Controlling Complexity

An introduction to question structure

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Michael D. Hardt

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This book is dedicated to Dr. Peter Mosenthal. In his memory, may the contents of this book assist you in becoming a true "passerby" who guides endless learners to "finding their pony."

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Foreword

For years I have been intrigued by the concept of making learning efficient and effective. I have come to recognize that the reason learners most often struggle is due to the gaps in underlying skills required to process content, rather than actual content itself. When I was introduced to Peter Mosenthal and Michael Hardt's structure-based approach to learning, I found a more precise taxonomy for learning at all levels in all contexts, and an excellent tool for defining and correcting those underlying skill gaps.

SkillPlan staff has had the privilege to work directly with both Peter and Michael over the years to learn firsthand about the Mosenthal Taxonomy. Through their mentoring and support, SkillPlan has based much of its instructional strategies on the taxonomy to effectively and efficiently address the skill gaps of our learners.

While working with both Peter and Michael, we discovered that even though there were numerous articles and scholarly journals that helped define the modern concept of literacy, there had not been a publication written and presented on the taxonomy, specifically in the area of Question Structure. SkillPlan has been given the unique opportunity to do just that - present an introduction of Question Structure theory and this learning taxonomy. SkillPlan's Julia Lew worked closely with Michael to capture this learning matrix and has done an outstanding job to illustrate this complicated concept in an accessible way. The layout of the strategies and activities for understanding Question Structure allow the reader to learn the theory and apply it in the areas of instruction and assessment.

As a mentee of Michael Hardt, I have witnessed the benefits of learning and applying Question Structure in various educational environments. I hope that you, the reader, will benefit from this book and that you will be able to apply these strategies to address the skill gaps of your learners.

Kyle Downie
VP of Operations, SkillPlan

Preface

The content of this book is the result of a convergence of over three decades of research from the areas of literacy instruction, psychometrics, and the neurosciences. The theoretical genesis for identifying a structure to the development of knowledge comes from the influential writings of Lev Vygotsky, Benjamin Bloom, and Jerome Bruner. The main idea is that there are explicit structures to all knowledge, and that those structures can be made known and taught.

This general idea of knowledge structure was transformed from theory into practice in the field of test design. This transformation occurred as the result of test development moving from Classical Testing Theory (CTT) to Item Response Theory (IRT). Test designers needed a better way of controlling the difficulty of the items they were using to build tests. The newer IRT models could make this happen as long as there were defined "constructs" being measured. A construct is an explicit representation of an abstract phenomenon. It is the point at which theory is transformed into measurable practice. A construct is what each item on a test is supposed to measure to create a quantitative or qualitative value. The growth of IRT meant that test designers could more precisely measure a greater array of phenomena found in theory.

Of specific importance to this book is the groundbreaking work of a brilliant think tank of analysts, educators, and visionaries. Individuals like John Guthrie, Stanley Jones, Ann Jungeblunt, Irwin Kirsch, Samuel Messick, Robert Mislevy, Peter Mosenthal, Scott Murray, and Albert Tuijnman came together over the course of several years to explicitly develop, test, and ultimately define several theoretical concepts of literacy. This talented collective used these refined operational definitions to develop the International Adult Literacy Survey (IALS). In doing so, they produced a universal framework for measuring literacy that worked regardless of language spoken, content used, or any other personal variables. Their work provided the constructs that define literacy in most large-scale assessment we still use today. They had unintentionally created a kind of "Rosetta Stone" for educators to translate abstract literacy theory into effective literacy practice. The same technical constructs developed for assessment took ten years of research and practice to translate into useable practice. The result is the book you now hold in your hands.

Michael D. Hardt
President, Performance by Design, Inc.

Acknowledgments

Appreciation is extended to all those who assisted with this book. Our deep gratitude and thanks go to our advisory committee members who represent many fields of expertise in education: David Gordon, Sandra Hennessey, Stephen Leppard, Charles Pankratz, and Lynn Riddell. Their insights and advice in the development of this book were invaluable. We thank Lesleigh Smith of the Office of Literacy and Essential Skills for her enthusiasm and vital support. Thank you also to Fern Martel, desktop publisher, for his hard work and valued contribution of the graphic elements and presentation of this book.

About SkillPlan

SkillPlan, the BC Construction Industry Skills Improvement Council, was formed in response to the learning needs of an evolving industry. Our mandate is to provide a solid foundation of Essential Skills, the Velcro ™ to which all other training sticks. Established as a not-for-profit society in 1991, we are a joint labour and management initiative of the construction industry in British Columbia.

The production of this book represents the work of dedicated professionals at SkillPlan, including Julia Lew who translated Michael D. Hardt's research and ideas into the contents of this book, Vanya Wong who provided the editing and polish, and Lynda Fownes and Kyle Downie who contributed to the final product.

