

The recipe for writing that changes the reader

Martin Rosvall

Which are students' greatest writing challenges?

Which resources for student writing exist?

Which resources for student writing are lacking?

1. Why write a Master's thesis?

2. Ingredients

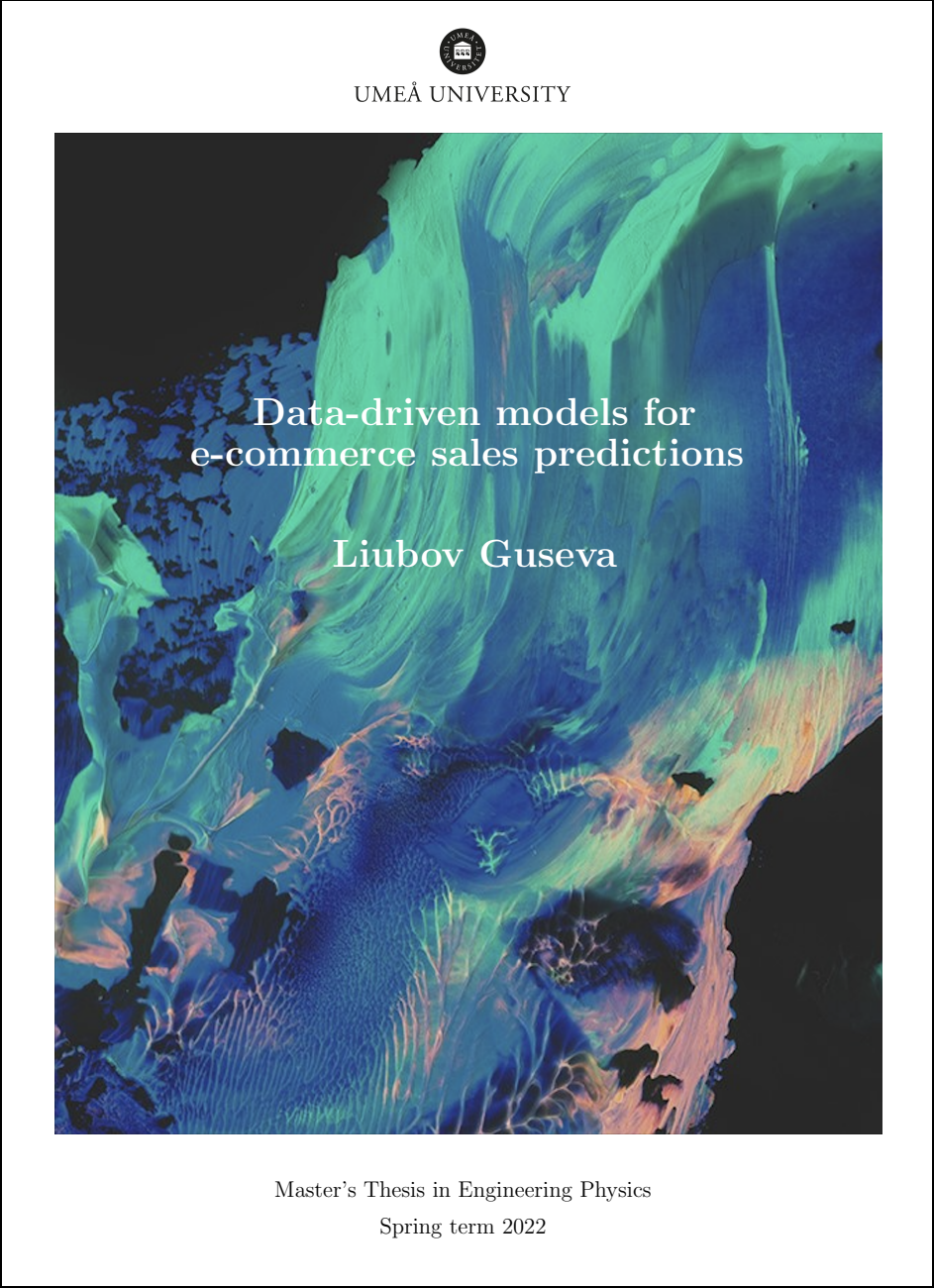
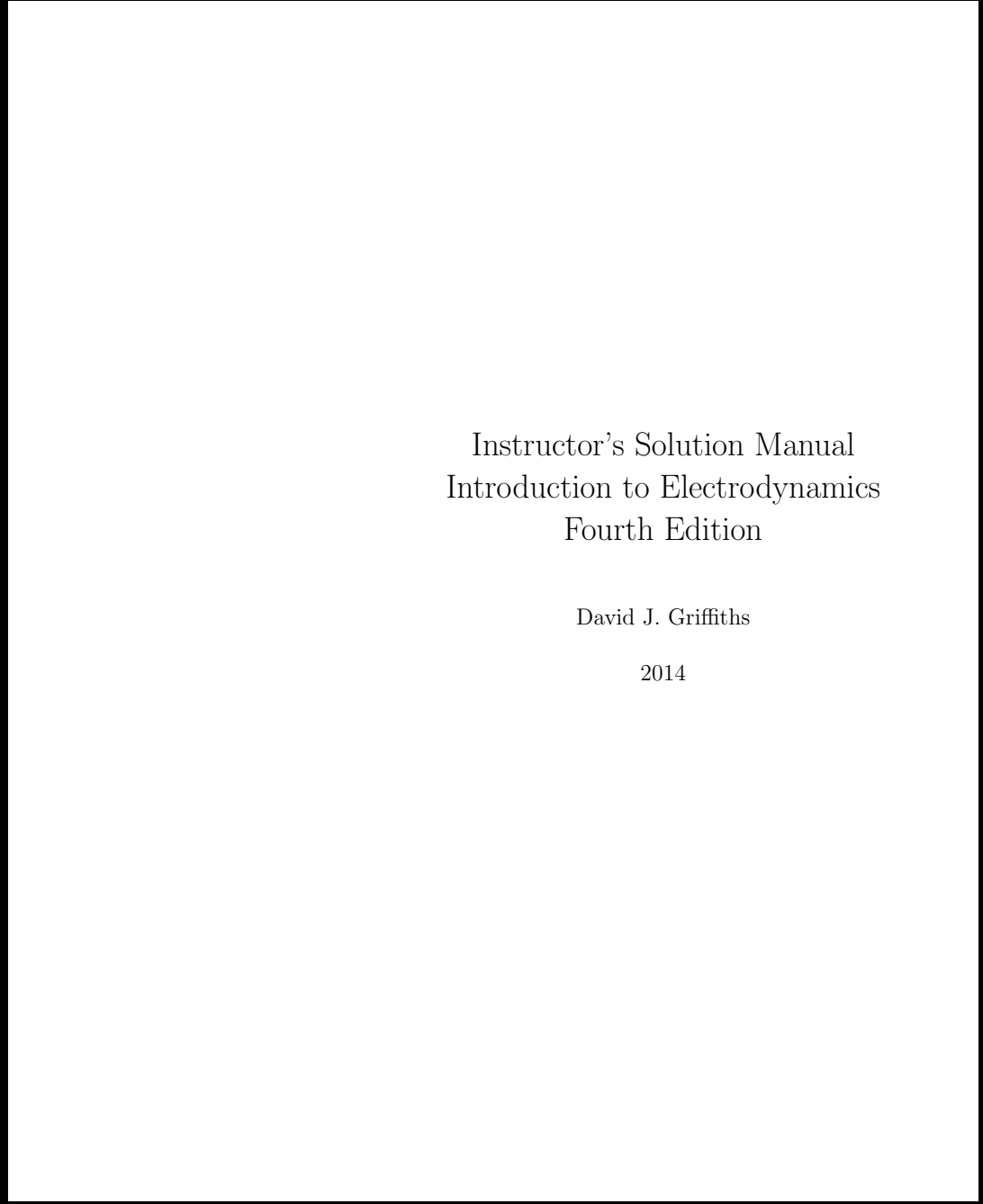
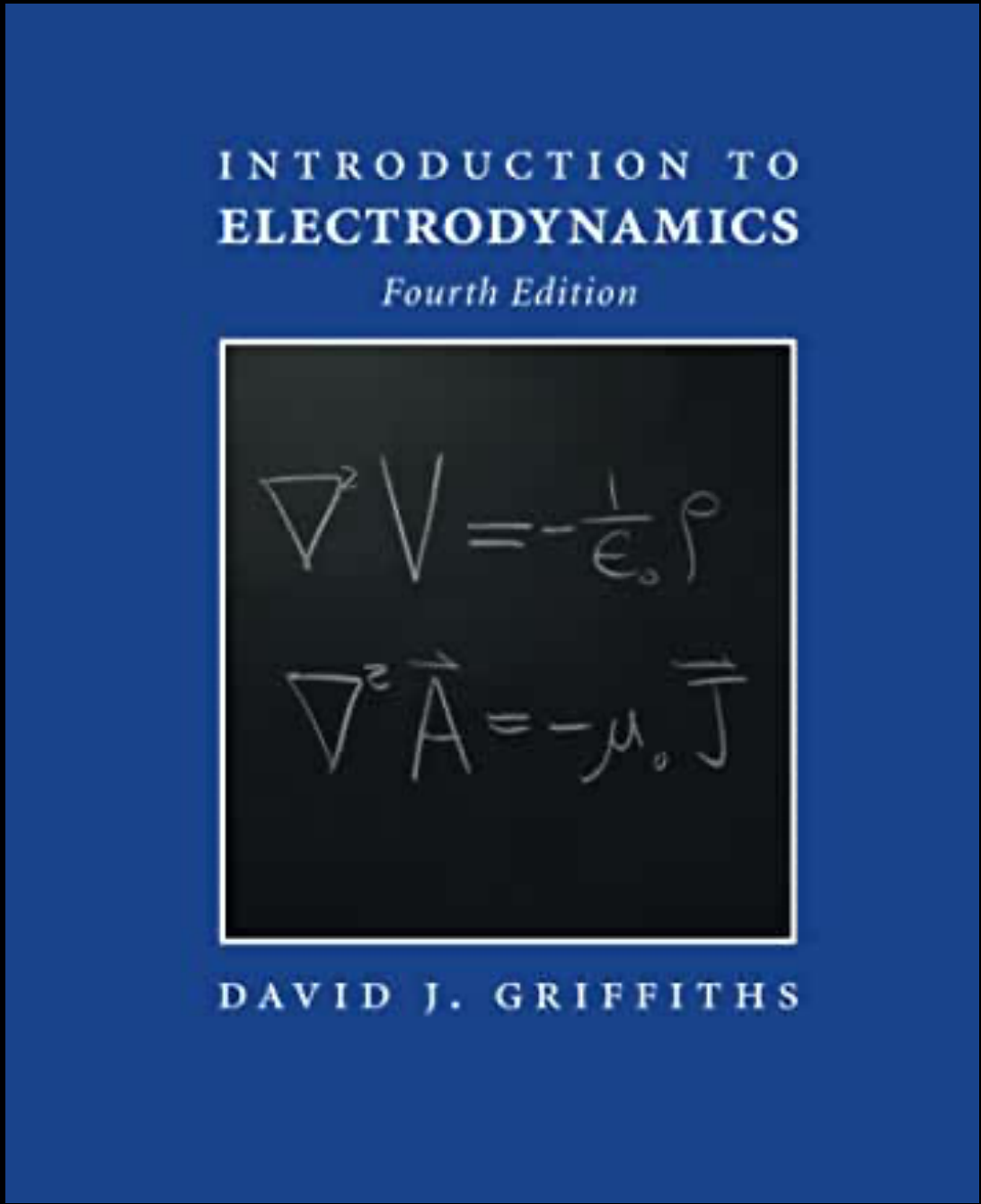
3. Instructions

