

# **A Handbook for Analytical Writing**

**Keys to Strategic Thinking**

# Synthesis Lectures on Professionalism and Career Advancement for Scientists and Engineers

Editors

Charles X Ling, University of Western Ontario

Qiang Yang, Hong Kong University of Science and Technology

A Handbook for Analytical Writing: Keys to Strategic Thinking

William E. Winner

2013

A Practical Guide to Gender Diversity for CS Professors

Diana Franklin

2013

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ISBN: 978-3-031-01379-9 print

ISBN: 978-3-031-02507-5 ebook

DOI 10.1007/978-3-031-02507-5

A Publication in the Springer series

*SYNTHESIS LECTURES ON PROFESSIONALISM AND CAREER ADVANCEMENT FOR  
SCIENTISTS AND ENGINEERS*

Lecture #1

Series Editor: Charles X Ling, University of Western Ontario, and Qiang Yang, Hong Kong University of  
Science and Technology

Series ISSN Pending

# A Handbook for Analytical Writing

## Keys to Strategic Thinking

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*SYNTHESIS LECTURES ON PROFESSIONALISM AND CAREER  
ADVANCEMENT FOR SCIENTISTS AND ENGINEERS #1*

## **ABSTRACT**

This handbook accelerates the development of analytical writing skills for high school students, students in higher education, and working professionals in a broad range of careers. This handbook builds on the idea that writing clarifies thought, and that through analytical writing comes improved insight and understanding for making decisions about innovation necessary for socioeconomic development. This short handbook is a simple, comprehensive guide that shows differences between descriptive writing and analytical writing, and how students and teachers work together during the process of discovery-based learning. This handbook provides nuts and bolts ideas for team projects, organizing writing, the process of writing, constructing tables, presenting figures, documenting reference lists, avoiding the barriers to clear writing, and outlines the importance of ethical issues and bias for writers. Finally, there are ideas for evaluating writing, and examples of classroom exercises for students and teachers.

## **KEYWORDS**

writing, analytical, handbook, science, engineering, business, planning, management, decisions, STEM

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# Preface

The simple goal of this handbook is to accelerate the development of analytical writing skills for high school students, students in higher education, and working professionals in a broad range of careers. This handbook builds on the idea that writing clarifies thought, and that through analytical writing comes improved insight and understanding for making decisions about innovation necessary for socioeconomic development.

This handbook explains the differences between descriptive writing and analytical writing, and presents guidelines explaining how students and teachers work together to write and think during the process of discovery-based learning. This handbook provides nuts and bolts ideas for forming functional teams, organizing writing, the process of writing, and constructing tables, figures, and reference lists. This handbook provides tips to avoid the ten most common barriers to clear writing, and outlines the importance of ethical issues and bias for writers. Finally, there are ideas for evaluating writing and examples of classroom exercises for students and teachers.

This handbook fills an important need. Successful scientists, engineers, business people, and other professionals acquire basic writing skills in English courses in high school and college. But for many, such courses provide only the foundation for the writing they do in careers later in life. Most professionals begin learning their analytical writing skills in post-graduate education, with mentors who help students develop documents including theses and journal articles. Later, editors for books and journals provide more writing instruction, and students' writing skills mature out of necessity. Still later, young professionals critically read the writings of others, and provide critical reviews of reports, business plans, and grant proposals. With each review, writing skills improve.

More than a decade of teaching capstone courses to undergraduate students convinced me that students in high school and higher education can, and should, learn analytical writing skills. Teachers, instructors, and professors can use this handbook to teaching writing in a wide range of classes in disciplines ranging from Agriculture to Zoology. This handbook can be an important guide for students enrolled in project-based courses, capstone courses, or research-based courses for both undergraduate and graduate students. This handbook can also be useful for students preparing projects and theses for graduate degrees.

I wrote this handbook so that it does not require a teacher; any student or professional in a career can use this handbook to increase their analytical writing skills. This handbook is a self-teaching guide for anyone wanting to improve analytical writing and thinking skills.

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# Acknowledgments

I wish to thank all those who encouraged me to create this handbook. My wife, Terri Lomax, is a constant source of support. My children, Ben and Maren, and my brothers and sister, Russ, Phil, and Carolyn, taught me life-long lessons about the importance of writing, oral communications, and working in teams. I sincerely appreciate the guidance from David Dalton and Hal Mooney.

# Dedication

I dedicate this handbook to the loving memory of my parents, Jean and Lee.