four purposes well – especially thought exercises and simulations. This last technique felt well supported, instructors hypothesized, because the ALC integrated the technology needed to provide remote access to simulation software, serving as a portal to these powerful tools.

“The ability to work this way seemed to facilitate the creative thinking process and encourage risk-taking and improvisation.”

Instructor, Tennessee Technological University, on personal Whiteboards



WHITEBOARDS ENHANCE THOUGHT EXERCISES

Faculty report that personal Verb whiteboards contributed significantly to thought exercises. “The boards forced students to write in large readable print,” said one instructor. “All students were involved because all could see and review what was being written... when the groups shared their derivations, it was easy for someone to pick up the whiteboard and show it to the adjoining team.”

Another said that the whiteboards made it easy for students to communicate with math symbols in quick, easy interactions. Yet another pointed out the value of information persistence: After students in an advanced class attached their marked-on whiteboards to the wall before leaving for the day, the boards remained present for other, more junior students to see. “They could see what graduate school was like, recognize the equations and see that they could handle the material” and even “enhance what they are learning in the present,” said the instructor.

TIME AND TRAINING NEEDED

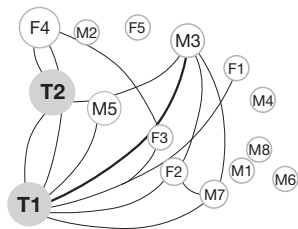
While faculty were very motivated to use the room’s new capabilities, it took time to acclimate to the technology, and some relied on a traditional computer-projector setup. The University’s grant team suggested this was the reason that in year one, only 65% of students said that it was easy or very easy to see information displayed in the classroom and remaining responses were neutral to negative. That year, 67% said their experience in the ALC was better or much better than in a traditional classroom, and remaining responses were neutral. With time and faculty development, perceptions improved by year two. To address this adoption curve, Tennessee Tech will require training for current and future instructors using the space, as well as for support staff who will be available to collaborate with faculty throughout the year.

FUTURE SPATIAL ANALYSIS

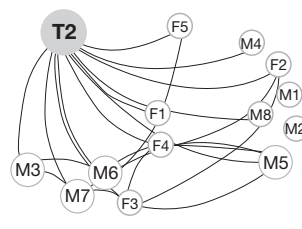
During year one, a Tennessee Tech project team developed a protocol for mapping the vector and frequency of interactions among students and between students and instructors using the space. While they need to gather further information to employ this method, they believe it could be used to help instructors reflect on their practices and to gain insight on spatial patterns that may affect engagement in a variety of ways.

SPATIAL ANALYSIS: MAPPING ENGAGEMENT PATTERNS

Class Session A
Lecture/discussion



Class Session B
Socratic seminar



Class Session C
Self-directed discussion