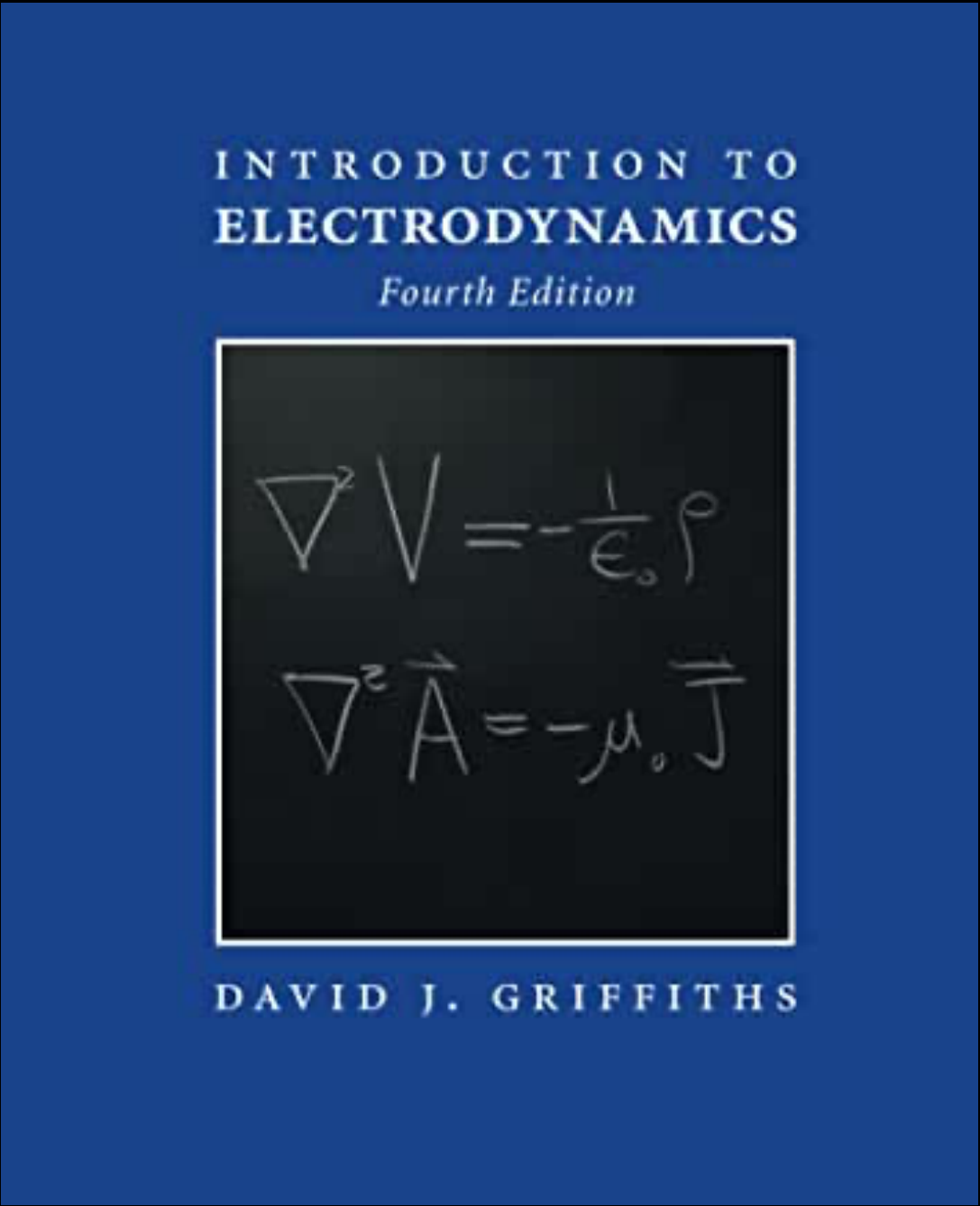
| . Why write a Master's thesis?

