



National Standards for Quality Online Programs (K-12)

Literature Review

Conducted and Compiled by Kay Shattuck, D.Ed., QM Director of Research, and
Barbra Burch, QM Manager of Research & Development
May 2, 2018

Introduction

This literature review has been conducted to inform the work of the National Standards for Quality Online Program revisions, a project led by a partnership between Quality Matters and the Virtual Learning Leadership Alliance. It includes a short summary of the relevant peer-reviewed literature followed by an alphabetical listing of the resources correlated to the National Standards for Quality Online Teaching in which they apply. This review includes an appendix that lists additional standards sets, which can be consulted as resources, as well as abstracts for most of the references listed.

Methodology

The review of the research literature was conducted in February through April of 2018 by the QM Research team of Barbra Burch and Kay Shattuck. Searches, using keywords K-12, online learning, online teaching, and online programs, within the date range of 2014-2018 were completed. Only references from research-based publications were recorded. The following databases were searched in order to achieve saturation:

- [Michigan Virtual Learning Research Institute's Research Clearinghouse](#)
- [QM Research Library](#) The QM Library contains more than 1,200 expert vetted references focused on online and blended learning.
- Academic databases Academic Search Complete, ProQuest Dissertations & Theses, Google Scholar, Google
- Virtual academic repositories Research Gate and Academic.edu

The findings were recorded on an Excel spreadsheet, with each entry including the reference, the abstract from the original publication, and, often, reviewer notes. An analysis of each reference as to its relationship with each of the iNACOL Standards was made and documented on a Google spreadsheet by the QM Research Team. The final step was an analysis of the research gathered in general relationship to the iNACOL standards, which resulted in a summary of the findings.

Summary of K-12 online programs review of the literature

Although distance education in K-12 has a longer than often realized history, focused research has been emerging only in the past few years. Yet, much of the research focuses on the micro-levels of pedagogy, that is, direct engagement and support between the teacher and students, and less often on broader program leadership and policies topics.

The professional and scholarly research related to K-12 online programs most often provides demographic and descriptive data focused on characteristics, features, and scope of existing online programs. Research focused on leadership, program-level themes on support services, and input from students, parents, and teachers in ways that might inform policy and evaluation is limited. This is not a new observation of online and blended learning research. Limited investigation of access, equity, ethics, systems, and institutions (macro-level research), and management, organization, costs/benefits, quality assurance, educational technology, innovation, professional development, and learner support services (meso-level of research) has been documented with a resulting call for attention to a broader research agenda for online and blended education (Zawacki-Richter & Anderson, 2014).

Barbour (2018) pointed out (and citing Ferdig, 2010) that too few researchers have focused their efforts to change the question from “Does online learning work?” to “Under what conditions does online learning work?” (p. 2). To that might be added, what leadership, policies, procedures, and management will enable necessary institutional conditions for quality online programs to work?

Quality online program standards provide a key function by directing attention to the macro- and meso-levels of assuring quality online and blended learning with institutional and evaluations standards aimed at the leadership and policy levels.

Cited references

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References Correlated to National Standards for Quality Online Programs

See [Appendix](#) for abstracts.

1. Institution Standards

- a. Standards Mission Statement
- b. Governance
- c. Leadership
- d. Planning
- e. Organizational Staffing
- f. Organizational Commitment
- g. Financial and Material Resources
- h. Equity and Access
- i. Integrity and Accountability

2. Teaching and Learning Standards

- a. Curriculum and Course Design
- b. Instruction
- c. Assessment of Student Performance

3. Support Standards

- a. Faculty
- b. Students
- c. Guidance Services
- d. Organizational Support
- e. Parents/Guardians