For more information, visit SkillPlan's website at www.skillplan.ca.

Introduction

Imagine having the power to positively change a learner's life. Imagine having the power to make that change by giving your learners a strategy that improves their understanding of what you are teaching. You hold this power in your hands – right now – in this book on question structure: how to construct and analyze questions.

Every educator evaluates a learner's comprehension by asking questions, whether on tests or during class discussions. With that in mind, it is critical that educators need to know *how* to ask questions in a way that accurately assesses a learner's abilities. It is also critical that learners understand *what* they are being asked to answer, and know *how* to find that answer. This book addresses these important issues.

A brief history

The theory of question structure was developed out of extensive research and data analysis of national and international literacy surveys. One of the principal researchers, Peter Mosenthal, took the resulting theory of question structure one step further when he asked, "How can this theory be used instructionally?" Mosenthal partnered with Michael D. Hardt, and together they developed an instructional model for question structure theory.

This instructional model has been taught to more than 5,000 educators across North America since 1996 through Michael D. Hardt's Performance by Design workshops, validating studies, and pilot projects, with undeniably positive impact. For educators it has been a paradigm shift; for learners a door-opener.

SkillPlan, an organization that specializes in developing Essential Skills resources, was an early adopter of Mosenthal and Hardt's work, and applied the theory to its own instructional and learning materials. Both Hardt and SkillPlan saw the need to make this information widely available and their partnership has resulted in this book.

What are the goals of this book?

Controlling Complexity provides an introduction to question structure theory with practical applications for educators. The book has two main goals. The first goal is to teach educators question structure theory to enhance their understanding and control of questions. When educators can control questions, they can more accurately assess their learners and "scaffold," or build on, that learning. The second goal is to provide instructional material to teach a question-answering strategy to learners. This strategy will enhance learner success in answering questions.

After finishing this book you will:

- be able to ask questions at specific difficulty levels
- discover your question-asking profile
- understand the framework for scaffolding learning
- be able to teach a theory-based strategy to your learners

This book is for educators in any setting. Whether you are instructing at a vocational institute or community college, in the K-12 system, or in the workplace, you will find the lessons in this book to be invaluable in your instruction.

How is this book organized?

The information in this book is organized using the *Parts* | *Functions* | *Connections* model of learning. The *Parts* | *Functions* | *Connections* model is a useful way to organize your thinking when learning something new. First, you break the new idea or concept down into its *parts*. Then you learn how those parts *function*. Finally, to get the big picture, you *connect* the parts to see how they all work together.

Here is how the *Parts* | *Functions* | *Connections* model is used in the organization of this book.

Parts	Section 1: The Big Picture *An introduction to the parts of question structure.*
Functions	Section 2: Type of Requested Information Section 3: Type of Match Section 4: Type of Processing Section 5: Competing Information *A detailed look at each of the four parts of question structure and how they work.*
Connections	Section 6: Putting it All Together Section 7: Question Structure in Instruction *A look at how the parts work together from an instructional point of view and from a learning point of view.*

This book is both instructional and interactive. Many of the sections start with theory and end with practice. You will learn the theory of question structure with the aid of many examples, and then you will have the opportunity to reinforce what you have learned with exercises. Detailed answer keys are provided for most exercises. To connect the theory to your own practice, some exercises require you to work with your own materials. Some sections include a case study to provide another way to learn how to apply the theory. The final section contains instructional materials and ideas that you can photocopy for use in your classroom.

The examples and exercises in this book use authentic workplace documents as the content material. A workplace focus was chosen for two reasons. First, considering the diversity of settings that educators come from, the workplace seemed the most neutral territory. Second, using these materials provided an opportunity to demonstrate how the theory is applicable beyond the classroom and into the workplace.

The information is presented sequentially, with each section building on information that comes before it. Therefore, we strongly recommend that you go through the entire book in the order it is presented and do not skip any section.

The symbols and graphics used in this book are briefly explained on this page.

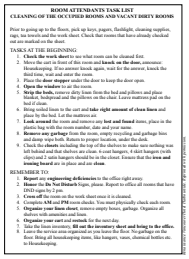
Type of Requested Information (TORI) dial

Type of Match (TOM) dial

Type of Processing (TOP) dial

Competing Information (CI) dial

Indicates information that adds more depth or insight to a topic



ROOM ATTENDANT'S TASK LIST
CLEANING OF THE OCCUPIED ROOMS AND VACANT DIRTY ROOMS

Prior to going up to the floors, pick up keys, papers, flashlight, cleaning supplies, rags, tea towels and the work sheet. Check that rooms that have already checked out are marked on the sheet.

