Effectiveness of Online Learning: A Literature Review

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Abstract

Online learning is being utilized in all levels of education from elementary to professional development for educators. This literature review synthesizes research that has examined online learning for professional development for educators, compared online learning to blended and face to face instruction and discovered critical components that support effective online instruction for all students. Results indicate when educators have a positive online experience; they are more likely to transfer their learning to other areas. Results were mixed when comparing online, blended and face to face instruction, with most of the results showing little difference in the learning outcomes of the professional learning for educators. The findings for the essential components needed for effective online instruction include a well-designed course, strong instructor presence, meaningful activities, and collaborative learning with other students.

 **Keywords**: online learning, professional development, course effectiveness, blended, face-to-face, student educator.

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The classrooms of today no longer include one teacher, a group of students, desks, books, paper and pencils. The classrooms of today reach outside of the classroom walls to communicate with the community, the country and the world. We need to prepare our students and teachers to communicate and work productively in a variety of learning environments. Online learning can be a valuable mode of delivery for students and teachers if created to enhance learning and collaboration with others outside of the classroom. It is crucial to prepare our teachers to be able to create and participate in online professional learning and development for their own learning as well as to benefit their student’s learning.

The purpose of this review is to evaluate literature that has examined the effectiveness of online teacher professional development. Online learning and instruction is currently being used in all levels of education, from elementary to professional development for teachers. This review was conducted to answer three research questions: (a) What does the literature say about online learning for professional development of teachers, (b) is online learning more effective than blended or face to face instruction for teacher professional development, and (c) what are the essential components needed for effective online instruction and learning of teachers? First, the method for selecting and including the articles for this review will be discussed. Then, the research findings, discussion and conclusion for the stated questions for this review will be individually addressed in detail.

**Methods**

**Criteria for Inclusion**

 Articles that were included in this review examined the relationships between online learning and instruction for teachers and the effects on their instruction with their students after returning to the classroom upon completion of an online course. Articles also included a comparison between online, blended and face to face instruction, and the effectiveness of those delivery methods. Other articles included the essential components for effective online instruction and learning. The research articles chosen include pre-service teachers, in addition to teachers currently in the classroom and/or receiving their masters’ degrees. Limitations included many teachers who volunteered or self-selected to be part of these studies and many of the studies only focused on one subject area for the research. However, most findings could apply to other subjects and other grade levels.

**Search Procedures**

 The search procedures included two steps. The first step included using ProQuest and ERIC databases to search for literature published from 1986-2012. The following keywords were used in the search: “online learning”; “professional development”; “professional development and learning”; “professional development and effectiveness”; “blended”; “face to face”; “professional development and students”; and “professional development and educators”. The first step resulted in 10,717 articles. In the second step, trade journals, magazines, and reports were excluded, and only peer-reviewed studies were included from the years 2000-2012. This narrowed the search to 66 articles which met the inclusion and exclusion criteria and were used to finalize which articles would be used for this literature review. Out of the 66 articles, 19 were chosen based on the three research questions: seven articles were chosen for question one - What does the literature say about online learning for professional development for teachers? Six articles were chosen for question two - Is online learning more effective than blended or face to face instruction? Seven articles were chosen for question three - What are the essential components needed for effective online instruction and learning? Some articles overlapped and answered more than one research question.