4. Evaluation Standards

- a. Program Evaluation
- b. Program Improvement

Reference	1	2	3	4
Ahn, J., & McEachin, A. (2017). Student enrollment patterns and achievement in Ohio's online charter schools. <i>Educational Researcher</i> , 46(1), 44-47.	X			
Allison, C. (2015). The use of instructional videos in K-12 classrooms: A mixed-method study (Doctoral dissertation, Indiana University of Pennsylvania). ProQuest Dissertations and Theses Database. , (UMI No. 3688706).		X		
Archambault, L., & Kennedy, K. (2016). Moving forward and moving on: continuing the mission of K-12 online education research. <i>Journal of Online Learning Research</i> , 2(3), 201-203. Waynesville, NC, USA: Association for the Advancement of Computing in Education (AACE). Retrieved from https://www.learntechlib.org/p/174256/	X	X	X	X
Archambault, L., Kennedy, K., Shelton, C., Dalal, M., McAllister, L. & Huyett, S. (2016). Incremental progress: re-examining field experiences in K-12 online learning contexts in the United States. <i>Journal of Online Learning Research</i> , 2(3), 303-326. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved from http://files.eric.ed.gov/fulltext/EJ1148603.pdf	X	X	X	X
Barbour, M. K. (2018, February). Examining online research in higher education: what can we replicate in K-12. Retrieved from https://www.academia.edu/35871463/Barbour_M._K._2018_-_Lessons_for_K-12_distance_online_and_blended_learning_from_research_in_higher_education._Lansing_MI_Michigan_Virtual_Learning_Research_Institute_at_Michigan_Virtual_University?auto=download&campaign=weekly_digest	X	X	X	X
Barbour, M. K., Adelstein, D., & Morrison, J. (2018). Still forgotten teachers in K-12 online learning: examining the perceptions of teachers who develop K-12 online courses. In K. Kennedy & R.E. Ferdig (Eds.), <i>Handbook of research on K-12 online and blended learning</i> (2nd ed., pp. 88-). Retrieved from Google Scholar April 22, 2018	X	X	X	
Barbour, M. K., Miron, G., & Huerta, L. (2017). <i>Virtual schools in the U.S.: Case studies of policy, performance, and research evidence</i> . Lansing, MI: Michigan Virtual University. Retrieved from http://media.mivu.org/institute/pdf/VSCase-17.pdf	X			X
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Cavanaugh, C., Maor, D., & McCarthy, A. (2014). K-12 mobile learning. In R. E. Ferdig & K. Kennedy (Eds.), <i>Handbook of research on K-12 online and blended learning</i> (pp. 391-414). Retrieved February 13, 2016, from http://press.etc.cmu.edu/files/Handbook-Blended-Learning_Ferdig-Kennedy-et-al_web.pdf	X	X	X	X
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Appendix

Other Standards Sets:

[QM Quality Matters Annotated Program Criteria](#)

[Future Ready Framework](#)

Abstracts

Ahn, J., & McEachin, A. (2017). Student enrollment patterns and achievement in Ohio's online charter schools. *Educational Researcher*, 46(1), 44-47.

We utilize state data of nearly 1.7 million students in Ohio to study a specific section of online education: K-12 schools that deliver most, if not all, education online, lack of brick-and-mortar presence, and enroll students full-time. First, we explore e-school enrollment patterns and how these patterns vary by student subgroups and geography. Second, we evaluate the impact of e-schools on students' learning, comparing student outcomes in e-schools to outcomes in two other schooling types, traditional charter schools and traditional public schools. Our results show that students and families appear to self-segregate in start ways where low-income, lower achieving White students are more likely to choose e-schools while low-income, lower achieving minority students are more likely to opt into the traditional charter school sector. Our results also show that students in e-schools are performing worse on standardized assessments than their peers in traditional charter and traditional public schools. We close with policy recommendations and areas for future research. [From conclusion] "In the history of education technology research, it is well established that technology as a delivery mechanism (e.g., whether something is online or face-to-face) has no direct impact on student learning outcomes (Bernard et al., 2004; Clark, 1983; Fishman et al., 2013). What really matters is understanding how the introduction of technology impacts who chooses to participate in particular learning environments and what they experience that result in learning outcomes" (p. 55)

Allison, C. (2015). The use of instructional videos in K-12 classrooms: A mixed-method study (Doctoral dissertation, Indiana University of Pennsylvania). ProQuest Dissertations and Theses Database. (UMI No. 3688706).

