

# Why Today's Students Value Authentic Learning

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## **Abstract**

Authentic learning engages students in the multidisciplinary problem solving and critical thinking researchers and experts use every day. While the concept isn't new, it is receiving renewed attention as advances in technology enable access to a greater range of real and virtual environments. Authentic learning activities depend on student buy-in and enthusiasm for success. This paper explores student attitudes toward authentic learning, highlighting its benefits as well as potential concerns.

## Students and Authentic Learning

In the final semester of my undergraduate career, I finally registered for the entry-level biology course I needed to graduate—just in time to be waitlisted. After a pleading session with the instructor, during which I must have repeated “Seriously, I can’t wait any longer to take this” a dozen times, I found myself spending each Wednesday afternoon studying the natural world, wedged between a second-semester freshman and an algae-filled aquarium.

With my impending graduation on the line, I completed my lab work dutifully each week, carefully copying data into Excel fields and sketching replicas of the fuzzy protozoan that I *thought* I saw through the microscope. Review-and-regurgitate seemed like a fair enough survival strategy for an aspiring historian with a long-standing disdain for the hard sciences and no clue how these laboratory exercises could ever translate to the real world. That changed, however, the day Matilda entered our lab.

Matilda, or so my lab mates and I called her, was a 100-pound swine found dead in central North Carolina. Using a slide show of images depicting her decaying corpse, our teaching assistant was trying to explain how entomology might provide clues to her cause of death. “Here,” he said, aiming a red laser pointer at the space that used to be her mouth. “If we see blowflies here at noon on Wednesday, what can we guess about her approximate time of death?”

After walking us through Matilda’s fate, our teaching assistant passed out more photos and sheets of paper. On each sheet, we were given some details about the corpse in front of us. Together, we brainstormed the questions that we’d have to answer to determine our victim’s cause of death. What was more important, for instance, the body temperature or the pattern of insects? The following lab session, clutching insect guides, weather reports, and other information we’d collected on the Web, we worked together to come to a final conclusion, each student playing the part of expert in a specific field.

Of all the lab exercises I undertook that semester, this was the only one that still sticks in my mind. I can remember the inner recoil at the insects in the photos and the way we all swore that the lab was actually beginning to smell like a rotting corpse. But more than that, I remember the thrill of investigating with my classmates, doing the necessary research and critical thinking to bring ourselves to a united conclusion. For the first time that semester, I felt as though we were doing something relevant, something that real forensic scientists would have to do in the field. I didn’t even have to ask, “Why, again, should anyone study entomology?” The problem felt more genuine because we didn’t know the path to take. We weren’t entirely sure what questions we should be asking or what evidence might be useful. As we fumbled through our research, we weren’t just learning facts—we were learning the process of discovery. It was more frustrating than any straightforward word problem but all the more rewarding when the answers were found.

The process paralleled a learning experience from a journalism class I’d taken early in my academic career. After spending a semester learning interviewing skills by turning to the person on my right or jotting down notes from a staged press conference, I enrolled in an advanced newswriting course. One of our first assignments was to draw an occupation from a hat and then spend the week tracking down a person in that occupation for a lengthy profile. After spending three fruitless days trying to coax a series of travel agents into allowing me to shadow them, I wound up in my professor’s office. Frustrated, I told him that the assignment had proven impossible and that I’d like a new occupation.

He didn’t offer the switch. Nor did he offer any advice. He just hinted that any *real* journalist could convince an unwilling source to talk. After all, I was only looking for a travel agent. When my finished piece was returned (saved by a friend of a friend with a sister-in-law who’d

recently traveled to Fiji), it didn't have a grade. Instead, he said that the story didn't really matter. It was getting there that did.

*Getting there* was the piece that would matter every time I sat down to write a story from that point forward. The course readings and lecture notes mattered little when on a deadline; it was all that practice learning how to get there that came rushing back.

Beyond sheer satisfaction, both projects had one central component in common: *authenticity*. While tracking down sources, I felt like a reporter. While scrunching my eyes at weather reports, I felt like a criminal investigator.

Authentic learning builds on this concept of "learning by doing" to create learning environments that move beyond merely allowing students to play a role. In the course of a project or problem, students engage in the type of multidisciplinary problem solving and critical thinking that researchers and experts use every day. Students learn how to investigate problems that require more than textbook formulas or rationales to solve.

