

## Chapter 7

# Virtually Authentic: Storytelling and the Engineering Design Process in Online Learning

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### ABSTRACT

*This chapter addresses the process of creating cross-curricular projects in an online environment, specifically the considerations, constraints, and methodologies. It discusses how to approach this type of learning through the lens of students' technology literacies, providing meaningful connections to digital pathways with which students are already engaged and authentic learning. The chapter also describes a digital makerspace as an avenue for student learning to take place. Finally, the authors present a student project that represents a culmination of these techniques. The project uses the engineering design process to blend both science and English language arts practices using side-by-side inquiry and the digital makerspace as a presentation medium.*

### INTRODUCTION

The transition from a traditional, brick-and-mortar classroom to a full-time, online classroom is both jarring and enlightening. The first major realization that you face upon making this transition is that many of the mousetraps, particularly those related to creating structure in the classroom, no longer work. The term “mousetraps” here refers to all of the procedures and tactics that we, as teachers, use to control the dissemination of information, the development of concepts, and the flow of people themselves. In fact, a teacher with any level of seasoning can create a mental picture of the classroom and how it both functions and moves, and then he or she can use this picture to design a project that fits neatly into this ideal model. It is within the four walls of our classrooms where we can illustrate the value of proxemics by standing close to a student to help him or her focus. It is a place where we can use lockdown browsers

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and system-level Internet controls to provide direction into the types of content that are appropriate for our students to consume and build upon. It is even a place in which we can provide timely and responsive feedback to student groups in order to develop teamwork and social skills. Now, we know that this ideal scenario is not one in which we find ourselves for more than a few moments at a time, but the ideal itself provides us just enough structure on which we can build the base of our project-based learning opportunities, at least until we go back and adjust many of the components to help conform to reality.

In an online environment, particularly an asynchronous one, teachers simply do not have enough information to build an accurate mental picture of the environment that students inhabit when they receive and perform project-based activities. Nonverbal cues are irrelevant when no one can see you. On-the-spot corrections are virtually impossible when students are working on projects at all hours of the day and rarely in a direct conference with us. Even Internet controls are not assured, because they are provided at the full discretion of the students' families. It is through awareness of these seemingly limiting circumstances that the second major realization of an online teacher occurs, which is that you have probably become a little too comfortable with these mousetraps and the use of them to help develop your lessons and projects.

While at first, this realization can be a bit terrifying; acceptance of this fact can provide the freedom necessary to develop lessons that address students as they actually are, and not as we decide they should be. While many of the tactics and techniques for classroom management can be used to some degree online, the pursuit of meaningful online learning requires that we consider what motivates a student in his or her life outside of the classroom. Furthering this line of thought, it actually makes a lot of sense to simply consider the idea of motivations that unites all people. If we look deeper into the human condition, we see that, after we meet our basic physical needs, storytelling takes on a very important role in our lives. While issues of health, shelter, and food define "how" we are, it may be that the creation and sharing of a great story defines who we are.

The beauty of storytelling is that it is not limited to the spoken or written word. Of course, important and inspiring stories come in these mediums, but they also come in the form of artistic works and even through the process of invention. To that point, what is the engineering design process, if not a storytelling device? While an author focuses on an idea that is personally meaningful to him or her, fleshes out characters and emotions, and creates draft after draft to create a powerful story to share with others, an engineer finds an issue that is important to him or her, researches these ideas to create possible solutions, and runs test after test to create something meaningful to share with others. Both of these people engage in a meaningful process of creation that they put their minds and hearts into in order to create something to share. That is a pretty powerful idea, and it is exactly the type of idea about which students can feel motivated, liberated, and excited. Students want to share their world as much as anything, and it is our job to help them find ways to do this in a meaningful way.

In order to create these opportunities for students, we must consider how to provide structure without removing the freedom necessary to tell their own stories. With that in mind, developing project-based activities for an online environment involves three major considerations: the use of authentic student behavior to develop project procedures, the use of technology to help maintain appropriate communication among students on a project team and between students and teachers, and the use of tools to help each student or group of students tell the story of his, her, or their project in a way that is most effective and meaningful.

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