[Author-provided Abstract]: The purpose of this study was to explore the use of instructional videos in K - 12 classrooms. This study sought to determine how often the use of instructional videos occurred in K - 12 classrooms, how the instructional videos were used, teachers' perceptions of the advantages and disadvantages of using instructional videos, and the frequency with which the cognitive theory of multimedia learning recommendations were included in the design of the videos that were being used. A mixed-method study was used to answer the research questions. The superintendents at two different school districts in southwestern Pennsylvania distributed an online, researcher-created survey via a mass e-mail system. A total of 324 classroom teachers were invited to participate in the study, and 73 teachers responded to the survey creating a 23 % response rate. Based on the findings, 85 % of the K - 12 educators who responded used instructional video technology for educational purposes. The frequency of use results indicated that the teachers used instructional videos frequently and maintained a collection of different video titles. Teachers reported using instructional videos to reinforce, motivate, meet student needs, provide authentic content, and demonstrate. Advantages to using instructional videos included maximize instructional time, teacher and student control, multi-modal instruction, and motivation. Teachers reported the following disadvantages to using instructional videos: lack of access, full group viewing, lack of interaction, and learning barriers. The cognitive theory of multimedia learning is a theory of how people learn from multimedia messages and defines specific design features that, based on empirical research, improve learning. This study investigated the use of the design principles recommended by the cognitive theory of multimedia learning. Although the principles of voice, politeness, pre-training, personalization, and signaling were present the majority of the time in the instructional videos used by K - 12 teachers, the principles of redundancy, spatial contiguity, temporal contiguity, coherence, and segmentation were used less frequently.

Archambault, L., & Kennedy, K. (2016). Moving forward and moving on: continuing the mission of K-12 online education research. *Journal of Online Learning Research*, 2(3), 201-203. Waynesville, NC, USA: Association for the Advancement of Computing in Education (AACE). Retrieved from <https://www.learntechlib.org/p/174256/>

Education in online and blended settings, particularly at the elementary and secondary school levels, is growing and gaining acceptance as a viable supplement or replacement for traditional, face-to-face learning. Gemin, Pape, Vashaw, and Watson (2015) report that all 50 states and the District of Columbia offer some form of online learning experiences for K-12 students. This has been true for a number of years, and the expansion continues to take hold, particularly as districts see advantages to offering coursework online, including but not limited to providing opportunities for credit recovery and advanced placement, accommodating for scheduling conflicts, and alleviating pressure for students with personal illnesses, teen pregnancy, or other health-related needs. As online learning grows in popularity, qualified teachers who are skilled and adept at creating conducive learning environments are essential components to the quality of instruction. Since teacher education programs are the mainstay of preparing educators to be effective, these programs should adapt to include not only traditional, face-to-face field experience opportunities, but also online ones (Kennedy & Archambault, 2012). Despite a call for the evolution and transformation of teacher education,

little has dramatically changed, including how the practical, hands-on component, known as a field experience is structured. Previous research, conducted in 2010, specifically examined how teacher education programs address K-12 online learning through their field experiences. The authors found that only 1.3% of those responding demonstrated evidence of a hands-on, practical experience in an online or blended educational setting (Kennedy & Archambault, 2012). As we quickly approach the second decade of the 21st century, it behooves us to reexamine how teacher education programs have evolved and explore the current implementation of field experiences within online learning contexts.