**Results and Findings**

**What does the literature say about online learning for professional development for teachers?**

 In the study, *Transfer of Online Professional Learning to Teachers’ Classroom Practice*, (Herrington, Herrington, Hoban & Reid, 2009) the researchers were evaluating the effectiveness of online professional learning and how that learning was transferred to the teachers’ classroom practice in K-12 classrooms. The study focused on the challenges and consequences for the teachers transferring this professional learning, the conditions that supported teachers in their teaching and professional learning of information and communications technology, and the impact of teacher professional learning on student information and communications technology experiences. The pilot implementation of the professional learning course included 170 teachers as participants, from 85 schools. Then, 36 of the 170 teachers were targeted to participate in the study which included two phases. The first phase was a telephone interview with the teachers that covered development of work programs, implementation of lessons, outcomes, challenges, impact on students, and willingness to improve. These interviews were recorded and analyzed. The second phase involved selection of in-depth cases. A sample of eight teachers were chosen to participate in the more in-depth inquiry based on their willingness and the recommendation of the researcher who interviewed the teachers. The data collected from the eight cases included teacher and class observations, teacher interviews, student interviews and additional artifacts, such as lesson plans and student work samples. The main observations that emerged from the analysis related to the design and implementation of the online modules and the teachers’ need for a community of support which would include not only other teachers, but also technical support. Transfer of learning to the teacher’s classroom was successful when their online learning experience was positive and valuable. The data collected in this study indicated that teacher professional learning through the online modules impacted the students substantially by engaging them in authentic and meaningful learning experiences, the students taking greater control of their learning, responding well to technology and using the technology to express themselves. In another study, *Emerging Innovative Teacher Education from Situated Cognition in a Web-Based Environment,* the researchers’ purpose was to propose principles to establish web-based learning environments incorporating situated cognition to support teacher education (Lin, Hsu, & Cheng, 2011). This study included 29 participants who were pre-service teachers in the field of biology. The three principles proposed included enhancing peripheral participation, strengthening cognitive apprenticeship, and forming special interest groups online. A website, named Technology Enhanced & Assisted Curriculum Headquarter (TEACH) was created to provide support to these pre-service teachers as they took part in course activities of their teacher education. An online self-report survey was used to collect the participants’ usefulness of the program through the use of the TEACH website. The survey results indicated that the function of enhancing peripheral participation in the teacher education course was perceived as quite useful, the pre-service teachers showed positive opinions toward the cognitive apprenticeship strengthened by TEACH in their teacher education program, and the pre-service teachers perceived the function of forming special interest groups online to be useful at a level slightly over neutral. The online environment offers a level of convenience for the participant, because it can eliminate the need for travel, childcare and scheduled class sessions. The online learning format tends to be cost-effective and more appealing overall (Holmes, Signer & MacLeod, 2010). In this study, *Professional Development at a Distance: A Mixed-Method Study Exploring Inservice Teachers’ Views on Presence Online,* researchers wanted to know the participant’s perspective of their online professional development experience relating to course satisfaction, the factors and features that contribute to their satisfaction and the impact on the active classroom from the online professional development experience. Inservice teachers that took online courses over the course of one year were invited to participate in the survey at the end of the course they took. From seven courses, 95 out of 103 participants completed the online survey. The teachers participating represented K-12 urban private school teachers. The results indicated that social presence and teacher presence served as the greatest factors related to participants’ learning and satisfaction in the online experience. Social presence involved interactions with other colleagues. These interactions allowed the participants to develop relationships that promoted learning. There were also suggestions that related to instructor presence in the online course. Suggestions included more feedback and interactions, faster responses and more guidance from the online instructor.

