Suggestions for Instructional Materials

Peter Occil

This version of the document is dated 2024-11-04.

These are suggestions to improve core and supplemental instructional materials, for all school subjects, used in U.S. schools from kindergarten to twelfth grade.

1. Instructional materials should be open educational resources (OER) that anyone can access and use free, at least for noncommercial purposes (e.g., CC-BY-NC-SA or Creative Commons Attribution-NonCommercial-ShareAlike). There should be a GitHub or GitLab repository containing the source code of the materials. [1]

2. Instructional materials should devote a majority or more of instructional time to explicit instruction (such as **Rosenshine's principles of instruction**[2] [Amer. Educator, spring 2012]) [3], rather than to "minimally guided instruction" such as discovery learning (or inquiry learning or problem-based learning), and they should not assign hands-on or "inquiry-based" activities to students until the students have mastered the necessary knowledge and skills relating to the activity. See also:

    - "**Why Minimal Guidance During Instruction Does Not Work**[4]" (Kirschner et al.; Educ. Psych. 41, 2006).
    - "**Putting students on the path to learning**[5]" (also in Amer. Educator, spring 2012).
    - Tom Sherrington's "**Mode A + Mode B**[6]".

3. In Literacy, instructional materials should be knowledge-rich and follow the criteria given in the **Knowledge Matters Campaign's review tool**[7]. In other subjects, instructional materials should likewise be **knowledge-rich**[8].

4. There is guidance for:

    - Increasing rigor and quality of **Latino American content**[9] and **black American content**[10] in U.S. History instructional materials.

[1] This suggestion may make it easier for the general public to view, edit, give feedback on, and suggest changes to the instructional materials for various reasons, including: To reduce cognitive load on students and teachers (without reducing rigor); to improve historical accuracy and cultural responsiveness; to correct errors; to best take advantage of research on how people learn (such as retrieval practice and interleaving of topics); to keep the materials up to date with scientific, technological, and historical scholarship; and to reduce preparation time for teachers.

[2] https://www.aft.org/sites/default/files/Rosenshine.pdf

[3] Other principles of explicit instruction are also found in *Explicit Direct Instruction: The Power of the Well-Crafted, Well-Taught Lesson* (Hollingsworth and Ybarra), *Teach FAST* (Tavernetti), and *Direct Instruction: A Practitioner's Handbook* (Kurt Engelmann). One of Rosenshine's principles is weekly and monthly review. Another principle is teachers' asking many questions and checking every student's response (e.g., **"Ratio" by Adam Boxer**). Direct Instruction lessons typically involve frequent rounds of teachers' asking questions and students' answering them in unison, with many rounds being repeated "until firm". https://achemicalorthodoxy.co.uk/2020/02/09/ratio/

[4] https://www.tandfonline.com/doi/abs/10.1207/s15326985ep4102_1

[5] https://www.aft.org/sites/default/files/GuidedInstruction.pdf

[6] https://teacherhead.com/2018/04/22/mode-a-mode-b-effective-teaching-and-a-rich-enacted-curriculum/

[7] https://knowledgematterscampaign.org/review-tool/

[8] https://teacherhead.com/2018/06/06/what-is-a-knowledge-rich-curriculum-principle-and-practice/

[9] https://unidosus.org/publications/analyzing-inclusion-of-latino-contributions-in-us-history-curricula-for-high-school/

[10] https://hub.jhu.edu/2021/02/10/black-history-curricula-lacking-rigor-and-quality/

- Improving **cultural responsiveness**[11] in Literacy instructional materials.
- **Content**[12] that could form part of a knowledge-rich curriculum up to eighth grade.
- The length of daily Social Studies and Science instruction up to fifth grade: **45 minutes**[13] and **60 minutes**[14], respectively.
- Structuring lessons in History and other aspects of Social Studies using the **Four-Question Method**[15].
- Structuring lessons in U.S. Civics using the questions in the civics portion of the naturalization test given by the U.S. government.
- **Instructional practices**[16] and **course content**[17] for Mathematics; also see **Merlo 2024**[18].
- Offering numerous **options to do beyond-grade-level content and exercises**[19] for willing and ready students, as long as these options are always presented to all students [20].

5. Instructional materials in Literacy should teach synonyms for new words to be learned and for other words and phrases prone to overuse. In sixth grade and up, they should include copious lessons on grammatical analysis and knowledge of English syntax, as well as concrete guidance to help students avoid the following in their writing:

    - Overuse of certain words or phrases, both within and across writings [21].
    - Imprecise word choices, especially choices of overused words.
    - Redundancy (which includes unnecessary words) not serving an expressive purpose.
    - Ambiguous language.