Archambault, L., Kennedy, K., Shelton, C., Dalal, M., McAllister, L. & Huyett, S. (2016). Incremental progress: re-examining field experiences in K-12 online learning contexts in the United States. *Journal of Online Learning Research*, 2(3), 303-326. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved from <http://files.eric.ed.gov/fulltext/EJ1148603.pdf>

[Author-provided abstract] Despite the call for a transformation of teacher education in the 21st century, surprisingly little has changed. This includes how the practical, hands-on component, known as a field experience is structured. Previous research, conducted in 2010, specifically examining how teacher education programs address K-12 online learning through their field experiences found that only seven programs nationally, or 1.3% of responding programs, offered such an experience. In comparison, the current study found a small expansion that includes 15 programs across nine states, representing 3.5% of responding teacher education programs. Despite being limited, there appears to be slow, targeted growth, particularly in contexts in which partnerships have formed between teacher education programs and K-12 online providers. However, while signs of progress are evident, significant work to move the field forward with respect to K-12 online teacher preparation remains.

Barbour, M. (2018, February). Examining online research in higher education: what can we replicate in K-12. Retrieved from [https://www.academia.edu/35871463/Barbour M. K. 2018 . Lessons for K-12 distance online and blended learning from research in higher education. Lansing MI Michigan Virtual Learning Research Institute at Michigan Virtual University?auto=download&campaign=weekly_digest](https://www.academia.edu/35871463/Barbour_M._K._2018_.Lessons_for_K-12_distance_online_and_blended_learning_from_research_in_higher_education.Lansing_MI_Michigan_Virtual_Learning_Research_Institute_at_Michigan_Virtual_University?auto=download&campaign=weekly_digest)

[Quoting from the introduction] In what was the first systematic examination of the literature focused specifically on K-12 distance education, Rice (2006) wrote that, “a paucity of research exists when examining high school students enrolled in virtual schools, and the research base is smaller still when the population of students is further narrowed to the elementary grades” (p. 430). A full decade later, this theme is still a relatively accurate description of the field of K-12 distance, online, and blended learning. While there has been a significant increase in the amount of literature and research related to K-12 distance, online, and blended learning, practice continues to outpace the availability of useful research. One of the reasons for this state of affairs, as highlighted in the next section, is that too few researchers have focused their efforts to

change the question from “Does online learning work?” to “Under what conditions does online learning work?” (Ferdig, 2010). The goal of this report is to briefly examine the state of research in K-12 distance, online, and blended learning. I will begin by briefly outlining some of the themes in the research based on reviews of the literature that have been conducted, as well as explaining some of the limitations of this research. Next, I will also describe a series of studies that have been conducted within the higher education context that may be of particular interest to researchers and practitioners in the K- 12 distance, online, and blended environments. Finally, I will discuss themes from these higher education studies within the context of future K-12 distance, online, and blended learning research. (p. 3) The absence of research focused on K-12 distance, online, and blended learning has led some scholars to look for guidance in the research conducted in higher education and other adult contexts. (p.4)

[QM Reviewer's note] Methodology relied on most cited (thereby assuming most influential) distance, online, blend articles in 20 identified educational technology journals as extracted from Google Scholar. No K-12 focused articles were found in a number of key journals. The author then presented the most often cited references usually in higher education environments and provided his k-12 perspective on how the finding might be translated into the k-12 online/blended environments. The report provides "lessons for k-12 distance, online and blended researchers" and "lessons for k-12 distance, online, and blended practitioners."

Barbour, M. K., Adelstein, D., & Morrison, J. (2018). Still forgotten teachers in K-12 online learning: examining the perceptions of teachers who develop K-12 online courses. In K. Kennedy & R.E. Ferdig (Eds.), *Handbook of research on K-12 online and blended learning* (2nd ed., pp. 88-). Retrieved from Google Scholar April 22, 2018.

[Author-provided abstract] Like many K-12 online learning programs, the Illinois Virtual High School (IVHS) began by utilizing vendor content to populate its online courses. In its fourth year, the IVHS began a concerted effort to design more of its own online content internally. The aim of this chapter was to examine the support needed and application of tools used by IVHS course developers. The data consisted of a two-part, web-based survey and telephone interviews that were analyzed using descriptive statistics and inductive analysis. The results showed these developers had a strong design to use interactive elements in their courses as well as working in cooperative teams. Further, developers were opposed to using a forced template, but indicated a need for general structural guidance and additional professional development. Finally, developers recommended that subject matter teacher-developers and multimedia specialists be split into two separate roles, and these individuals work together as a part of a team. Further research should be conducted on the intended use of technology tools requested.

