# REL Appalachia Ask A REL Response

Educator Effectiveness
October 2019

## Question:

What peer-reviewed research has been done on the implementation and effectiveness of interactive notebooks?

## Response:

Thank you for your request to our REL Reference Desk regarding evidence-based information on interactive notebooks. Ask A REL is a collaborative reference desk service provided by the 10 Regional Educational Laboratories (RELs) that, by design, functions much in the same way as a technical reference library. Ask A REL provides references, referrals, and brief responses in the form of citations in response to questions about available education research.

Following an established REL Appalachia research protocol, we searched for peer-reviewed articles and other research reports on the implementation and effectiveness of interactive notebooks. We focused on identifying resources that specifically addressed the effects of interactive notebooks on student academic outcomes. However, there was limited research on the effectiveness of interactive notebooks and most of the articles focused on how they can be implemented in a classroom setting. The sources included ERIC and other federally funded databases and organizations, research institutions, academic research databases, and general Internet search engines. For more details, please see the methods section at the end of this document.

The research team did not evaluate the quality of the resources provided in this response; we offer them only for your reference. Also, the search included the most commonly used research databases and search engines to produce the references presented here, but the references are not necessarily comprehensive, and other relevant references and resources may exist. References are listed in alphabetical order, not necessarily in order of relevance.

### References

Kerr, S., Schmeichel, M., & Janis, S. (2015). Using Evernote® as an interactive notebook with pre-service social studies teachers. *Social Studies Research and Practice*, *10*(1), 94–111. Retrieved from https://pdfs.semanticscholar.org/5c57/0804aa31c845f9d9ac4796e84ecce34763bc.pdf?_ga=2.238990272.1330585855.1570481428-424995485.1570202071

*From the abstract:* "Teacher educators are expected to create experiences for pre-service teachers to prepare them for the world of teaching and the ever-changing contexts of schools and teaching. In this article, we discussed integrating two different aspects of teacher education—field-based instruction and technology—through the use of Evernote®, a digital note-taking and archiving application, to create digital interactive student notebooks. Our goal was to provide other practitioners with insight into our use of Evernote® to address two different pedagogical goals of a field-based course: 1) to enrich our pedagogies through the use of a digital interactive notebook with pre-service teachers who were spending more time in Pre-Kindergarten–12 social studies classrooms, and 2) to teach pre-service teachers to use a particular cloud-based technology that could be implemented in their future classrooms. We described Evernote®, how we used it to work against the notorious theory and practice gap in teacher preparation, and discussed the importance of taking the time in teacher education to teach technology to digital natives."

Mallozzi, F., & Heilbronner, N. N. (2013). The effects of using interactive student notebooks and specific written feedback on seventh grade students' science process skills. *Electronic Journal of Science Education*, *17*(3), 1–23. Retrieved from https://eric.ed.gov/?id=EJ1188360

*From the abstract*: "The purpose of this study was to determine whether the consistent use of metacognitive strategies embedded in an Interactive Student Notebook (ISN) would impact science process skills of 7th-grade students. In addition, this study explored whether specific teacher written feedback, provided to students in the ISN, further enhanced the use of ISNs and resulted in greater gains in students' science process skills. A sample of convenience, 7th-grade students ($n$ = 194) in two suburban middle schools in the northeastern United States was utilized for this study. Students participated for 15 weeks in one of three instructional programs: (a) a science instructional program using ISNs embedded with metacognitive strategies and specific written feedback (treatment), (b) a science instructional program using ISNs embedded with metacognitive strategies only (comparison), and (c) a traditional science program using regular classroom instructional practices (control). Students' science process skills were measured using Form A (pretest) and Form B (posttest) of the Diet Cola Test, and data were analyzed using an analysis of variance (ANOVA) and a multiple linear regression. Results revealed a significant main effect for type of instruction. Students in the comparison group ($n$ = 67, $M$ = 10.75, $SD$ = 3.53) scored significantly higher ($p$ = .026, $d$ = .47, moderate) than students in the control group ($n$ = 66, $M$ = 9.10, $SD$ = 3.50) on mean posttest scores of Science Process Skills. There were no significant differences between the remaining groups. In addition, regression analysis suggested that the type of feedback that students received (Task-specific, Process-specific, or Metacognitive-specific) did not predict students' science process posttest scores. Implications for educators and researchers are suggested."

Mason, K., & Bohl, H. (2017). More than data: Using interactive science notebooks to engage students in science and engineering. *Science and Children*, *55*(3), 38–43. Abstract retrieved from https://eric.ed.gov/?id=EJ1161627

*From the abstract:* "A traditional science notebook is an official record of a scientist's research. Even in today's digital world, it is still common practice for scientists to record their experimental procedures, data, analysis, results, notes, and other thoughts on the right pages of a bound notebook in permanent ink with nothing written on the left side or back of a page. The notebook becomes an official record of scientific research. The use of a science notebook in elementary classrooms enables students to be scientists by documenting their investigations in much the same way. Each component of the inquiry and design process is recorded and communicated in their science notebook. In addition, educators have found a productive use for the left-side pages of a science notebook to better engage students in the learning process. While a traditional science notebook only uses the right page, an interactive science notebook uses the left page to facilitate interactions between students and between the student and the teacher. The teacher prompts students to document their scientific thinking on the left page, using teaching strategies such as questioning, sentence stems, concept maps, drawings, and diagrams. For example, the teacher may pose thought-provoking questions at the beginning of a lesson or unit to assess students' prior knowledge or identify misconceptions held by the students. The students' conceptions can be expressed on the left-side page in words, charts, diagrams, or drawings. After recording their own ideas in their notebook, the students are then asked to discuss their ideas about science in small groups or as a whole class. In this way, the notebook is facilitating interactions and scientific discussions within the classroom. During future lessons, the teacher can continue to use the notebook to check for understanding, which facilitates more discussion and informs the next steps of instruction. This also allows a place for students to document their thinking and changes in their thinking during the learning process. As a result, the interactive science notebook is an official record of both student thinking (on the left page) and scientific investigations (on the right page)."

