

Theater as the STEAM Engine for Engaging Those Previously Disengaged

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EXECUTIVE SUMMARY

Connects the use of creative dramatics with engaging students previously disengaged with STEM classes. 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' interests throughout their elementary school experiences. However, for much of the older school age population, science, mathematics and engineering are seen as “cold” subjects that are lacking in emotion

and humanity (Heaverlo, 2011; Burke & Mattis, 2007), and by the time students reach early adolescence they have pretty much become disengaged from these STEM subjects (USDOE, 2006; Osborne, Simon, & Collins, 2003).

Why Do So Many Adolescents, Who Previously Enjoyed Elementary School STEM, Flee From These Subjects as They Get Older?

In order to answer this question it is important to investigate what is relevant to early and later adolescents. Perhaps a better way to ask the question is “what matters to teenagers?” Before you read on, please take one or two minutes to write down your top two answers to 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 come to the same conclusions. Everyone pretty much agrees that they care most about being *accepted by a group of their peers* who matter to them. Secondly, they care that they can *demonstrate their competence* in things important to their peers and important to members of the community. This is different than the former need in that in the latter they are *respected* for who they are and what they can accomplish.

If a teacher can meet these needs while engaging students in STEM learning then it is a natural, organic process. It is what students want to do, not something that they must be forced to do. They will come and do it even if they aren’t required. Let us use the humanistic psychologists’ explanation of human needs, which is supported by our current understanding of brain neurobiology, to put this in a better conceptual perspective.

In the 1950s and 60s, Abraham Maslow (1968) and his colleagues studied individuals whom lots of people recognized as the most mentally healthy individuals they knew. The people they wish they could be. 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 with thousands of individuals around the world, researchers have come to realize that this sequence of needs is *genetically programmed* into all humans. This matches well with our knowledge of neurobiology where 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, 1968). From the figure you can see that the survival and more emotional aspects of the hierarchy are the foundation and, therefore, always override the more rational aspects up the triangle. Once people have met their physiological—food, clothing and shelter—needs, then they have to focus on their safety needs. Homeless children keep slipping back

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