

# The Elements of Education for **CURRICULUM DESIGNERS**

50 Research-Based Principles Every Educator Should Know

**Ei**

ENACTED VS.  
INTENDED VS.  
ASSESSED

**S**

SCALABILITY

**Mi**

MINIMALISM

**It**

ITERATION

**Bd**

BREADTH VS.  
DEPTH

**Gs**

GRAIN SIZE

**Ca**

CASE  
STUDIES

**Tc**

THRESHOLD  
CONCEPTS

**Mm**

MENTAL  
MODELS

**Ac**

CURRICULUM  
ASSESSMENT

**Dc**

DEVELOPMENT  
CYCLE

**Tx**

TEXTBOOKS

**Eq**

ESSENTIAL  
QUESTIONS

**Lu**

USABILITY VS.  
LEARNABILITY

**Fr**

FRAMING

**Cp**

CAPSTONES

**In**

INCLUSIVITY

**Di**

INNOVATOR'S  
DILEMMA

**Ae**

AESTHETICS

**Cs**

CONTENT VS.  
SKILLS

**Lo**

LEARNING  
OUTCOMES

**R**

RIGOR

**Mc**

MAGICIAN'S  
CODE

**Cr**

CROSSWALKS

**Bk**

BACKGROUND  
KNOWLEDGE

**Mo**

MODULARITY

**Ft**

FLEXIBILITY  
TRADEOFF

**Lp**

LEARNING  
PROGRESSIONS

**Db**

BACKWARD  
DESIGN

**A**

ALIGNMENT

REBECCA STRAUSS  
AUSTIN VOLZ  
WILLIAM LIDWELL

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P R E V I E W

# **The Elements of Education for Curriculum Designers**

50 Research-Based Principles  
Every Educator Should Know

Rebecca Strauss, Austin Volz, and William Lidwell

 **Routledge**  
Taylor & Francis Group  
NEW YORK AND LONDON

Designed cover image: TBC

First published 2023

by Routledge

605 Third Avenue, New York, NY 10158

and by Routledge

4 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

*Routledge is an imprint of the Taylor & Francis Group, an informa business*

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*Library of Congress Cataloging-in-Publication Data*

Names: Strauss, Rebecca (Learning designer), author. | Volz, Austin, author. | Lidwell, William, author.

Title: The elements of education for curriculum designers:

50 research-based principles every educator should know /

Rebecca Strauss, Austin Volz, and William Lidwell.

Description: First Edition. | New York: Routledge, 2023.

Identifiers: LCCN 2022029211 | ISBN 9780367336950 (Hardback) |

ISBN 9780367336943 (Paperback) | ISBN 9780429321283 (eBook)

Subjects: LCSH: Curriculum planning. | Instructional systems—Design. | Learning.

Classification: LCC LB2806.15. S768 2023 |

DDC 375/.001—dc23/eng/20220718

LC record available at <https://lcn.loc.gov/2022029211>

ISBN: 978-0-367-33695-0 (hbk)

ISBN: 978-0-367-33694-3 (pbk)

ISBN: 978-0-429-32128-3 (ebk)

DOI: 10.4324/9780429321283

Typeset in Palatino

by Apex CoVantage, LLC

# P R E V I E W

Richard and Lois Strauss  
Connie Chen

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## Acknowledgments

The authors would like to thank many people who have made this work possible.

Dan Veraldi: for every dog walk conversation, happy hour chat, and cooking-turned-writing session that became a chapter. Richard and Lois Strauss: for making it undeniable that the best educators aren't always teachers.

Connie Chen: for the permission to work late as well as the inspiration to laugh and live. Bill and Tamara Volz: for always providing a foundation when everything else is in flux.

We are grateful to our incredible colleagues at Avenues: The World School, who provided us with both direct and indirect support that helped bring this book into existence. Thank you especially to Julia Chun, Amy Rosenberg, Rosanna Satterfield, Jill Butler, Julia Higdon, Jeff Clark, and all the members of the R&D team. Our immense appreciation goes to Luna Zhang, who iterated, adapted, and persevered to create images that complemented our written words.

Finally, we would like to thank everyone at Routledge—and particularly our editor, Lauren Davis—for their patience, professionalism, and support of this book.