While authentic learning has existed for decades, it has received considerable attention in recent years as technology, particularly 3D environments and cyberinfrastructure, has lowered the barrier to implementation. Defining *authentic learning* remains a challenge, but Jan Herrington, a researcher at the University of Wollongong in Australia, surveyed the literature and developed a 10-point definition, which posits that authentic activities:

- have real-world relevance;
- are ill-defined, requiring students to define the tasks and subtasks needed to complete the activity;
- comprise complex tasks to be investigated by students over a sustained period of time;
- provide the opportunity for students to examine the task from different perspectives, using a variety of resources;
- provide the opportunity to collaborate;
- provide the opportunity to reflect;
- can be integrated and applied across different subject areas and lead beyond domain-specific outcomes;
- are seamlessly integrated with assessment;
- create polished products valuable in their own right rather than as preparation for something else; and
- allow competing solutions and a diversity of outcomes.<sup>1</sup>

Today, authentic learning has been applied across the academy. Students at the University of Virginia have dug through the archives, adopting the role of researchers, to create an archive of primary source documents detailing the American South. Purdue University launched nanoHUB, an online portal to industry-level nanotechnology tools in which students can simulate scientific practices using their own data in real time. Students in Australia have been using a CD simulation to learn research methods by investigating a school closure through statistics and interviews. Regardless of the discipline or the format, the vital ingredient is student adoption and enthusiasm, requiring a closer look at student attitudes toward authentic learning and potential barriers to success.

### Attitudes About Authenticity

In the late 1990s, faculty at the University of Illinois at Urbana-Champaign turned a critical eye toward their accounting curriculum. Globalization, the rise of information technology, and greater scrutiny of the profession after a series of securities frauds and bond crises were changing the role of accountants. No longer could a student expect to compete without developing the skills necessary to be a collaborative worker and critical thinker.

The accounting department launched Project Discovery in 1997. Starting with the sophomore class, faculty and researchers worked to overhaul the curriculum to better train students to survive in the business world. Through simulations and group work, they would learn the collaborative and interpersonal skills necessary to complete business tasks. Using case studies and role playing, they would take an active role in their learning, practicing decision making, inquiry, judgment, and analysis through practice. They integrated ethical questions into class projects and case studies, forcing students to critically examine ethical issues. They also required that students defend their responses through written or oral presentations.

Students might not leave with the same formulas imbedded in their minds or the same practice answering word problems that their peers in more traditional programs share, but that's just fine for Matt Stern, who came to Illinois for graduate school after spending much of his undergraduate career in traditional business and accounting courses. "You can learn [formulas and rules] on your own. You can read a textbook on your own," he says. "This is about active learning. It's about being in a group and learning how to work with others, how to sell your ideas. You just can't get that from a program that says, 'Here's a problem and let's walk you through it.'" What he might not remember in formula specifics, he has retained in transferable skills, he says. He thinks that if one day he is in a leadership position, the ethical issues and administrative quandaries he faced as a student will ensure he knows how to deal with complex problems.

Students frequently cite skills development as a benefit to the use of authentic learning over more traditional methods, but the value stretches much further.

### Relevance

Across the board, students cite relevance as the key value to authentic learning in the classroom. Employing industry standards or allowing students to adopt a role helps them see the connection between course content and their future careers. Or, they understand how the discipline might be employed to solve contemporary issues. With this in mind, students say they are more likely to engage with the material because they do not regard it as "busy work."

### Preparation

Before venturing into an actual classroom, John Raible played the part of student and teacher in a simulation called Microteaches at the University of Central Florida. The university built miniature classrooms, and students were asked to develop lessons and deliver course content to their peers. Participants in the program felt free to use their imaginations and delve deep into course design. Students sat on the floor and painted on the undersides of their desks to simulate how Michelangelo worked on the ceiling of the Sistine Chapel, or they composed music using GarageBand. When the course ended, Raible says he felt more prepared to teach. "I already had materials to use. I'd already created something that I could take into the classroom or give to someone else to deliver." By playing the part using tools or

simulations, students' confidence is increased, and they feel more prepared to enter their field of study. They also gain practical skills using the tools they might encounter in the workplace. In many cases, authentic learning allows students to have a finished product that they can use or reference after graduation.

### Critical Thinking

Students are well aware that problems in the real world don't fit neatly into 200-word problems or test questions. Likewise, real-world problems are not easy to see or answer. Authentic learning projects, designed to create ill-defined problems, mimic the types of problems that students will confront after graduation. They put the emphasis on the mode of discovery, not the answer, helping students develop the critical thinking skills necessary to reach a conclusion. Students learn how to look for information or seek out collaborations.