**Is online learning more effective than blended or face to face instruction?**

 Results were mixed throughout the articles reviewed when comparing online, blended and face to face instruction, with most of the results showing little difference in the learning outcome of the educators who participated in these different modes of professional development. In a study, *On-line Instruction: Are the Outcomes the Same*?, the researchers wanted to know if the achievement level of the participants was equal when comparing an online course with a face-to-face format (Warren & Holloman, 2005). There were 52 pre-service teachers who participated in the study. Half of the participants were randomly selected for the online course and the other half for the face-to-face module. Participants were assigned similar coursework and were pre-assessed and post-assessed. Participants also filled out course evaluations. The data gathered showed no significant differences in student outcomes or student satisfaction (Warren & Holloman, 2005). In another study, *Comparing Student Performance: Online Versus Blended Versus Face-to-Face,* the researchers wanted to compare these three delivery modes, online, blended and face-to-face, to determine any significant difference in the participants’ success. The data that was collected included the results of three exams that were given to all three groups and a student evaluation survey. The student survey included questions about student satisfaction, learning effectiveness and faculty satisfaction. From the research data collected, the researchers concluded there was no significant difference in student performance regardless of the delivery format whether, it was taught face-to-face, blended or online. The online and blended design offered more time for participants to complete the coursework than face to face instruction because they didn’t have to attend class. In addition, the blended and online learning modes compared favorably to the face-to-face based on the student evaluations (Larson & Sung, 2009). The effectiveness of online and blended delivery depends on audience and subject matter. In this study, *To Blend or Not to Blend,* (Collopy & Arnold, 2006) the authors were reviewing literature that had researched the impact of learning in an online environment, the participant’s level of comfort in that online mode, and teamwork in online learning. The participants were 80 pre-service teachers enrolled in one of three courses using the Data for School Improvement curriculum. Each class had different delivery methods, online and blends of online and in-class support. Surveys were given to all participants. Participants in both of the blended models reported higher levels of learning than those in the online only group. None of the groups differed in the time it took to complete the coursework. Pre-service teachers in the blended classes reported higher levels of competence and comfort in putting what they learned into practice. The literature shows that transfer is more likely when participants of online learning feel self-efficacious, comfortable with the content and competent in using it (Pugh & Bergen, 2006; Collopy & Arnold, 2009). In a study completed with math teachers, both the online and face-to-face formats altered teachers’ beliefs about teaching math and changed their instructional practice. The study was designed to compare learning outcomes of the same course content presented as either a face-to-face or an online course. Two classes of each format were created. Each class would have no more than 25 participants. Forty-eight teachers were randomly assigned to the online course and 49 were assigned to the face-to-face course. All teachers were currently teaching math to 7th or 8th grade students. There were six data instruments administered, a background survey, a pedagogical beliefs and practices survey, a measure of teachers’ understanding of teaching algebraic concepts, a student survey and a course evaluation. Teachers recognized a balanced approach to instruction was valuable. They increased opportunities for students to discuss problem solving strategies, write about math and engage in higher order problem solving activities. The teachers’ understanding of algebra teaching also increased. It was suggested that a well-designed online course would be more cost effective and time efficient if the same learning outcomes were going to be achieved as the face to face course. According to the student survey in this same study, students of teachers who took the online course reported fewer worksheets and an increase in the teacher asking the students to find new ways to solve problems and explain their answers, and working on extended math problems (Carey, Kleiman, Russell, Venable & Louie, 2008). Again, in an additional study, *Online Versus In-Class Courses,* the research focused on comparing learning outcomes between an online course and a traditional face-to-face course. Participants included teachers enrolled in a Southwest university pursuing their Master’s degree in Education. They were currently teachers of elementary or middle school students. The data was collected and analyzed from exam grades, a literature review paper, and an end-of-course anonymous student satisfaction survey. The results from the paper grades showed no significant difference between the two delivery modes. Participants’ survey results indicated they felt their learning was the same, but there were advantages to the online course over the face to face. The students’ survey showed the online course was convenient, made them more responsible for their own learning, and they were able to review course materials numerous times, if needed (Kirtman, 2009). In yet another study, teachers’ pedagogical beliefs, level of understanding and practices when teaching algebra changed after their online course, but the teachers in the face to face course had the same results. In this study, both the online and face-to-face versions of the course had the teachers participating in the course completing the same coursework, doing the same activities with their own students in their classrooms, and all activities had to be completed within the same eight week period of time. Participants were currently teaching math to students in 1st-5th grade. There were 126 teachers who participated in the study, but were randomly assigned to one of the two delivery modes. The data was collected using the following instruments, a background survey, pedagogical beliefs and practices survey, and a measure of the teachers’ understanding of teaching the base ten system, a student survey, a teacher log and a course evaluation. The results showed both delivery modes of the course changed teachers’ beliefs about teaching math, changed their math instructional practice and increased their understanding of teaching the base ten system to their students. In teacher logs and student surveys, it was noted that there were significant changes in teachers’ instructional practices. These changes included asking students to develop new ways to solve math problems, asking students to describe in writing how they solved math problems and having students work in pairs or groups. Overall, the data suggests that the effects were similar between the two online and face-to-face versions of the course (Russell, Carey, Kleiman & Venable, 2009).

**Limitations**

There were several limitations mentioned with online versus blended and face to face instruction. First, there needs to be research on the quality of the online courses and the student outcomes. There also need to be research on issues related to online course delivery and the impact on students (Warren & Holloman, 2005). Second, many of these studies only focused on one course or one subject. Third, in many of the studies the participants were volunteers or self-selected. Last, many of these courses were long lasting, somewhere between eight and ten weeks. These limitations could have an effect on future research.