Student perspective



9 + 3 + 4 years





vi	Contents	
	1.6 The Theory of Vector Fields 52	
	1.6.1 The Helmholtz Theorem 52	
	1.6.2 Potentials 53	
2 ■	Electrostatics	59
2.1	The Electric Field 59	
2.1.1	Introduction 59	
2.1.2	Coulomb's Law 60	
2.1.3	The Electric Field 61	
2.1.4	Continuous Charge Distributions 63	
2.2	Divergence and Curl of Electrostatic Fields 66	
2.2.1	Field Lines, Flux, and Gauss's Law 66	
2.2.2	The Divergence of E 71	
2.2.3	Applications of Gauss's Law 71	
2.2.4	The Curl of E 77	
2.3	Electric Potential 78	
2.3.1	Introduction to Potential 78	
2.3.2	Comments on Potential 80	
2.3.3	Poisson's Equation and Laplace's Equation 83	
2.3.4	The Potential of a Localized Charge Distribution 84	
2.3.5	Boundary Conditions 88	
2.4	Work and Energy in Electrostatics 91	
2.4.1	The Work It Takes to Move a Charge 91	
2.4.2	The Energy of a Point Charge Distribution 92	
2.4.3	The Energy of a Continuous Charge Distribution 94	
2.4.4	Comments on Electrostatic Energy 96	
2.5	Conductors 97	
2.5.1	Basic Properties 97	
2.5.2	Induced Charges 99	
2.5.3	Surface Charge and the Force on a Conductor 103	
2.5.4	Capacitors 105	
3 ■	Potentials	113
3.1	Laplace's Equation 113	
3.1.1	Introduction 113	
3.1.2	Laplace's Equation in One Dimension 114	
3.1.3	Laplace's Equation in Two Dimensions 115	
3.1.4	Laplace's Equation in Three Dimensions 117	
3.1.5	Boundary Conditions and Uniqueness Theorems 119	
3.1.6	Conductors and the Second Uniqueness Theorem 121	

CHAPTER
1
Vector Analysis

1.1 ■ VECTOR ALGEBRA

1.1.1 ■ Vector Operations

If you walk 4 miles due north and then 3 miles due east (Fig. 1.1), you will have gone a total of 7 miles, but you're *not* 7 miles from where you set out—you're only 5. We need an arithmetic to describe quantities like this, which evidently do not add in the ordinary way. The reason they don't, of course, is that **displacements** (straight line segments going from one point to another) have *direction* as well as *magnitude* (length), and it is essential to take both into account when you combine them. Such objects are called **vectors**: velocity, acceleration, force and momentum are other examples. By contrast, quantities that have magnitude but no direction are called **scalars**: examples include mass, charge, density, and temperature.

I shall use **boldface** (**A**, **B**, and so on) for vectors and ordinary type for scalars. The magnitude of a vector **A** is written $|\mathbf{A}|$ or, more simply, A . In diagrams, vectors are denoted by arrows: the length of the arrow is proportional to the magnitude of the vector, and the arrowhead indicates its direction. **Minus A** ($-\mathbf{A}$) is a vector with the same magnitude as **A** but of opposite direction (Fig. 1.2). Note that vectors have magnitude and direction but *not location*: a displacement of 4 miles due north from Washington is represented by the same vector as a displacement 4 miles north from Baltimore (neglecting, of course, the curvature of the earth). On a diagram, therefore, you can slide the arrow around at will, as long as you don't change its length or direction.

We define four vector operations: addition and three kinds of multiplication.

FIGURE 1.1

FIGURE 1.2

1



UMEA UNIVERSITY

Data-driven models for
e-commerce sales predictions

Liubov Guseva

Master's Thesis in Engineering Physics
Spring term 2022


Why write a Master's thesis?

