Study shows no difference in impact between online and face-to-face professional learning

WHAT THE STUDY SAYS

Adopting new curricula presents both a need and an opportunity for professional development to advance teacher content knowledge and instructional practices for achieving curriculum-specific student outcomes. This study examines two modalities of professional development: face-to-face in a summer workshop and online that included two days of face-to-face orientation and subsequent online learning over several months. Extensive analysis of teacher factors and student learning demonstrates no significant differences between modalities.

Study description

The research team examined professional development for teachers to support the adoption of a yearlong high school environmental science curriculum, *Investigations in Environmental Systems* (2005). The curriculum, designed with support from the National Science Foundation, is now licensed to a publisher for commercial distribution. The professional development accompanied the adoption

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At a glance

This study employed a cluster randomized trial to examine the difference in teacher and student effects in two modalities of professional learning, online and face-to-face. Researchers concluded that both conditions produced results and the differences between modalities were negligible.

THE STUDY

Fishman, B., Konstantopoulous, S., Kubitskey, B., Vath, R., Park, G., Johnson, H., & Edelson, D. (2013, July). Comparing the impact of online and face-to-face professional development in the context of curriculum implementation. *Journal of Teacher Education, 64*(5), 426-438.

of a high school science curriculum and focused on developing teacher knowledge, beliefs, and curriculum-specific instructional practices and increasing student learning in high school environmental science.

The study examines two distinct modalities for teacher professional development. One modality includes a six-day, 48-hour, face-to-face summer workshop. The second modality, called online, included a two-day, 12-hour face-to-face orientation and subsequent online professional development workshop which teachers completed asynchronously and at their own pace. The amount of time teachers engaged in the online workshop ranged from three to 52 hours, with an average of 20 hours of online professional development over the several months following the orientation session.

Researchers emphasized that the opportunity to learn and the content in both modalities were consistent,

thereby strengthening internal and external validity of the comparison. Teachers in both conditions had access to the same computer-based simulations and print-based support materials.

While the content remained consistent, researchers acknowledge taking advantage of each condition's medium, such as how teachers interacted with each other, materials, and facilitators, and the time they spent on professional development activities.

Questions

Researchers posed one overarching question and three subquestions:

How does online professional development compare with face-to-face professional development in terms of effects on teachers and students when the professional development content is held constant?

• Are there differences in teachers' learning in terms of changes in beliefs and knowledge as a

WHAT THIS MEANS FOR PRACTITIONERS

As a result of this study, practitioners have more evidence that professional learning through both online and face-to-face modalities produces similar effects for teacher learning necessary for early-stage adoption of a defined curriculum program and for student effects.

Given the tremendous demand for professional learning related to implementation of new curriculum, especially as districts and states develop and implement new curricula and curricula frameworks aligned with new student standards, districts and states may increase access and cost-effectiveness of professional learning by employing professional learning through both an online and face-to-face modality.

This is especially true if the professional learning is constant over time and will be repeated multiple times so as to recoup the initial cost of design and deployment of effective online learning.

The study, however, does not provide evidence that professional learning for all purposes or all types of teachers is equally effective through both modalities. In fact, professional learning frequently sets goals such as increased collaboration for sharing expertise and increasing consistency in instruction and student learning.

This study looked only at individual learning with no expectation for teacher collaboration to generate shared understanding and expertise.

The introduction of the online modality in a two-day, face-to-face orientation session raises questions about the effectiveness of online professional development alone with no face-to-face component. This study examines teachers who all have responsibility to teach the adopted curriculum.

This finding opens doors for using both face-to-face and online professional development to achieve outcomes related to curriculum adoption and potentially for other purposes. It also suggests that designers of professional development may tap the particular benefits of both online and face-to-face professional development for accomplishing outcomes related to each approach.

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function of different professional development modalities?

- Are there differences in teachers' classroom practices as a function of professional development modalities?
- Are there differences in student learning outcomes as a function of professional development modalities?

The research team acknowledges that asking about the effects of either professional development modality is a question that begins with asking, "Most effective for what purpose?" This study focuses specifically on the purpose of curriculum adoption.