Barbour, M. K., Miron, G., & Huerta, L. (2017). *Virtual schools in the U.S.: Case studies of policy, performance, and research evidence*. Lansing, MI: Michigan Virtual University. Retrieved from <http://media.mivu.org/institute/pdf/VSCase-17.pdf>

[Provided executive summary] Over the last five years, the National Education Policy Center has published a Virtual Schools in the U.S.: Politics, Performance, Policy, and Research Evidence report. As an extension of the data collected for the Virtual Schools in the U.S. 2017 report (Molnar et al. 2017), the lead authors produced case studies for five states (i.e., Ohio, Wisconsin, Idaho, Washington, and Michigan). The goal of these case studies was to describe the enrollment, characteristics, and performance of virtual and blended schools in that state over the previous year; discuss the research related to the virtual and blended school characteristics and outcomes, as well as the legislative activities; and examine the legislation and policies that have been introduced (and enacted) over the past two years.

Barbour, M., K., Grzebyk, T. W., & Eye, J. (2014). Any time, any place, any pace-really? Examining mobile learning in a virtual school environment. Turkish Online Journal of Distance Education, 15(1). Retrieved February 13, 2016 from <http://files.eric.ed.gov/fulltext/EJ1042983.pdf>

[Author Article Abstract] - "Over the past decade, the number of K-12 students engaged in online learning has increased from between 40,000 and 50,000 to more than two million. Students have also gained increased access to mobile devices throughout recent years, and educators have actively looked for ways to capitalize on this trend. A case study of students enrolled in an Advanced Placement European History course, offered by a statewide, supplemental virtual school in the Midwest. The students were studied over the course of four weeks, using Mobl21, an app that works on mobile devices, and offers an emulated version that runs on a computer. The results showed that despite the fact that existing literature indicated students' perceptions were positive toward mobile technologies; these students' perceptions were negative. The isolated implementation of the project may have affected these perceptions. However, students' access to mobile devices limited the project implementation. (p. 114).

Blackburn, H. A. (2014). A mixed methods study: Assessing and understanding technology pedagogy and content knowledge among college level teaching faculty. (Doctoral dissertation, Drexel University). Retrieved from https://idea.library.drexel.edu/islandora/object/idea%3A4531/datastream/Obj/download/A_Mixed_Methods_Study_Assessing_and_Understanding_Technology_Pedagogy_and_Content_Knowledge_Among_College_Level_Teaching_Faculty.pdf

[Author-provided Abstract] - Online higher education has grown rapidly over the last decade. While online higher education has improved access for many students, it suffers from the problem of higher learner attrition. Student persistence engagement in online learning may be enhanced through improvements in instructor technology and pedagogy knowledge. This mixed-methods study on online learning is an exploration into the online instructional faculty's knowledge of integrated Technological, Pedagogical, and Content Knowledge (TPACK). TPACK