Student perspective

1. To graduate

2. To show that I have familiarized myself with a subject and understand it

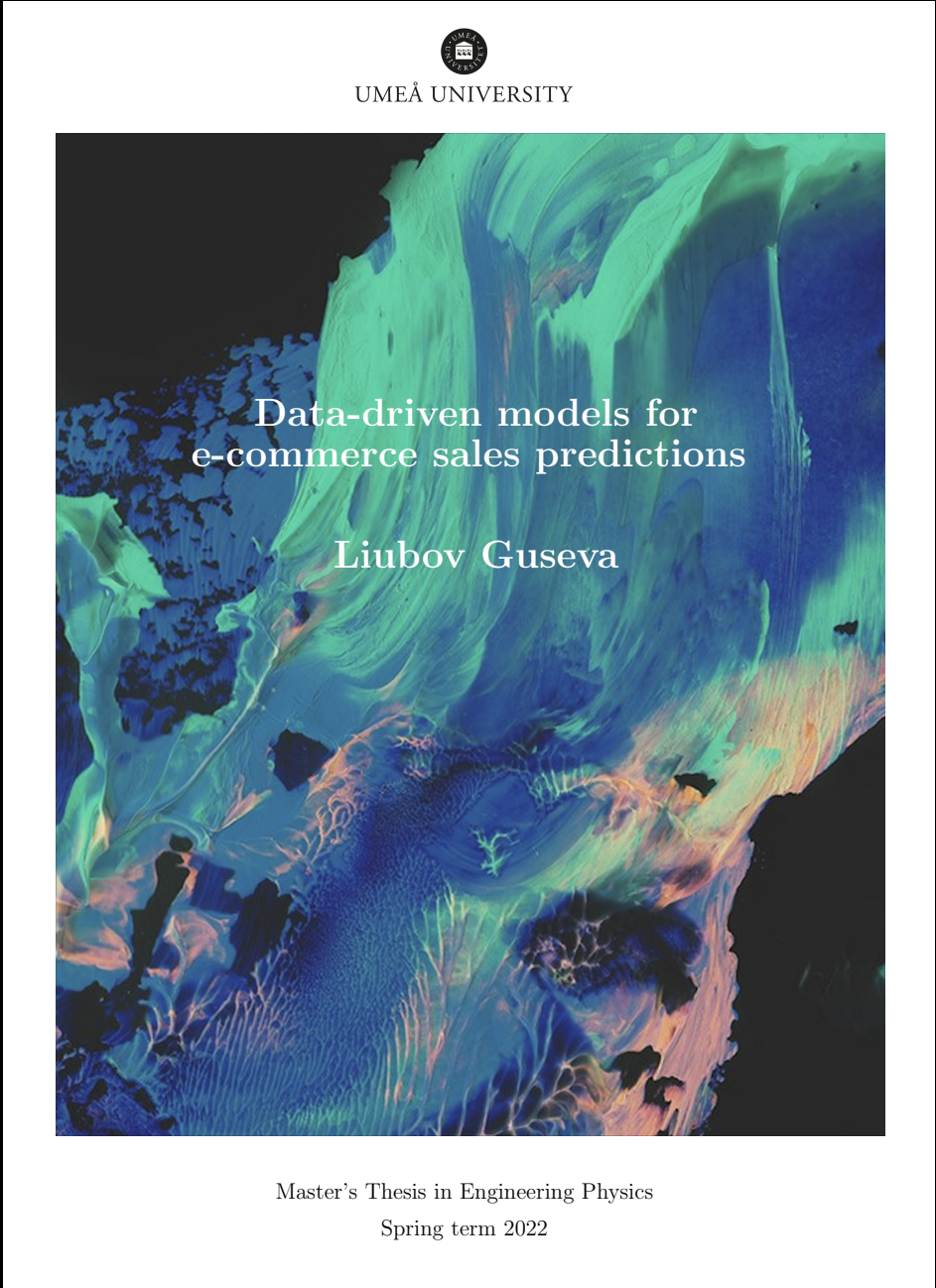
3. To impress the teacher

THINK  **WORLD**





1. Get paid
2. Always finish



Introduction



Methods



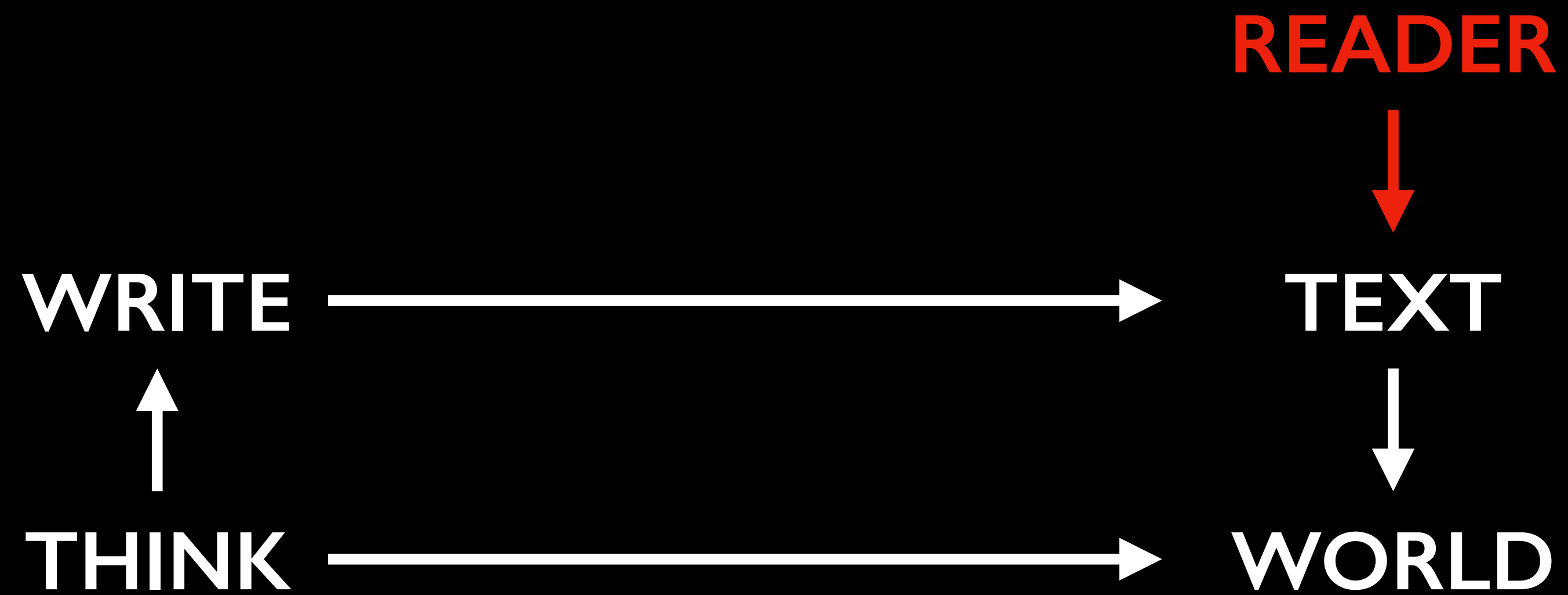
Results



Discussion



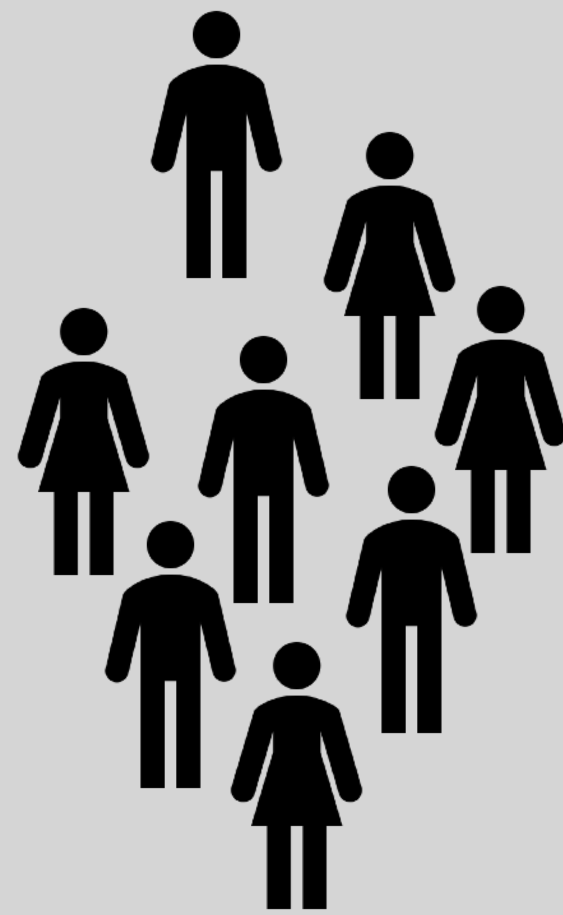
Reader perspective



1. Slow down
2. Don't understand
3. Get aggravated
4. Stop reading

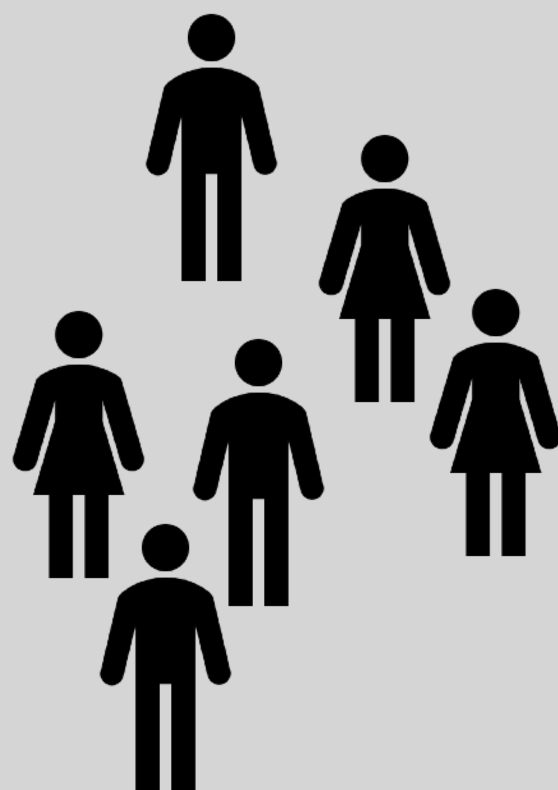
KNOWN

UNKNOWN



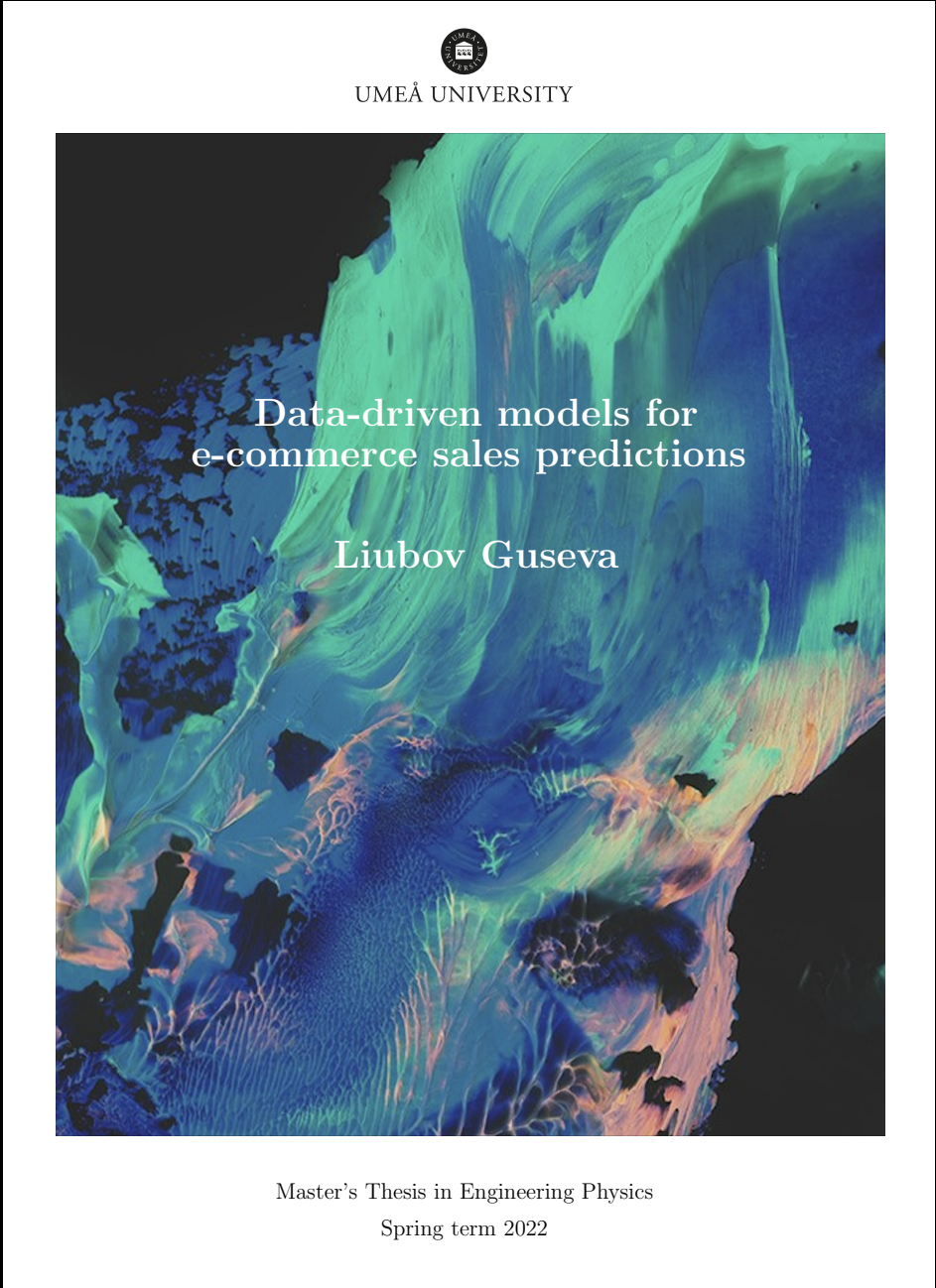
