

Preface

The first goal of this book is to assist methods professors in the STEAM methods classroom. The second goal is to assist teachers who are ready for STEAM methods in their classroom. The cases in the book provide techniques and practices for STEAM in the classroom.

STEAM is a current “hot” topic in science education. This book assists teachers and educators with cases that are examples of STEAM teaching. This collection of chapters includes a theory underlying the STEAM teaching model.

Science, technology, engineering and mathematics education (STEM) has been implemented for many years. The most current standards for science education, Next Generation Science Standards (NGSS), includes engineering and environmental sciences. Science education has implicitly included arts education (STEAM) in many forms including, models, diagrams, graphic novels, acting out phenomenon and so on. We view STEAM as a way to include more students in the process(es) of learning and understanding science. Research also supports STEAM because approximately 75% of the nerve pathways in the human brain are dedicated to processing sensory information (reception, decoding and storage). This information is particularly true about visual information. If we want students to learn STEM content more deeply and be able to use the information it behooves us to use methods that will increase the probability of understanding the content.

The research on STEAM education is in its infancy. In education, research is generally based on either a testable model or an ability to identify and describe salient features of practice. This book focuses on case studies of practices and a resultant model that can be further tested and refined/refuted. Each of the chapter authors and book editors are prominent members of a variety of professional organizations that focus on teaching in the STEAM areas.

The book is subdivided into four sections. Section 1 is the introduction to STEAM and its underlying theory. The introductory chapter is the first attempt by the editors to answer the questions, “Why this book?” and “What is STEAM?” The second chapter is a conversation between two educators using the theme, unanswered questions, for the development of a STEAM teaching model. Section 2 provides

the readers with cases that include descriptions of art practices. The case chapters include information about graphic novels, trade books, theatre, movement, fine art and visualization. Section 3 focuses on theme based chapters. Lessons include topics from tower building, air planes, bee pollination, catapults, insulators, engineering, ramps and sliders, marine science, to imagineering. Section 4 uses case information from the book chapters to explain differentiating lessons for special needs students. Finally the conclusion sums up and highlights special features from the cases.

We would like to thank all of the case authors for not only writing such interesting chapters but also for the time they spent peer-reviewing their colleagues' chapters. The peer-review process strengthened every chapter in this book.

We hope that this book motivates you to move forward utilizing STEAM practicing.

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