

Chapter 4

Theater as the STEAM Engine for Engaging Those Previously Disengaged

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EXECUTIVE SUMMARY

This chapter connects the use of creative dramatics with engaging students previously disengaged with STEM classes. It elucidates a variety of reasons how creative dramatics allows STEM teachers and their students to succeed. Each of the assertions is backed by citations of research studies, classroom practice, and details of the theoretical underpinnings. Also included are detailed descriptions of three effective classroom methodologies using theater in STEM classes, along with specific examples of each that include student and teacher interactions.

INTRODUCTION

Skilled inquiry-based elementary teachers who engage students in daily materials-based STEM investigations maintain students' interest throughout elementary school. However, for much of the older school age population, science, technology, engineering, and mathematics (STEM) are seen as “cold” subjects that lack emotion and humanity (Heaverlo, 2011; Burke & Mattis, 2007), and by the time students reach early adolescence they have essentially disengaged from these STEM subjects (Grocholski, 2018; Kesar, 2018; USDOE, 2017; USDOE, 2006; Osborne, et al., 2003).

Why do so many adolescents who previously enjoyed STEM in elementary school disengage from it as they get older? In order to answer this question, it is

important to investigate what is relevant to adolescents. Perhaps a better way to ask the question is, “what matters to teenagers?” Before reading on, please take a moment to answer this question.

Over the years I have done this exercise with thousands of teachers and parents, and in virtually every case the consensus has been the same. I have also done it with hundreds of teenagers, and they have also reached the same conclusions. Everyone agrees that they care most about being *accepted by a group of peers* who matter to them. They also care about being able to *demonstrate their competence* in things they and society find important. This differs from the former need in that in the latter they are *respected* for who they are and what they can accomplish.

STEM education becomes a natural, organic process when teachers can meet these needs while engaging students. It becomes a task that students want to do, not one that they must be forced to do. Students may practice STEM even if they weren't required. The humanistic psychologists' explanation of human needs, which is supported by current understandings of brain neurobiology, may put this in a better conceptual perspective.

In the 1950s and 60s, Abraham Maslow (1998) and his colleagues studied individuals who many recognized as having incredible mental health. From this study the researchers deduced a hierarchical set of human needs. Until one need is reasonably met, the others are not of consequence to the person. After testing this on thousands of individuals globally, researchers have found that this sequence of needs is *genetically programmed* into all humans. This aligns with neurobiological knowledge that the frontal cortex and other reasoning parts of the brain surround the amygdala, the most ancient part of our evolutionary brain.

Figure 1 (page 2) illustrates the hierarchy of needs (Maslow, 1998). The figure shows that survival and emotional needs serve as the hierarchy's foundation and therefore always override the rational aspects towards the hierarchy's top. Once people have met their physiological needs (food, clothing and shelter), then they have to focus on their safety needs. Homeless children keep slipping back into this category and can't much focus readily on anything happening in school. Safety needs comprise the hierarchy's second tier. Safety means the ability to regularly predict life's events. Safety reaches beyond physical safety; it includes psychological wellness. This explains why kids raised in abusive or dysfunctional households struggle to focus on school. Teenagers whose safety needs are fulfilled focus mostly on the two hierarchy tiers that reflect aspects of adolescence that teens care about most. The next two levels of belonging (acceptance in a group) and esteem (respect for competence) are where *genetically* teens must be. Society often demands that teens reach the top level, self-actualization, functioning with all preceding needs sufficiently fulfilled, but adolescents typically don't have these levels filled. Nevertheless, schools generally ask them to do things because they will need it in

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