KNOWN

UNKNOWN



KNOWLEDGE GAP → COST

CLOSE GAP → BENEFIT



Introduction



Methods

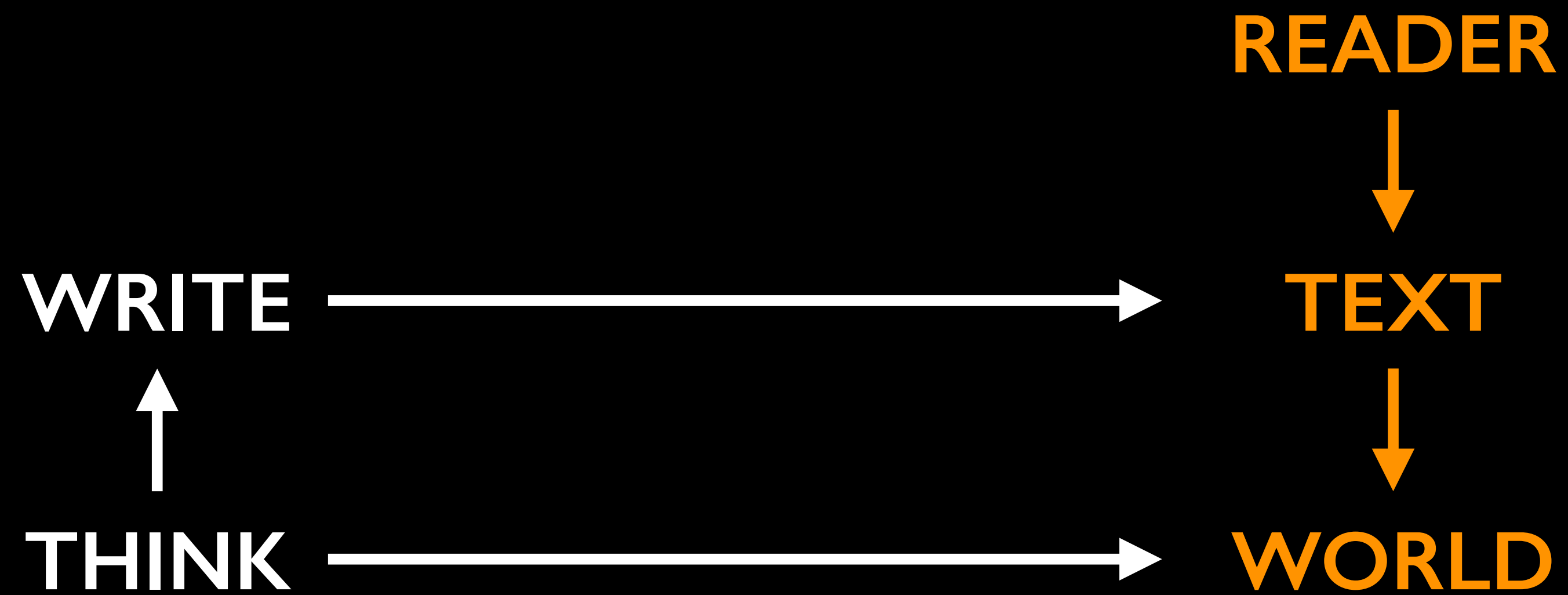


Results



Discussion





1. Valuable = change
2. Persuasive
3. Organized
4. Clear

| . Why write a Master's thesis?

Change the reader by uncovering
and filling a knowledge gap

2.

Ingredients

Text = structure + content

Why Some Ideas Survive
and Others Die

MADE

to

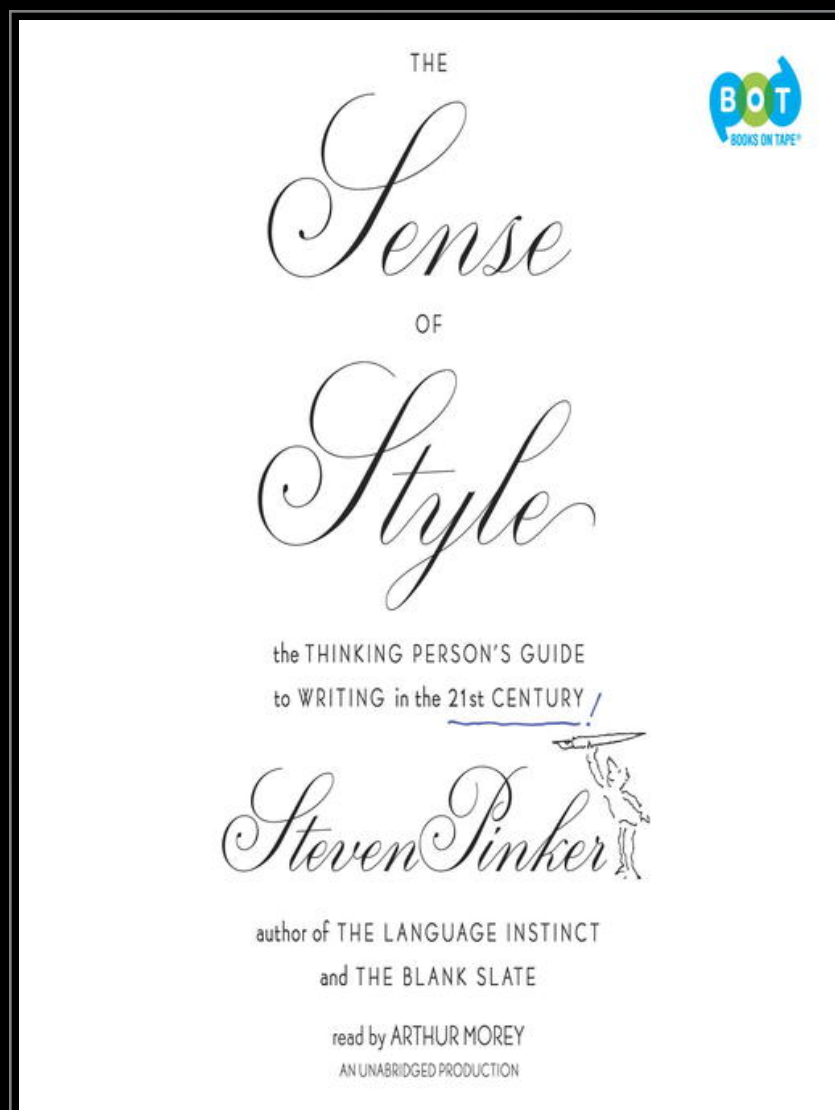
STICK

Chip Heath & Dan Heath

SUCCES

- **Simple** (find the simple in the complex)
- **Unexpected** (identify knowledge gaps)
- **Concrete** (ground your concepts with examples)
- **Credible** (build on previous work)
- **Emotional** (evoke curiosity by highlighting the unknown)
- **Stories** (thread together story modules)

- **Simple** (find the simple in the complex)



Mild exposure to CO can result in accumulated damage over time. Extreme exposure to CO may rapidly be fatal without producing significant warning symptoms.

Using a generator indoors can kill you in minutes. Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell. Never use inside a home or garage.