TASKS AT THE BEGINNING:

1. **Check the work sheet** to see what room can be cleaned first.
2. Move the cart in front of this room and **knock on the door**, announce: Housekeeping. If no answer knock again, wait for the answer, knock the third time, wait and enter the room.
3. Place the **door stopper** under the door to keep the door open.
4. **Open the curtains** and the **windows**.
5. **Strip the beds**, move to dirty linen from the bed and pillows and place blanket, bedspread and the pillows on the chair. Leave mattress pad on the bed if clean.
6. Bring soiled linen to the cart and **take right amount of clean linen** and place by the bed. Let the mattress air.
7. **Look around** the room and remove any **lost and found** items, place in the pocket of your apron. Report to office at the end.
8. **Remove any garbage** from the room, empty recycling and garbage bins and damp wipe both. Return to proper location, under the sink.
9. Check the **closets** including the top of the shelves to make sure nothing was left behind and that shelves are clean. 6 coat hangers, 4 skirt hangers (with clips) and 2 satin hangers should be in the closet. Ensure that the **iron and ironing board** are in place and are **clean**.

REMEMBER TO:

1. **Report** any **engineering deficiencies** to the office right away.
2. **Replace** the **Do Not Disturb** Signs, please. Report to office all rooms that have DND signs by 2 pm.
3. **Cross off** the room on the work sheet once it is cleaned.
4. Complete **AM** and **PM** room checks. You must physically check each room.
5. **Organize your linen closet**, remove empty boxes, garbage. Organize all shelves with amenities and linen.
6. **Organize your cart** and **restock** for the next day.
7. **Turn in** all **lost and found** items, **keys** and **report and bring to the office.**
8. Leave the service area organized as you leave that floor. No garbage on the floor. Bring all housekeeping items, like hangers, vases, chemical bottles etc. to Housekeeping.

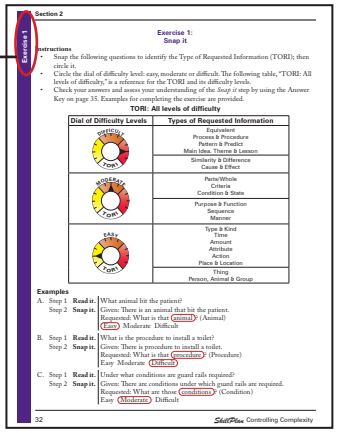
Indicates a document

important information

explanatory notes

exercise pages for educators

Exercise 1



Section 2

Exercise 1:
Snap it

Instructions

Snap the following questions to identify the Type of Requested Information (TORI); then circle it.

- Circle the dial of difficulty level: easy, moderate or difficult. The following table, "TORI: All levels of difficulty," is a reference for the TORI and its difficulty levels.
- Check your answers and assess your understanding of the *Snap it* step by using the Answer Key on page 35. Examples for completing the exercise are provided.

TORI: All levels of difficulty

Dial of Difficulty Levels	Types of Requested Information
DIFFICULT TORI	Equivalent Process & Procedure Pattern & Predict Main Idea, Theme & Lesson
	Similarity & Difference Cause & Effect
MODERATE TORI	Parts/Whole Criteria Condition & State
	Purpose & Function Sequence Manner
EASY TORI	Type & Kind Time Amount Attribute Action Place & Location
	Thing Person, Animal & Group

Examples

A. Step 1 **Read it.** What animal bit the patient?
Step 2 **Snap it.** Given: There is an animal that bit the patient.
Requested: What is that (animal)? (Animal)
Easy Moderate Difficult

B. Step 1 **Read it.** What is the procedure to install a toilet?
Step 2 **Snap it.** Given: There is procedure to install a toilet.
Requested: What is that (procedure)? (Procedure)
Easy Moderate (Difficult)

C. Step 1 **Read it.** Under what conditions are guard rails required?
Step 2 **Snap it.** Given: There are conditions under which guard rails are required.
Requested: What are those (conditions)? (Condition)
Easy (Moderate) Difficult

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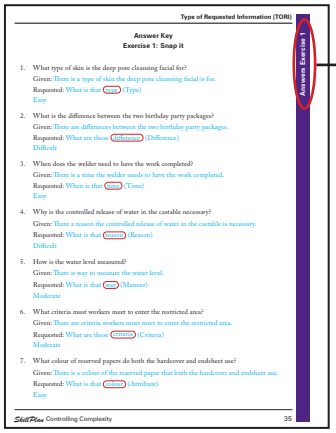

Type of Requested Information (TORI)

Answer Key
Exercise 1: Snap it

1. What type of skin is the deep pore cleansing facial for?
Given: There is a type of skin the deep pore cleansing facial is for.
Requested: What is that (type) (Type)
Easy