# Introduction

If you asked a dozen educators how they understand curriculum design, you'd likely hear a dozen different responses:

- ◆ A superintendent might describe a set of learning standards that articulate what all students should know or be able to do at a given point their learning.
- ◆ A principal might describe the foundational pillars of their school's academic program.
- ◆ A teacher might describe how they go about constructing a syllabus or a lesson plan.
- ◆ A college or guidance counselor might describe their school's diploma requirements.
- ◆ A provost or dean might describe their university's academic footprint, the range of majors and minors offered, and key areas of the faculty's expertise.
- ◆ An educational publisher might describe research, trials, peer review, or editorial processes.
- ◆ A textbook author might describe how they organize content or what gets included in a given chapter and why.
- ◆ A museum educator might describe resources created for classroom teachers or audio guides developed for school visits.
- ◆ An edtech provider might describe integrated engagement tools, interoperability, or embedded assessments.
- ◆ An instructional designer or curriculum writer might describe how they translate learning objectives into activities, resources, and assessments.
- ◆ A policy analyst might describe concrete data points derived from standardized test results.
- ◆ A workforce learning and development specialist might describe reskilling initiatives or leadership training programs.

The sheer breadth of these possible understandings of curriculum design is dizzying, made all the more so given that each one is valid and important—and this list is hardly exhaustive. To make matters even trickier, we haven't even begun to touch on how essential stakeholders, such as students and families, might understand curriculum design!

This volume attempts to bridge such disparate understandings of curriculum design by zeroing in on fifty essential elements. These elements were selected using a few key criteria. Each one is informed by classic seminal research that finds new salience when situated in the context of cutting-edge fields, including cognitive science, educational psychology, and instructional design, as well as by our own first-hand experiences. Each one prioritizes utility, applicability, and practical value. Each one is relevant across the

widest possible range of educational contexts, from K-12 schools to higher education and from publishing to edtech. And each one is critical to the difficult work of crafting effective learning experiences for students of all ages and backgrounds.

Because this book is itself a learning experience for readers, we have tried to practice what we preach. As in a well-designed curriculum, we have used a consistent structure for each section, arranged them alphabetically for ease of reference, and embraced brevity and plain-spokenness in our style. Each element has a consistent two-page structure. The left-hand page provides a concise definition, an overview of the research, an explanation of why the principle matters, and a description of how it works. These paragraphs are followed by a “see also” section of related elements. The right-hand page presents guidelines in the form of “Dos” and “don’ts” for how to apply the principle in practice. These guidelines are not absolute: context, logistical constraints, priorities, and other factors may influence the best method of application. Each element concludes with a quote to inspire further reflection.

These fifty elements are by no means exhaustive. Indeed, it is our hope that this book will inspire further investigation and spark further debate about the essential elements of curriculum design. Because one thing is for sure: in a world characterized by unprecedented complexity and accelerating change, the work of designing effective learning experiences has never been more urgent.

Rebecca Strauss  
Austin Volz  
William Lidwell

# 1 Advance Organizers

**Introductory devices used to facilitate learning, promote transfer, and enhance recall by contextualizing new information in terms of what learners already know.**

Advance organizers help learners understand new information in terms of what they already know. Presented in written, spoken, or visual form prior to the introduction of new material, advance organizers are typically big picture chunks of information. They are distinct from overviews, outlines, inventories, surveys, and synopses in that they are intended to situate (rather than summarize) new material. Examples of advance organizers include concept maps, cause-and-effect diagrams, Venn diagrams, anticipation guides, know, want, learn charts, and storyboards. There are two basic types of advance organizers: expository and comparative.

Expository advance organizers are most useful when the audience has little to no prior knowledge about what is being taught. By spotlighting the key elements of a given unfamiliar topic, expository advance organizers flag what is most important by contextualizing information. For example, before presenting information on how to draw a two-point perspective landscape to an audience with no background in art, an expository advance organizer would first describe horizon lines and vanishing points.

Comparative advance organizers are most useful when the audience already has some prior knowledge about what is being taught. By relating what is about to be learned to what is already known, comparative advance organizers provide a roadmap for how to deepen understanding of a given topic. For example, in teaching more experienced artists about how to draw a two-point perspective landscape, a comparative advance organizer would contrast methods for drawing one-point perspective landscapes to methods for drawing two-point perspective landscapes.

Advance organizers build conceptual understanding, encourage transfer, and promote recall. This is all the more the case when the structure of the advance organizer differs from that of the instruction itself, allowing for dual coding and the presentation of information in multiple formats. For this reason, auditory, graphical, and illustrated advance organizers are often more effective than those that use text alone. Whether the advance organizer is expository or comparative, the technique's effectiveness always hinges upon a well-defined point of entry. Advance organizers are most useful in learning situations where content is presented in a linear fashion, serving as an orienting device to help students situate themselves.

See also Background Knowledge, Five Hat Racks, Framing, Propositional Density, Spiral Curriculum

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Gurlitt, Johannes, Dummel, Sebastian, Schuster, Silvia, and Nückles, Matthias. 2012. "Differently Structured Advance Organizers Lead to Different Initial Schemata and Learning Outcomes." *Instructional Science* 40 (2): 351–369.