Methodology

Forty-nine teachers (24 face-to-face and 25 online) from six urban, 22 suburban, and 17 rural schools that had adopted the curriculum were randomly assigned to either face-to-face or online professional development. Students were clustered by teacher, with approximately 23 students per teacher for a total of 1,132 students (522 face-to-face and 610 online).

The study employed pre- and post-test measures of teacher content knowledge, self-efficacy, feeling of preparedness to teach environmental science, and general beliefs about science teaching and student content knowledge.

In addition, teachers submitted videotapes of classroom practice, which raters coded using rubrics designed to assess teaching strategies related to the curriculum. The coding examined the degree to which teachers enacted specific strategies from the curriculum, employed general teaching quality, engaged students, and modified or adapted the curriculum.

Analysis

Analysis primarily focused on the independent variable of the online professional development, with face-to-face professional development serving as the comparison group. Researchers conducted multivariate analyses and linear regression models of teacher characteristics such as years of experience, years of teaching science, and certification in environmental science, student demographics and grade point average, and school features including location and socioeconomic status with teacher outcomes and covariate analysis of student outcomes.

Results

Essentially, researchers found no significant difference in effects between online and face-to-face professional development modalities. The list of findings below summarizes specific analyses.

- Teachers' content knowledge was not affected by the professional development condition, meaning that there was no significant difference in content knowledge gained.
- Teachers in both conditions improved in relation to their personal beliefs with no significant difference between the modality through which they receive professional development.
- Teachers in both conditions did not improve in relationship to impersonal belief in either condition.
- Four of the six variables related to teacher beliefs about teaching environmental science were

positively impacted in both conditions.

- Only five of the 23 teacher outcomes related to teachers enacting the core features of the curriculum had significant differences.
- There was no difference in environmental science scores between students in the two professional development conditions.

The findings of no difference in effects between the modalities may appear to suggest no finding at all, researchers note. Yet examined at another level, the finding of no difference is significant. It conveys that, regardless of the modality of professional development, the effects for teachers and students are similar.

This finding opens doors for using both face-to-face and online professional development to achieve outcomes related to curriculum adoptions and potentially for other purposes. It also suggests that designers of professional development may tap the particular benefits of both online and face-to-face professional development for accomplishing outcomes related to each approach.

For example, when participants are in proximity to one another or when the professional development design requires discussion among participants, face-to-face professional development may be more appropriate. When access across time and space or personalization of learning are needed, online professional development may be more appropriate.

Limitations

The study raises questions about the use of various modalities for professional learning. Researchers offer no information about the design of the professional learning beyond the modality through which it was offered. The degree to which the design of the professional development contributed

to the similar effects is unknown.

The subjects in this study may not represent typical teachers new to curriculum. They were teachers whose districts had adopted the curriculum and who had responsibility for teaching the curriculum. Their mean years of experience in teaching was just over 10 years, with almost five years of teaching environmental science, and almost 80% held certification in environmental science.

This particular study examined the adoption of a specific curriculum and pedagogy associated with the curriculum. It does not provide guidance about the difference between online and face-to-face modalities if the content and teacher and student outcomes varied, if the professional learning focused on outcomes beyond early-stage implementation, if teacher experience is more limited, or if teachers' experience with the curriculum were more mature.

For example, in this study, teachers in the online modality worked independently with no expectation for collaboration with peers or calibration of

instructional practice across classrooms.

While the researchers label the online professional development as such, it is important to note that teachers' engagement with the online professional development modality began with a two-day face-to-face orientation.

Most would label this form of professional development as blended rather than online, even though researchers make a point that their program was completely online and because they did not reveal in the orientation the type of data they would collect throughout the study, they were justified with this label.

Perhaps actual modality matters less than the design of the learning experience itself, and unfortunately the researchers provide no information about that aspect of the study. Multiple other research studies confirm that blended professional development is a stronger modality for engaging adults in online learning, increasing completion rates, and for teachers, improving teaching practices. ■