has been used to assess teaching in the K-12 classroom setting and is currently being utilized as an assessment in the U.S. Department of Education's Race to the Top grant selection process. This study applied the TPACK framework to college level teaching faculty to assess their technology and pedagogy knowledge, their TPK, and TPACK. The primary research questions of this study were, "What is the level of TPACK among college level teaching faculty within a diverse college at a large, private four year university?", "What processes do online higher education instructors use in developing their technological pedagogical knowledge of new technologies?" and "What techniques do instructors with high TPACK utilize to engage online students?" The study began as a quantitative study and measured the level of TPACK among college level teaching faculty. A qualitative method followed with one-on-one interviews of nine selected instructors demonstrating high TPACK components. Quantitative findings of the study indicate that there is high technology, content, pedagogy, and technological pedagogical knowledge amongst the college level teaching faculty within the college studied. The level of full, integrated TPACK amongst the faculty has not fully been explored due to limited data on content knowledge. Qualitative findings of the study indicate that the college level teaching faculty instructors are engaged in high impact practices with their online students that demonstrate their TPACK skills and that the college level teaching faculty use their TPK to assess inclusion of new technologies tools in the online classroom. [QM Reviewer's note] - Reader will find of interest a FY2011 QM Research Grant The Development of Technological Pedagogical Content Knowledge (TPACK) in Instructors Using Quality Matters Training, Rubric, and Peer Collaboration: Cheryl Ward, Principle Investigator, University of Akron. Findings: Pedagogy is central to the quality development of online course design and that the TPACK (Technological, Pedagogical, Content Knowledge) conceptual framework is key in enabling instructors to develop new schema for a re-conceptualization of content, pedagogy and technology. Posited that use of the Quality Matters process helps instructors develop this complex knowledge that enables them to discuss, develop and implement more effective online learning. Therefore, the purpose of the project was to study the process of how the QM Rubric and QM training help instructors develop TPACK knowledge that enables them to discuss, develop and implement more effective online learning. Here are the research questions that guided the study: *Is the QM rubric consistent with the TPACK framework to help instructors construct knowledge in quality design and online instruction? *How is the QM rubric implemented and integrated as a catalyst to inform and guide online instructors for quality design and instruction? *An alignment between the QM Rubric and the TPACK conceptual framework was done to determine if any gaps existed between the rubric and the six areas of the framework. Three professors of instructional technology and three instructional technology students did independent alignment processes with the TPACK framework and the QM Rubric. One premise of this study was that the QM Program can inform and facilitate knowledge growth in the TPACK areas. *The alignment indicated that the QM Rubric is fairly well aligned with the TPACK conceptual framework. It was interesting that a rubric that purports to only address the design elements of an online class aligns so highly with the pedagogical elements in the TPACK conceptual framework. *This alignment supports initial contentions that the elements of the QM Rubric foster discussion and knowledge development in more areas than just design of these environments. Technological, pedagogical and content discussions are overlapping and connected in a dynamic way that result in the inability to discuss or work on them in isolation for online course development. Four participants were recruited after they finished QM training. Multiple data resources collected in the study revealed that

becoming online learners themselves for the QM training helped the participants understand the needs of online learners. *The QM Rubric increased the instructors' knowledge of the importance of aligning learning objectives to assessment, instructional activities, and technology integration. *Even though QM training and the QM Rubric did not specifically introduce the Technology Pedagogical Content Knowledge conceptual framework to the instructors, it is clear that their knowledge increased in the areas of technology, pedagogy and content. *The learning experiences they shared with the researchers about the QM training also demonstrated that they grew to be more sophisticated online instructors because of the way they designed, modified and implemented their online courses through the knowledge they gained. The data analysis results from this study suggest a developmental model that depicts a few key transitional points in order to become effective online instructors, and how QM training can effectively consider these transitional points to deliver the training more efficiently to enhance the quality of online courses with more explicit guidelines to not only course design, but permeate to the other aspects of online teaching and learning. [<https://www.qualitymatters.org/fy10-12-%28completed%29>]

Borup, J. & Stevens, M. (2016). Parents' perceptions of teacher support at a Cyber Charter High School. *Journal of Online Learning Research*, 2(3), 227-246. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved from <https://eric.ed.gov/?id=EJ1148409>

[Author provided abstract] Despite high growth rates, cyber charter schools experience higher attrition rates than their brick-and-mortar counterparts. Students' reasons for failing an online course are complex and students may require a high level of teacher support to be successful online. Research examining effective teacher engagement has relied heavily on teacher perceptions and perceptions of parents may prove especially insightful. In this research we conducted 19 interviews among 9 parents of students who were enrolled at a cyber charter school. Interview analysis was guided by, but not limited to, the elements of teacher engagement described in the adolescent community of engagement (ACE) framework. Parents tended to be highly satisfied with the course quality and the support that teachers provided to their students. However, parents also expressed a degree of dissatisfaction with their students' experience in the school and provided recommendations for improvement.