### Multidisciplinary Nature

When discussing the need for instruction in engineering informatics, William Regli likes to talk about the iPhone. The phone's functioning relies on the work and cooperation of different technical specialists. The hardware engineers must work with designers to make sure components will fit into the handset. Engineers must work with programmers to ensure the touch screen sends signals that are translated into the appropriate actions. Each specialized unit must work with others to create a viable product. The iPhone, like most products or programs, requires a multidisciplinary approach to succeed. When students engage in complex, multidisciplinary projects, they learn how to ask other experts for assistance and how to manage collaborative relationships. They learn, before entering the workforce, that most problems require a multidisciplinary approach.

### Evaluation

Throughout the course of a public relations class at North Carolina State University, Rachel Rosenberg didn't just learn how to manage a campaign, she ran one. Student groups developed partnerships with small businesses in the area, and, over the course of the semester, the students were required to design, pitch, and implement an intensive marketing campaign. At the end of the semester, students were evaluated not only by the professor but also by the companies, which delivered assessments detailing the strengths and weaknesses of the student proposals. The project forced students to understand that evaluation isn't always determined by one person or one clear rubric. Instead, they learned that evaluation is subjective and may be determined by the customer as well as the advisor.

### Interactive

Many students simply say that learning is fun when they are allowed to step away from problem sets or research papers and actually engage with material or tools. They relish the opportunity to be creative, to build, and to experiment.

## Myth vs. Reality

In Satyandra Gupta's class on bio-inspired robots, the last few weeks of class can bring students to the brink of utter frustration. Over the course of the semester, students are asked to use programming and engineering principles to construct robots that can perform basic tasks, such as walking. But the project is often fraught with difficulty. There might be a bug in the software or a problem in the hardware but no easy way to isolate the problem. Debugging can be a long and arduous process.

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“A week before the project is due and they are lost in design and worried that it’s never going to work out, they so much want to throw this robot out the window,” says Gupta. Often they beg, “Can’t you just give me a C grade?” Then, he says, the robot works. It’s not uncommon to see the teams actually jump into the air with excitement. “Right in front of you, people are just sort of dancing, just because it’s walking. They believe they can take on the world now because they’ve made this little robot walk,” he says. “It’s a very good feeling.”

One of the arguments against authentic learning is that students will disengage when material becomes too difficult. If the answers or pathways aren’t clear, they will become frustrated and lose interest. But while some students and faculty say this may be the case, they argue that, for the majority of students, the payoff at the end is well worth the sacrifice. In retrospect, they contend, authentic learning environments provide more value and skill development when the scars have healed.

Ginan Jobarah, an undergraduate student in computer science, says she values the hours she’s logged doing her own programming more than any other class exercise. “It’s more difficult because sometimes you’re left on your own and you just have to figure it out. You have to try it over and over. It’s difficult, but it’s actually where the most learning comes in.” The benefit of working with real code and real programs is that students can assess and test their own work. When the code finally clicks, “it’s really satisfying,” she says.

Perfect results aren’t necessarily required to keep students intrigued. At the University of British Columbia, students use Ancient Spaces, a 3D modeling program, to reconstruct parts of ancient civilization. After digging through the library for clues about building specifications, materials, and social spaces, the students actually design ancient cities. More often than not, says Michael Griffin, their renderings were pretty inaccurate compared to those of experts. But that had value, as well. “By putting together 20 different inaccurate projects, you get some sense of what the issues are [for researchers and archeologists]. Truth is not so strictly written as we think; everyone is guessing,” he says.

Authentic learning projects can be time-consuming, especially for students taking heavy course loads or for nontraditional students who might be juggling full-time work with their studies. While some students claim the coursework is frustrating and exhausting, few report that the work has no value. On the contrary, most find the work more rewarding when they begin to reflect on their learning outcomes.

Given the time, complexity, and rigor involved in authentic learning experiences—and remembering that most students are assessment-driven—an important element of authentic learning experiences is that they provide course credit. Projects provided as “supplemental” might be ignored by time-conscious students in favor of elements with course credit attached. Beyond sheer credit points, the work must have a clear link to the discipline or to a tangible, relevant problem. Otherwise, the work feels less authentic, and students may minimize the project’s value or feel they “don’t know when they’ll ever need to use this again.”

It’s easy to assume that authentic learning environments might be more valuable after rudimentary building blocks have been laid in the curriculum. A freshman, for instance, might be seen as not having the foundation to build upon for an intensive, immersive project. Yet several successful authentic learning projects—notably Ancient Spaces and Project Discovery—are used by novice students with great success. For these students, the value is not merely in building upon principles but seeking the necessary information to explore the problem. The thrill, in this case, involves teaching oneself the necessary skills to reach the conclusion. My classmates and I were hardly experts when we sat down to investigate the death of our swine corpse, yet we managed to untangle the jargon and mount our own

investigation. Unhindered by precedent, we were able to brainstorm our own solutions and seek out our own methods. In many ways, the seemingly obvious risk of not knowing all the prerequisites became a clear advantage.