2. What is the difference between the two birthday party packages?
Given: There are differences between the two birthday party packages.
Requested: What are those (differences) (Difference)
Difficult

3. When does the welder need to have the work completed?
Given: There is a time the welder needs to have the work completed.
Requested: When is that (time) (Time)
Easy

4. Why is the controlled release of water in the castable necessary?
Given: There a reason the controlled release of water in the castable is necessary.
Requested: What is that (reason) (Reason)
Difficult

5. How is the water level measured?
Given: There is way to measure the water level.
Requested: What is that (way) (Manner)
Moderate

6. What criteria must workers meet to enter the restricted area?
Given: There are criteria workers must meet to enter the restricted area.
Requested: What are those (criteria) (Criteria)
Moderate

7. What colour of reserved papers do both the hardcover and endsheet use?
Given: There is a colour of the reserved paper that both the hardcover and endsheet use.
Requested: What is that (colour) (Attribute)
Easy

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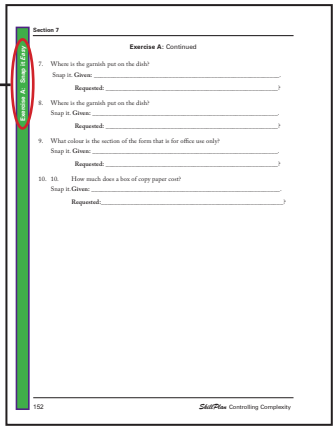
Answer: Exercise 1

answer key pages for educator exercises

exercise and answer key pages for learners

Exercise A: Snap it *Easy*



Section 7

Exercise A: Continued

7. Where is the garnish put on the dish?
Snap it. Given: _____
Requested: _____?

8. Where is the garnish put on the dish?
Snap it. Given: _____
Requested: _____?

9. What colour is the section of the form that is for office use only?
Snap it. Given: _____
Requested: _____?

10. 10. How much does a box of copy paper cost?
Snap it. Given: _____
Requested: _____?

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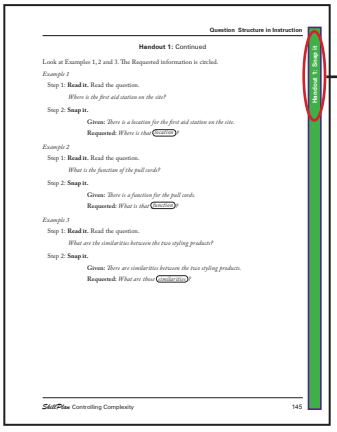

Question Structure in Instruction

Handout 1: Continued

Look at Examples 1, 2 and 3. The Requested information is circled.

Example 1
Step 1: **Read it.** Read the question.
Where is the first aid station on the site?
Step 2: **Snap it.**
Given: *There is a location for the first aid station on the site.*
Requested: *Where is that (location)?*

Example 2
Step 1: **Read it.** Read the question.
What is the function of the pull cords?
Step 2: **Snap it.**
Given: *There is a function for the pull cords.*
Requested: *What is that (function)?*

Example 3
Step 1: **Read it.** Read the question.
What are the similarities between the two styling products?
Step 2: **Snap it.**
Given: *There are similarities between the two styling products.*
Requested: *What are those (similarities)?*

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Handout 1: Snap it

handout pages for learners

What materials do you need?

Before you begin, we suggest you gather the following materials, which you will need as you work through this book:

- ☐ A set of your own 10 questions that meet all these criteria:
  - They are from a single test that you have developed yourself.
  - They are not multiple choice questions.
  - They are based on a document (textbook, chapter, manual, handout, etc).
  - They are chosen randomly from the beginning, middle, and end of the test.
- ☐ A copy of the document the test questions are based on (textbook, chapter, manual, handout, etc).

If you do not have a set of 10 of your own questions, we strongly recommend that you develop a set before you begin. Write a test as if it were for a real group of learners. Follow the criteria as described above, and write questions that vary in difficulty (easy, moderate, and difficult).

A final word before you begin

The ideal way to approach something new is to have an open mind and a willingness to learn. This approach is especially important as you work through this book because the subject matter – questions – is so familiar. As an educator, you use questions daily. Questions are something you know well and use unquestioningly (pun unintentional). Now you are given the opportunity to see questions and question structure through a new lens, and you will find that questions function quite differently than you thought. So although it may be unsettling to find out you may not know everything you thought you did about questions, we hope you find the prospect of understanding how questions work exciting. Be assured that almost every educator feels the same when introduced to these new ideas. The theory may be a bit challenging at the beginning, but stick with it and the pieces will begin to fall into place. We believe you will find the effort worthwhile.