Boston Consulting Group (2014). Teachers know best: Teachers' views on professional development. (College Ready report for the Bill & Melinda Gates Foundation). Retrieved from <http://collegeready.gatesfoundation.org/sites/default/files/Gates-PDMarketResearch-Dec5.pdf>

Results of survey research on teachers' experiences on provided professional development. *Disconnect between intent and experience (Who are your stakeholders & planners shapes offerings) *View Types of PD as Compliance, less so in planning, designing, and delivering instruction. Report ends with list of PD features noted in research and calls upon additional research to better understand which models work under which

conditions. Characteristics of professional development associated with improving student achievement, include teacher learning goals aligned with standards. Full report available at <http://collegeready.gatesfoundation.org/sites/default/files/Gates-PDMarketResearch-Dec5.pdf>

Brasiel, S., Jeong, S., Ames, C., Lawanto, K., Yuan, M. & Martin, T. (2016). Effects of educational technology on mathematics achievement for K-12 students in Utah. *Journal of Online Learning Research*, 2(3), 205-226. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved from <https://www.learntechlib.org/p/171540/>

[Author-provided abstract] Teaching mathematics has long required the use of technology due many powerful affordances. More recently, education technology has been developed to support personalized learning through the use of adaptive learning systems. Through the use of educational technology in online learning, there is great potential for improving students' mathematics achievement. In this article, we report the results of an evaluation study, where 11 online mathematics educational technology products were distributed to close to 200,000 K-12 students and their teachers in the state of Utah to supplement classroom instruction. While only ten percent of students used the products at the recommended level over the course of the 2014-15 school year, there were six products where an educationally meaningful impact on mathematics achievement was found. While teachers responded positively, a third of teachers reported lack of access to technology as a barrier. We are already seeing improved usage during the second year of the project due to modifications to the expectations for schools based on what was learned from the first year of implementation.

Burdette, P. J., & Greer, D. L. (2014). Online learning and students with disabilities: Parent perspectives. *Journal of Interactive Online Learning*, 13(2), 67-88. Retrieved February 13, 2016 from <http://www.ncolr.org/jiol/issues/pdf/13.2.4.pdf>

[Author Article Abstract] - While research has been conducted on parental involvement in K-12 online learning, none of this research relates specifically to the parents of students with disabilities. Thus, researchers developed a survey around the following constructs: parental roles, instruction and assessment, communication and support from the school, and parental challenges. Researchers then distributed the survey to parents who had a child with a disability enrolled in an online setting. This article describes the survey findings based on 119 qualified responses from across the United States. In general, parents were pleased with the outcomes that their children were experiencing in online learning, but some issues still exist for educating students with disabilities within this environment (p. 67). [QM Reviewer's Note] - Parents' concerns included: (1) instruction and assessment, for example, "the following instructional methods were not incorporated in the instructional activities: social media (39%), simulation (11%), discussion (10%), and games (9%)" despite discussion and games often used in f2f situations" (p. 83). (2) the parental role of being placed in an untrained teacher role. (3) Communication: Parents might need training with online educational communication to act as effective models and learning coaches (pp. 85-86).

Cavanaugh, C., Maor, D., & McCarthy, A. (2014). K-12 mobile learning. In R. E. Ferdig & K. Kennedy (Eds.), Handbook of research on K-12 online and blended learning (pp. 391-414). Retrieved February 13, 2016 from http://press.etc.cmu.edu/files/Handbook-Blended-Learning_Ferdig-Kennedy-et-al_web.pdf