Mayer, Richard E. 1979. "Twenty Years of Research on Advance Organizers: Assimilation Theory is Still the Best Predictor of Results." *Instructional Science* 8 (2): 133–167.

**DO** .....

- ◆ Do use advance organizers to contextualize new information.
- ◆ Do use expository advance organizers when learners have little to no background knowledge about the topic being introduced.
- ◆ Do use comparative advance organizers when learners already have some background knowledge about the topic being introduced.
- ◆ Do only use advance organizers at the beginning of instructional units.

**DON'T** .....

- ◆ Don't use expository advance organizers for material that is tangential or digressive.
- ◆ Don't use comparative advance organizers for material that is superficial or inconsequential.
- ◆ Don't use advance organizers to summarize information at the end of a unit.

**REFLECT** .....

Researchers have demonstrated improvements in students' comprehension and recall from advance organizers that rely on familiar structures when they are presented in writing, orally, or pictorially. These studies indicate that when students are provided with an organizational structure in which to fit new knowledge, they learn more effectively and efficiently than when they are left to deduce this conceptual structure for themselves.

## 2 Aesthetics

**Techniques of visual and writing style used to increase the appeal and effectiveness of a curriculum.**

Aesthetic curricula are characterized by clear, straightforward writing and visual aids that are both elegant and integral to the design. They are generally perceived more positively than jargon-heavy curricula or curricula that are overloaded with unnecessary or distracting graphics. As a result, aesthetic curricula have a higher probability of being adopted and are more likely to generate higher levels of investment and attachment from key stakeholders including teachers, students, school administrators, and district leaders. As such, they achieve better learning at scale.

This element applies at all levels of curriculum design, from high-level learning outcomes to daily lessons. For example, consider the following learning outcome from Common Core's Grade 2 Mathematics standards: "draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph." This standard is riddled with unaesthetic complexity: the two sentences represent two different outcomes; the use of jargon (such as "put-together, take-apart, and compare problems") makes the language difficult to parse; and without a visual aid representing what a successful picture graph or bar graph would look like, the outcome is difficult to assess. To make this standard more aesthetic, it could be rephrased more plainly as "record and interpret data presented in the following graphical forms" and accompanied by labeled visual examples of each graphical form.

Resources for individual lessons should employ the same aesthetic principles. The goals of a given handout or worksheet should be clearly stated. Instructions should be phrased simply, briefly, and without the use of jargon. Thoughtful decisions should be made with regard to all visual components including font choice, the use of clip art or other graphic elements, and document layout.

Because aesthetics play a key role in how curricula are used and implemented, teachers and students are less likely to perceive shortcomings in a well-written and visually evocative curriculum. A textbook that is overly pedantic in its writing style, that is printed in a dated font such as Comic Sans, or that utilizes stock images invites a heavy-handed critique from its users. By contrast, a textbook that is written in clear and accessible language, printed in a readable modern font, and incorporates dynamic and original graphics demonstrates a level of intention and care that users perceive more favorably. Even if the unaesthetic textbook actually has higher quality content, it risks lower acceptance and inferior implementation due to a lack of aesthetics. Likewise, even if the more aesthetic textbook has lower quality content, its aesthetic superiority would make teachers and students less likely to notice and more likely to be tolerant of its shortcomings.

**See also** Framing, Labeling Systems, Student-Facing vs. Teacher-Facing, Textbooks, Scalability

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Kurosu, Masaaki, and Kashimura, Kaori. 1995. "Apparent Usability vs. Inherent Usability: Experimental Analysis on the Determinants of the Apparent Usability." In *Conference Companion on Human Factors in Computing Systems*, 292–293. ACM Association for Computing Machinery.

**DO** .....

- ◆ Do use a writing style that is clear, accessible, succinct, and jargon-free.
- ◆ Do incorporate visual aids that provide complementary understanding to the text.
- ◆ Do recognize teachers' and learners' limited willingness to parse, navigate, and use an unaesthetic curriculum.
- ◆ Do err on the side of less is more aesthetic.

**DON'T** .....

- ◆ Don't use a writing style that is vague, dense, verbose, or jargon-heavy.
- ◆ Don't incorporate inessential or superfluous resources.
- ◆ Don't underestimate the role of aesthetics in how a curriculum is perceived.

**REFLECT** .....

For designers, the visceral response is about immediate perception: the pleasantness of a mellow, harmonious sound or the jarring, irritating scratch of fingernails on a rough surface. Here is where the style matters: appearances, whether sound or sight, touch or smell, drive the visceral response. This has nothing to do with how usable, effective, or understandable the product is. It is all about attraction or repulsion. Great designers use their aesthetic sensibilities to drive these visceral responses.