

## **REL Appalachia Ask A REL Response**

Online Courses, Teacher Preparation  
December 2018

### **Question:**

What does the research say about the most effective practices for designing and implementing online asynchronous learning models to increase teachers' content knowledge?

### **Response:**

Thank you for your request to our REL Reference Desk regarding evidence-based information about online asynchronous learning models for teacher professional development. 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 online asynchronous learning models for teacher professional development. We focused on identifying resources that specifically addressed the design and implementation of online asynchronous learning models, excluding studies of online courses that involved facilitation, moderation, or other interactive or in-person elements. We also included additional search terms addressing the assessment of teacher competency in such models. 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**

Carey, R., Kleiman, G., Russell, M., Venable, J. D., & Louie, J. (2008). Online courses for math teachers: Comparing self-paced and facilitated cohort approaches. *Journal of Technology, Learning, and Assessment*, 7(3). Retrieved from <https://eric.ed.gov/?id=EJ838629>

*From the abstract:* “This study investigated whether two different versions of an online professional development course produced different impacts on the intended outcomes of the course. Variations of an online course for middle school algebra teachers were created for two experimental conditions. One was an actively facilitated course with asynchronous peer interactions among participants. The second was a self-paced condition, in which neither active facilitation nor peer interactions were available. Both conditions showed significant impact on teachers’ mathematical understanding, pedagogical beliefs, and instructional practices. Surprisingly, the positive outcomes were comparable for both conditions. Further research is needed to determine whether this finding is limited to self-selected teachers, the specifics of this online course, or other factors that limit generalizability.”

Dash, S., de Kramer, R. M., O’Dwyer, L. M., Masters, J., & Russell, M. (2012). Impact of online professional development on teacher quality and student achievement in fifth grade mathematics. *Journal of Research on Technology in Education*, 45(1), 1–26. Retrieved from <https://eric.ed.gov/?id=Ej991837>

*From the abstract:* “Despite the ever-increasing number of online professional development (OPD) programs, relatively few studies have been conducted to examine the efficacy of such programs for teachers and students. This manuscript presents findings from an impact study of OPD courses in fractions, algebraic thinking, and measurement on 79 fifth grade teachers’ pedagogical content knowledge and pedagogical practices as well as their students’ mathematics achievement. The OPD courses were offered one course per semester for three semesters, and each course comprised 1 week of orientation and 6 weeks of course content. Overall, teachers participated in more than approximately 70 hours of OPD. The research findings showed that teachers who had been randomly assigned to the experimental group had significantly greater gains in scores for pedagogical content knowledge and pedagogical practices than teachers in the control group. Nevertheless, the positive changes in teacher outcomes did not translate to any meaningful differences in students’ mathematics achievement.”

Reeves, T. D., & Pedulla, J. J. (2013). Bolstering the impact of online professional development for teachers. *The Journal of Educational Research & Policy Studies*, 1, 50–66. Retrieved from <https://eric.ed.gov/?id=ED545314>

*From the abstract:* “Online professional development (OPD) for teachers is an increasingly popular and viable alternative to face-to-face professional development. While OPD can be effective, little is known about OPD’s design and implementation features that maximize its impact. Using data from a large-scale OPD initiative, this correlational study (N = 1231) investigates antecedents of self-reported changes in teacher knowledge, classroom practice, and student achievement. Three regression analyses replicate the importance of several factors in effective professional development, or online learning more generally, and also identify additional predictors of OPD’s impact(s). The paper also discusses an applied framework for conceptualizing and modeling the effects of OPD’s features on its

successive outcomes. Implications for the design, implementation and evaluation of OPD, directions for future research, and study limitations are discussed.”

Skylar, A. A. (2009). A comparison of asynchronous online text-based lectures and synchronous interactive web conferencing lectures. *Issues in Teacher Education, 18*(2), 69–84. Retrieved from <https://eric.ed.gov/?id=EJ858506>

*From the abstract:* “Online learning environments are more prevalent in teacher education than ever before. In 2009, many instructors are attempting to emulate traditional instructional methods in the online learning environment as much as possible. Online courses are separated into two categories, (1) asynchronous; and (2) synchronous, depending on the nature of the online tool. Asynchronous courses provide learners with a flexible environment that is self-paced with learners accessing course content using a variety of tools such as CD-ROMs, streamed prerecorded audio/video web recordings, and audio podcasts. On the other hand, synchronous courses provide online learning environments that are very interactive and use web conferencing products such as ‘Elluminate Live, Interwise, Wimba Live Classroom, Adobe Acrobat Connect Professional,’ and ‘Saba Centra.’ This study aims to compare asynchronous online environments and synchronous web conferencing environments and their effect on the achievement and satisfaction of students. Specifically, the study investigates whether asynchronous and synchronous online instruction result in differences in student performance, student satisfaction, or student perception of their technology skills. Forty-four preservice general education and special education students receive instruction in two different types of online learning environments (asynchronous text-based lectures using WebCT and synchronous web conferencing lectures using ‘Elluminate Live’). The results of this analysis suggest that both types of lectures are effective in delivering online instruction. In addition, almost three-fourths (30 of the 41 students) of the students indicate that they would rather take an online course that uses synchronous web conferencing lectures than an online asynchronous text-based lecture course. This finding suggests the importance of interactivity on student satisfaction in a course. This study supports the finding that students participating in an online course perceive an increased level of their technology skills.”

### **Additional Ask A REL Responses to Consult**

Ask A REL Appalachia at SRI International. (2018). *What are the characteristics of effective online professional development courses, particularly for ELA and social studies teachers?* Retrieved from <https://ies.ed.gov/ncee/edlabs/regions/appalachia/askarel/aar24.asp>

Ask A REL West at WestEd. (2016). *Summary of research on online professional development for math teachers.* Retrieved from [https://relwest.wested.org/system/documents/pdfs/465/original/REL\\_West\\_Memo\\_Online\\_PD\\_for\\_math\\_teachers\\_508.pdf?1461172349](https://relwest.wested.org/system/documents/pdfs/465/original/REL_West_Memo_Online_PD_for_math_teachers_508.pdf?1461172349)

## Methods

### Keywords and Search Strings

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

- Teacher\* AND “professional development” AND (online OR virtual) AND (asynchronous OR “self-guided” OR “self guided” OR “self-paced” OR “self paced”) AND (content OR competenc\* OR knowledge) AND (impact\* OR eval\* OR design)
- Teacher\* AND “professional development” AND (online OR virtual) AND (assess\* OR eval\*) AND (strateg\* OR behav\* OR pedagog\* OR “instructional competenc\*”)

### 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 December 3, 2018. 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.