SUCCES

- **Unexpected** (identify knowledge gaps)
- **Emotional** (evoke curiosity by highlighting the unknown)

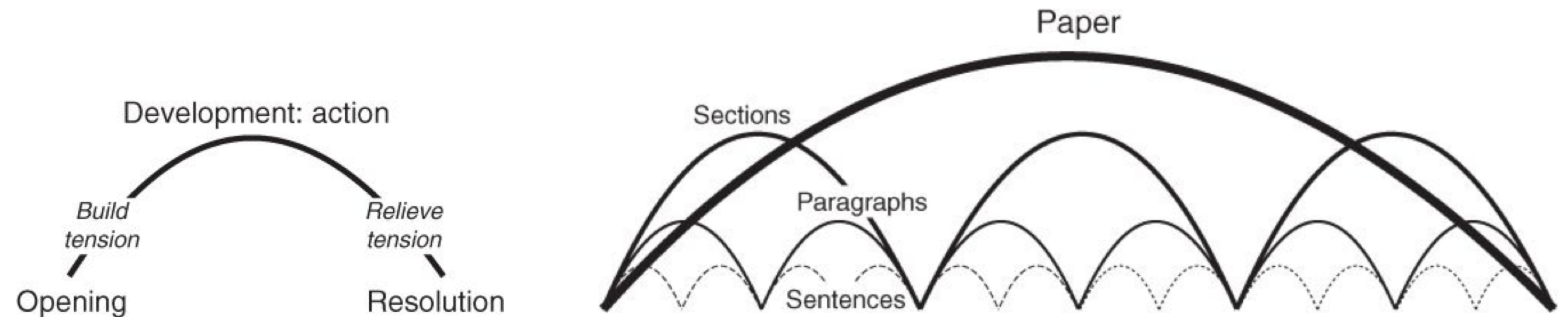
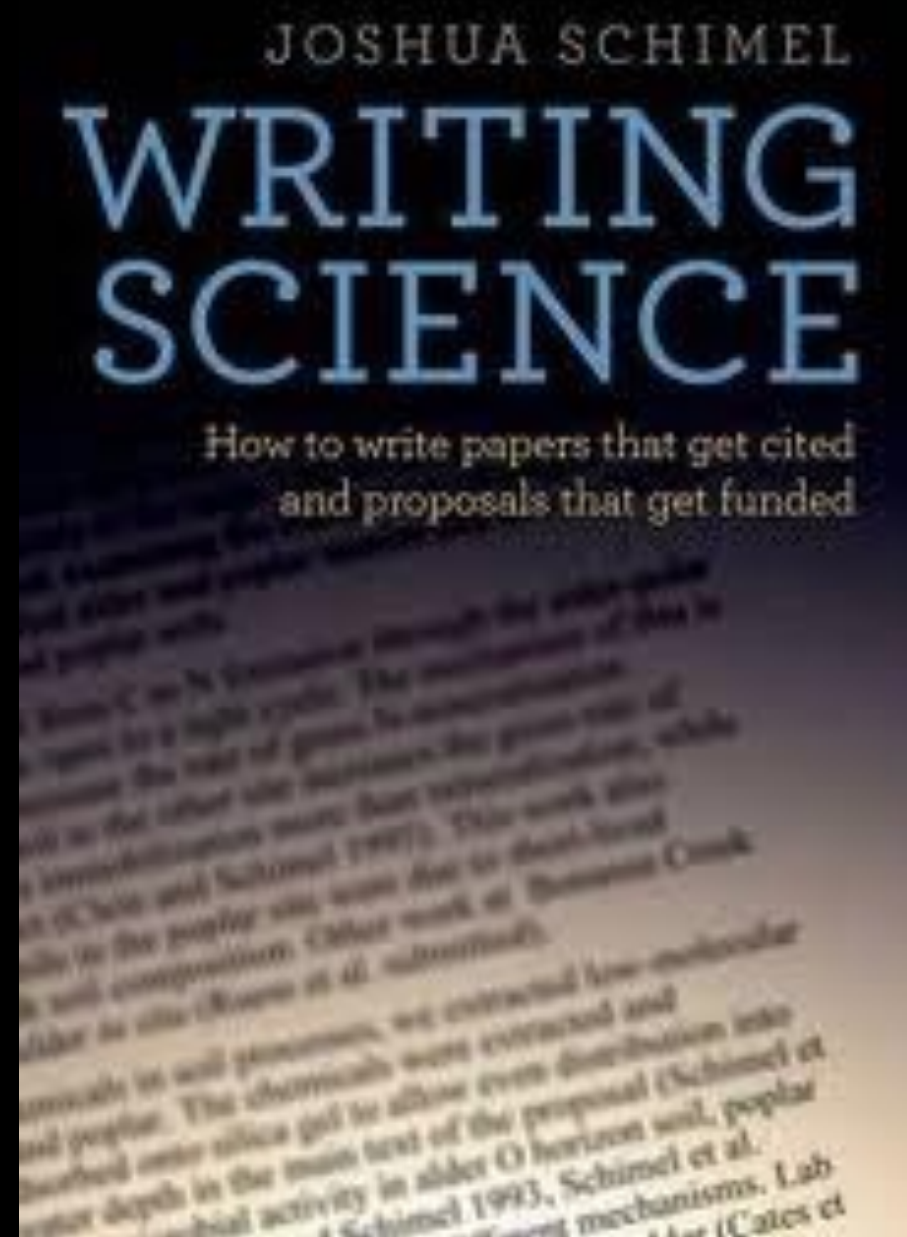
1. What is the status quo?

2. What is wrong or contradictory with the status quo?

3. How does the work go beyond the status quo?

SUCCEs

- **Stories** (thread together story modules)



SUCCES

- **Stories** (bind samman nästlade historieenheter)

- **Sammanfattning**

1. Vad är det vi vet? 2. Vad är det som är fel? 3. Hur går vi bortom?

- **Introduktion**

1. Vad är det vi vet? 2. Vad är det som är fel? 3. Hur går vi bortom?

- **Metod**

1. Vad är det vi vet? 2. Vad är det som är fel? 3. Hur går vi bortom?

- **Resultat och diskussion**

1. Vad är det vi vet? 2. Vad är det som är fel? 3. Hur går vi bortom?

- **Slutsats**

1. Vad är det vi vet? 2. Vad är det som är fel? 3. Hur går vi bortom?

2. Ingredients

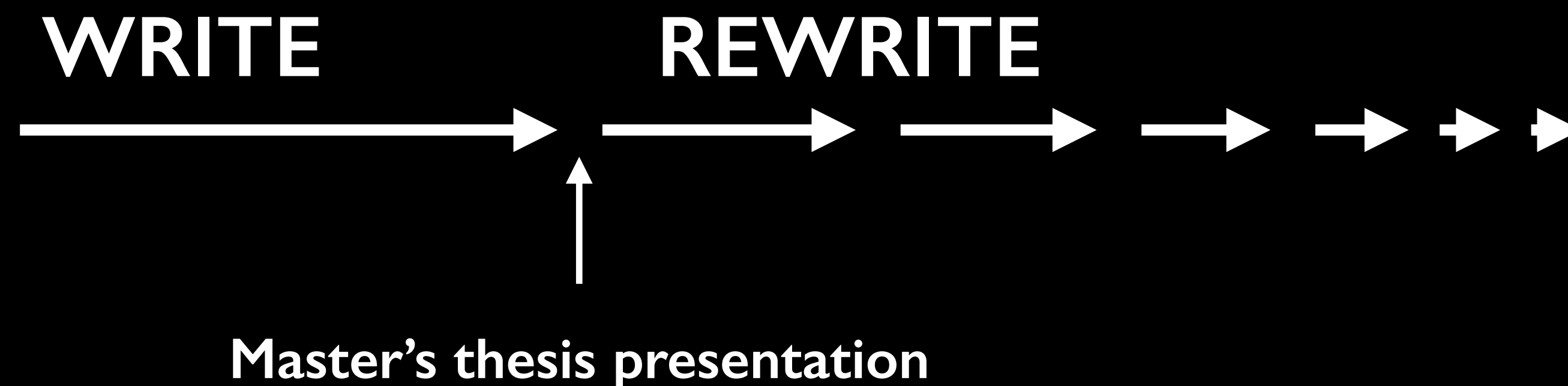
Change the reader lastingly by
employing **SUCCES**-ingredients

3.