Monem, R., Bennett, K. D., & Barbetta, P. M. (2018). The effects of low-tech and high-tech active student responding strategies during history instruction for students with SLD. *Learning Disabilities: A Contemporary Journal*, *16*(1), 87–106. Retrieved from https://eric.ed.gov/?id=EJ1179954

*From the abstract:* "Instruction in history is important for all students. However, students with specific learning disabilities (SLD) often struggle to learn information in this content area. Instructional strategies proven effective for students with SLD are those that include active student responding (ASR), which are observable, measurable responses to instructional antecedents. Using an alternating treatments design, we compared a low-tech ASR condition (interactive notebook strategy) to a high-tech ASR condition (Quizlet Application on an iPad) used as end-of-session reviews of history content. Participants were seven Hispanic middle school students with SLD. Results showed that all participants made improvements using either ASR method over a series of pretest control probes and that differences between the two conditions were negligible. These results, and implications for practice and future research, are discussed."

Young, J. (2003). Science interactive notebooks in the classroom. *Science Scope, 26*, 44–47. Retrieved from https://achieve.lausd.net/cms/lib/CA01000043/Centricity/Domain/172/science_secondary/Docs/Science%20Interactive%20notebooks%20in%20the%20classroom.pdf

*From the introduction:* "Writing is one of the ways that children learn in science.… When students explain what they have seen and why they think this occurs in writing, they are forced to clarify their thoughts and organize these ideas in a way that others can

understand (Azimioara, Bletterman, and Romero n.d.). Science interactive notebooks are a tool used to strengthen student learning of curriculum (the input) through increased student participation (the output). They can be used in class daily to promote student learning and prove to be successful because they use both the right- and left-brain hemispheres to help sort, categorize, and implement the new knowledge creatively. The right side of the spiral notebook is for writing down information given by the teacher (notes, vocabulary, video notes, labs, etc.). The left side of the spiral shows the processing of the information from the right side (brainstorming, reflections, drawings/figures, worksheets, etc.)."

### Additional Organizations to Consult

National Science Teaching Association: http://www.nsta.org

*From the website:* "The National Science Teachers Association (NSTA)—renamed the National Science Teaching Association in 2019—was founded in 1944 and is headquartered in Arlington, Virginia. It is the largest organization in the world committed to promoting excellence and innovation in science teaching and learning for all. NSTA's current membership of 50,000 includes science teachers, science supervisors, administrators, scientists, business and industry representatives, and others involved in and committed to science education."

- Interactive Notebooks Collection: https://learningcenter.nsta.org/mylibrary/collection.aspx?id=qtexoRRUY5Q_E

## Methods

### Keywords and Search Strings

The following keywords and search strings were used to search the reference databases and other sources:

- "Interactive notebook" OR "student interactive notebook"
- "Interactive notebook" AND (science OR math OR English OR history)

### Databases and Resources

- We searched ERIC, a free online library of more than 1.6 million citations of education research sponsored by the Institute of Education Sciences (IES), for relevant resources. Additionally, we searched the academic database ProQuest, Google Scholar, and the commercial search engine Google.

**Reference Search and Selection Criteria**

In reviewing resources, Reference Desk researchers consider—among other things—these four factors:

- Date of the publication: Searches cover information available within the last ten years, except in the case of nationally known seminal resources.
- Reference sources: IES, nationally funded, and certain other vetted sources known for strict attention to research protocols receive highest priority. Applicable resources must be publicly available online and in English.
- Methodology: The following methodological priorities/considerations guide the review and selection of the references: (a) study types—randomized controlled trials, quasi experiments, surveys, descriptive data analyses, literature reviews, policy briefs, etc., generally in this order; (b) target population, samples (representativeness of the target population, sample size, volunteered or randomly selected), study duration, etc.; (c) limitations, generalizability of the findings and conclusions, etc.
- Existing knowledge base: Vetted resources (e.g., peer-reviewed research journals) are the primary focus, but the research base is occasionally slim or nonexistent. In those cases, the best resources available may include, for example, reports, white papers, guides, reviews in non-peer-reviewed journals, newspaper articles, interviews with content specialists, and organization websites.

Resources included in this document were last accessed on October 25, 2019. URLs, descriptions, and content included here were current at that time.

This memorandum is one in a series of quick-turnaround responses to specific questions posed by education stakeholders in the Appalachia region (Kentucky, Tennessee, Virginia, and West Virginia), which is served by the Regional Educational Laboratory Appalachia (REL AP) at SRI International. This Ask A REL response was developed by REL AP under Contract ED-IES-17-C-0004 from the U.S. Department of Education, Institute of Education Sciences, administered by SRI International. The content does not necessarily reflect the views or policies of IES or the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. government.