**What are the essential components needed for effective online instruction and learning?**

In the articles reviewed, the following components were found to be effective for online instruction and learning. First, a well-designed online course should include content specific to what needs to be learned (Knapczyk, Frey & Wall-Marencik, 2005). Second, this same study found learning activities in online courses should be meaningful to the content material. There should be many opportunities within the course for students to interact with the instructor and other students to maximize learning. Instructors should design assignments where students interact with each other and the content of the course (Knapczyk, Frey & Wall-Marencik, 2005; Dixxon, 2010). Third, studies also found that a strong instructor presence was important for mentoring and facilitating discussions to support learning among the group along with feedback for assignments (Knapczyk, Frey & Wall-Marencik, 2005; Dixxon, 2010). Fourth, online courses need cooperative/collaborative active learning. These would include application activities, discussion forums, group projects, and current event assignments (Dixxon, 2010; Rhode, 2009). In several articles read for this review, it was emphasized that interactions with other learners and the instructor was crucial to achieve a desired learning outcome (Knapczyk, Frey & Wall-Marencik, 2005; Dixxon, 2010; Rhode, 2009).

 In addition to the components mentioned above for effective online instruction, Thomas Guskey’s use of the Kirkpatrick model (Guskey, 2000) to describe four levels of evaluation is important when designing and evaluating an online course. These levels are: participants’ reactions to the online course; whether or not participants achieved the desired learning outcomes; participants’ use of new knowledge and skills in their teaching; and resultant improvements in student learning. In this same article, Guskey makes the point that it is important to evaluate the user experience along with whether or not participants achieved the desired learning outcomes because a positive experience along with the achieving learning outcomes are both necessary conditions for making effective changes to teaching practice (Doherty, 2010).

**Conclusion**

An online course for professional development can provide a support community for teachers during and after the course completion. Relationships that are developed in online communities allow participants to continue the learning process beyond the course. An online course offers a level of convenience for the participant because it can eliminate travel and child care expenses and also allows freedom of time for completion of the course requirements. We offer many professional learning courses after school in our district. However, many classes have had to be cancelled because of low enrollment. Teachers lead busy lives before, during and after school. This semester we offered our first online professional development course to our teachers during the month of May. This normally is a very busy month during the school year and teachers usually do not have a lot of extra time. However, 20 teachers enrolled in the course and are very excited about participating. A positive and valuable online learning experience for the participant can encourage transfer of learning to the classroom and modifications of pedagogy and classroom instruction.

 In regards to online versus blended and face to face instruction, there needs to be more research done on the quality of the course offerings and the learning outcomes of the participants. The course design, selection of the right materials, an active instructor and interaction with other students is more important than the delivery method. Some coursework requires some face-to-face time. Evidence suggests there are similar learning outcomes whether students are online, blended or face-to-face, but there is a preference for online and blended for convenience and method of learning. Blended courses allow for questions to be answered in more detail and relationships to be developed that will then be continued in the online environment. Online courses should be at least six to eight weeks to provide time for learning and interactions with other members of the class. Content should be well-developed and activities should provide for a variety of learning styles. Instructor presence is also an important component in the online course environment. Instructors should respond to student questions, be available and be knowledgeable about the online environment.

Design of the course content is important to facilitate and promote meaningful learning in an online environment. Creating multiple ways of meaningful communications between students and the instructor is an important component of the online course. Discussion boards, chat rooms, blog postings and an email component are just a few possible avenues of communication between online participants. Assignments should be designed to have the students interact with each other and the content of the course. Assignments should also be meaningful and authentic. Participants’ learning is enhanced through projects and activities that have meaning and/or authentic to the learning. An evaluation component should also be included for an effective online course. The evaluation should include participants’ reactions to the online course, whether or not participants achieved the desired learning outcomes, participants’ use of new knowledge and skills in their teaching, and resultant improvements in student learning. This is not only useful for the student, but for the instructor to make improvements to the online learning course (Guskey, 2000).

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