### Students in Charge

After her freshman year at the Georgia Institute of Technology, Anu Parvatiyar spent a week at LeaderShape, an intensive, curriculum-driven leadership institute that teaches college students the planning and leadership skills necessary to implement a personal vision. When it came time to pen her goal, Parvatiyar thought about the spread of globalization and the “world is flat” phenomenon. How many of her classmates were prepared to survive today’s global economy? How many even realized the disparities between cultures around the world?

She turned her questions into action, writing a proposal for a two-semester course that challenges students and faculty to problem-solve for local or international communities. Over the course of the first semester, students and faculty study the cultural, political, and anthropological profile of a selected location. The students also try to determine how they might create a sustainable project to improve the quality of life. In the second semester, the students actually implement their projects, drawing on their previous coursework to keep the needs of the community fresh in their minds. From a service perspective, the students are challenged to create sustainable projects that the community might not have the resources to complete on its own. For their own careers, students have an opportunity to experience design from start to finish, taking into consideration the role and perspective of the “customer” and the issue of sustainability. From a learning perspective, they must learn to work in multidisciplinary teams and to apply their knowledge to tangible problems.

Parvatiyar was elected student body president in the spring of 2007. She’s using the resources available in her new office to get the project implemented, on a small scale, in spring 2008. Georgia Tech students will be working with the community in a low-income area in central Atlanta. When the course was announced, she sent out 150 e-mails to gauge interest among her peers. After the e-mail circulated among friends and various listservs, she received 150 responses from students interested in enrolling. She attributes her classmates’ enthusiasm partly to their service-minded nature. “At Georgia Tech, we have many students involved in service projects outside of the classroom,” she says. “I think it’s a goal in their future to work on projects like this.”

But also, she says, it’s a rare opportunity to be able to engage in real-world problem solving and receive course credit for the effort. “This is a chance to integrate [service and outreach] into their learning and to show faculty that this is actually a beneficial way to teach. It’s more than just a lecture.”

Parvatiyar’s vision demonstrates the possibilities when students are left in charge of their own education. She designed the course believing that students need a holistic view of problems in society. It’s not enough merely to learn how to fix a water line—engineers need to understand the community, the policy, the city’s infrastructure. These are the types of problems students will confront after graduation, she believes, and should be the types of problems that they confront in the classroom.

With only their imaginations’ as a guide, students have no shortage of ideas about how authentic learning might be integrated into their curriculum. One student suggests using a virtual stock market that would allow business students to learn to trade in real time. Another wants their writing to be tested by their peers. They imagine a course where English papers

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are written and then submitted to the class for a review similar to those used by academic journals. Then, they say, students get real practice in evaluation and analysis. Other students say they don't want questions attached to their case studies so that their imaginations can really be tested. No matter the discipline, the suggestions all share a set of characteristics:

- They allow students to adopt the role of a professional, whether a day trader, researcher, teacher, or archaeologist.
- Problems are left open-ended, with no "right answers."
- Students receive course credit in proportion to the time and energy involved.
- The professor acts as a guide without imposing strict restrictions or guidelines.
- Problems involve specifics.
- Participants have the opportunity to "see" and "feel" the world around them, whether through real life, a simulation, or a game-like environment.
- Group work is structured so that each student brings a distinct skill, ensuring that each member feels utilized and engaged.
- Problems force students to look outside their discipline and learn something new.

## Final Thoughts

The intuitiveness and distribution of IT allows authentic learning to infiltrate fields across the academy, from constructing ancient buildings in Greece to manipulating carbon nanotubes with online simulations. Despite the time and difficulty involved, students are enthusiastic about the increase in authentic learning environments on campus, praising their ability to bring real-world relevance to education. Tired of spending hours studying formulas they fear they'll never use, they welcome the opportunity to see a clear connection between their coursework and either their own careers or the larger problems in society. Even short-term frustrations tend to dissipate when students reflect on their coursework and discover the practical skills they have gained. Their enthusiasm creates a greater need and responsibility for faculty, students, and IT professionals to investigate new ways to develop and share authentic learning experiences across disciplines and across institutions.

## Endnote

1. Thomas C. Reeves, Jan Herrington, and Ron Oliver, "Authentic activities and online learning" (Annual Conference Proceedings of Higher Education Research and Development Society of Australasia. Perth, Australia, 2002). Retrieved from <http://www.ecu.edu.au/conferences/herdsa/main/papers/ref/pdf/Reeves.pdf>.