Instructions

Writing science is to rewrite

The first draft is an injured patient in need of triage



Build the text like a house
from foundation and walls
to interior finishes and final cleaning

Build the text like a house from foundation and walls to interior finishes and final cleaning

- Foundation – question

1. What is the status quo? 2. What is wrong? 3. How move beyond?

Build the text like a house from foundation and walls to interior finishes and final cleaning

- Foundation – question

1. What is the status quo? 2. What is wrong? 3. How move beyond?

- Structure – outline

Write bulleted lists of important ideas in all parts of the article.

Build the text like a house from foundation and walls to interior finishes and final cleaning

- Foundation – question

1. What is the status quo? 2. What is wrong? 3. How move beyond?

- Structure – outline

Write bulleted lists of important ideas in all parts of the article.

- Interior finishes – paragraphs

Develop each idea into a complete paragraph.

Build the text like a house from foundation and walls to interior finishes and final cleaning

- Foundation – question

1. What is the status quo? 2. What is wrong? 3. How move beyond?

- Structure – outline

Write bulleted lists of important ideas in all parts of the article.

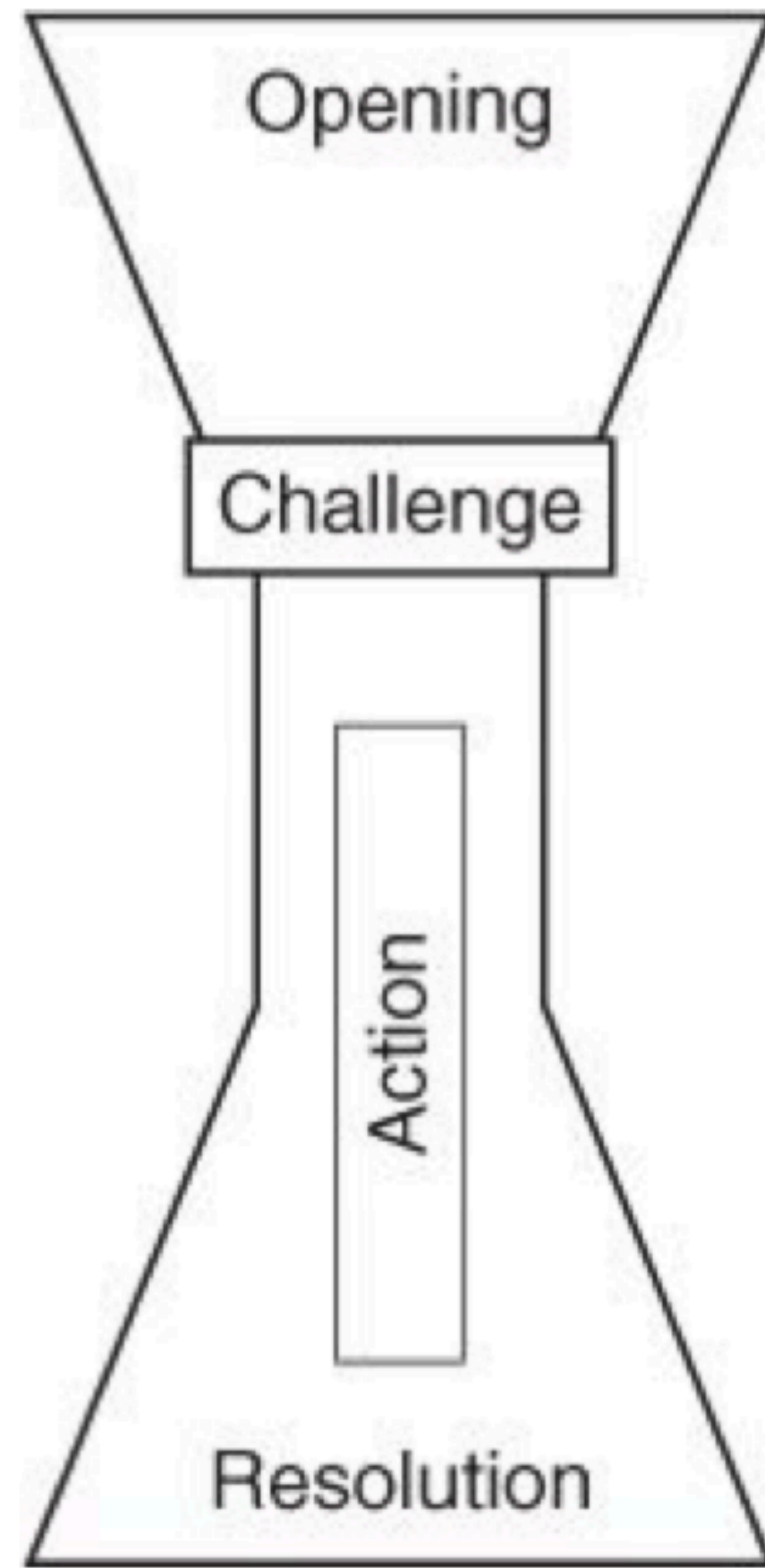
- Interior finishes – paragraphs

Develop each idea into a complete paragraph.

- Final cleaning – condensing

Remove unnecessary words and phrases.

Begin with the abstract and rewrite when the draft is ready



Broad: Which area and topic?

Closer to the knowledge gap: why and what?

Narrow: Which exact problem are you solving?

How did you solve it and what was the result?

What follows immediately from the results?

Broad: What are the consequences?

Short about the final cleaning

Use active voice for effective communication

To address this, a new approach was developed to describe social interactions as the complex dynamic systems that they are.

To address this problem, we developed a new approach to describe social interactions as the complex dynamic systems they are.

In order to review relevant research regarding ethical aspects of persuasive technology, a literature search is done using the following keywords: ...

To review relevant research on ethical aspects of persuasive technology, we searched the literature using the keywords: ...

3. Instructions

Build the text like a house from foundation and walls to interior finishes and final cleaning to enable feedback

CONCLUSION

Change the reader lastingly by employing **SUCCES**-ingredients and build the text like a house with continuous feedback

Which are students' greatest writing challenges?

Which resources for student writing exist?

Which resources for student writing are lacking?