These suggestions concern only instructional materials; outside the scope are policies that promote eliminating distractions to learning. [22]

[11] https://steinhardt.nyu.edu/sites/default/files/2020-12/CRE%20Scorecard%20Revised%20Aug%202020.pdf

[12] https://www.coreknowledge.org/core-knowledge-sequence/

[13] https://ccsso.org/sites/default/files/2018-11/Elementary%20SS%20Brief%2045%20Minute%20Version_0.pdf

[14] https://www.nsta.org/nstas-official-positions/elementary-school-science

[15] https://4qmteaching.net/

[16] https://www.thescienceofmath.com/

[17] https://mathacademy.com/courses

[18] https://www.cis.org.au/publication/the-science-of-mathematics-and-how-to-apply-it/

[19] https://slatestarcodex.com/2018/09/04/acc-entry-does-the-education-system-adequately-serve-advanced-students/

[20] One example, similar to the approach found in *Illustrative Mathematics*, is the presence in student workbooks of "Are you ready for more?" followed by a challenging exercise. Another example is a relatively short unit on basic calculus concepts such as limits and continuous functions at the end of Algebra 2, such as the last unit of **Fishtank Learning's Algebra 2 course**. https://www.fishtanklearning.org/curriculum/math/algebra-2/

[21] A list of some of the **overused and discouraged words** is given elsewhere. The works of Emilio Bernal Labrada, Theodore Bernstein, Mario Pei, Bill Bryson, and Richard Lederer, among others, provide guidance on good English usage.

[22] Additional suggestions to improve education, which instructional materials could choose to address, are as follows:(1) Encouraging caregivers to keep mobile phones and social media away from their children, especially if the caregivers themselves use **social media for 1 hour or more daily**.(2) A playlist of made-for-kids videos relating to topics in the Core Knowledge Foundation's ***Core Knowledge Sequence*** (especially videos that invite viewers to answer questions on the topics they present), for each grade from kindergarten to eighth grade, intended for children to optionally watch at home outside of instruction.(3) Teacher training in every school subject should cover the following topics as much as possible: (A) Generally accepted theories on how the mind works, such as cognitive load theory (e.g., severely limited working memory and vast long-term memory), and effective study practices (e.g., retrieval practice, cover/copy/compare, deliberate practice, spaced repetition, interleaving); (B) explicit instruction principles (in the sense of Rosenshine, Engelmann, Tavernetti, Hollingsworth/Ybarra); (C) the importance of devoting most instructional time to explicit instruction rather than to discovery/inquiry/problem-based learning; (D) the importance of not assigning hands-on/"inquiry" activities to students until students have mastered the necessary background knowledge and skills; (E) the importance of eliminating distractions to learning such as **classroom noise**, **classroom overdecoration**, and **mobile phones during school days**; (F) the importance of having a knowledge-rich curriculum (see suggestion 3 above) and of teaching and using academic vocabulary (e.g., Coxhead's Academic Word List); (G) modeling good student behavior and setting consequences for misbehavior; (H) practical ways to implement topics A to G above in teachers' day-to-day work, along with instructional coaching; (I) research references on topics A to H.(4) For Literacy, a free and open-source English grammar reference book designed for middle school and secondary students.(5) The recognition that Social Studies encompasses history, geography (natural and human), culture, civics, and economics and instruction in Social Studies should be knowledge-rich and lay an accent on the country and locality where the instruction takes place. https://www.hhs.gov/surgeongeneral/priorities/youth-mental-health/social-media/index.html https://www.coreknowledge.org/core-knowledge-sequence/ https://www.nathanielswain.com/cognitoriumblog

Suggestion number 5, in particular, is intended to address observations that our language may be getting poorer by the year, in terms of everyday vocabulary and linguistic variety (see, e.g., Emilio Bernal's "Good usage prevents abusage"). [23]

1 License

2 Endnotes

/2024/6/quiet-and-silence https://teachthinkblog.wordpress.com/2021/04/06/minimising-classroom-displays/ https://www.educationnext.org/take-away-their-cellphones-rewire-schools-belonging-achievement/

[23] A list of some of the **overused and discouraged words** is given elsewhere. The works of Emilio Bernal Labrada, Theodore Bernstein, Mario Pei, Bill Bryson, and Richard Lederer, among others, provide guidance on good English usage.

[24] https://creativecommons.org/publicdomain/zero/1.0/