[Author Article Abstract] - "Mobile devices have been the focus of a push in many nations and internationally as part of efforts to achieve greater literacy and numeracy among students. Research has shown a strong link between Internet usage, the spread of broadband in a country, and its GDP. Those countries that are the highest performing educationally already integrate mobile devices in their education. This paper synthesizes empirical research on mobile devices from 2010 to 2013 in K-12 schools by focusing on studies that demonstrate emerging themes in this area. It is also clear that the pedagogy needed to be successful in creating positive outcomes in the use of technology has to be student-centered with the aim of personalizing the learning experience. Research found that students could become collaborators in designing their own learning process. As students become independent learners, they become more prepared in the skills needed for college and in their careers" (p. 391). [QM Reviewer's Note] - This chapter in Ferdig, R. E., & Kennedy, K. (Eds.) (2014). Handbook of Research on K-12 Online and Blended Learning. Retrieved from <http://press.etc.cmu.edu/content/handbook-research-k-12-online-and-blended-learning-0> provides an overview of pedagogical theories tied to approaches to mobile learning (see p. 393) and summarizes research lit regarding mobile learning in k-12. They offer k-12 focused research in support of student engagements, motivation, project-based/inquiry-based practices, collaboration, and interaction. The authors point out the need for professional development to prepare teachers for mobile learning.

Chiu, C.-H. (2013). Verification of theory based design features for designing online instruction for students with learning disabilities and other struggling learners. https://kuscholarworks.ku.edu/bitstream/handle/1808/15127/CHIU_ku-0099D_12758_DATA_1.pdf?sequence=1&isAllowed=y: Unpublished dissertation.

From Abstract: This study involved a comprehensive review of the literature on multimedia design to identify theory based design principles applicable to online instruction. Seven theories were reviewed. They included Cultural Historical Activity Theory (CHAT), Human Computer Interaction (HCI), Cognitive Theory of Multimedia Learning (CTML), Cognitive Load Theory (CLT), Universal Design for Learning (UDL), Kosslyns's (2007) eight Psychological Principles, and Wicken's (1999) thirteen Principles of Display Design. The focus was on all learners including those with disabilities. Forty theory based design principles, supported by research, were verified through Q methodology model (Brown, 1980; McKeown & Thomas, 1988). Three panels of experts in 1) multimedia theory, 2) design/development of online instruction for all K-12, and 3) design/development of online instruction for students with learning disabilities rated the importance of each principle. The Q-sort involved sorting along the dimensions of a quasi-normal distribution scale. This prevented the experts from placing a disproportionate number of

principles in any single category. The response rate for experts was 81.1%. An Analysis of Variance was carried out to ascertain differences among the rating of expert by group and in combination and followed by a Post-Hoc Test. The result showed that only one principle had the p value = .042 between Group 1 Multimedia and Group 2 All K-12 Learners at the $p < .05$ significant level. The implications are that there was little differentiation between the focus on all students and the focus on students with learning disabilities. A correlation analysis was conducted with the correlation matrix indicating only six observed relationships were very strong. There were three principles with the most positive correlation coefficients ranging from $r = .529$ to $r = .554$. In contrast, there were three negative correlations coefficient between principles, ranging from $r = .462$ to $r = .503$. These results imply that there was considerable independence among the principles. The factor analysis resulted in five factors being identified i.e., Factor 1: Learner variability, Factor 2: Cognitive strategies, Factor 3: prerequisites for teaching/learning, Factor 4: Context for learning, and Factor 5: Media presentation.

Conn, E. M. (2016). Distances of space and time: Understanding the challenges and support needs of secondary school teachers developing online courses (Order No. 10100872). Available from ProQuest Dissertations & Theses A&I. (1786290481).

[Author-provided abstract] This study investigated the experiences of teachers involved in an online course development program at a small Wisconsin virtual school in order to understand the challenges experienced and the support needs desired by secondary school teachers developing online courses. Article One was a review of literature, which analyzed research on K-12 online curriculum and course development, using the International Association for K-12 Online Learning (2011) Standards for Quality Online Courses as the organizational framework. Article Two was the research study, which used a phenomenological methodology with focus groups of middle and high school teachers followed by a confirmatory survey of results. Findings identified four major areas of challenge where teachers needed specific support: the overall course development process, the curricular and organizational design of the courses, providing instruction and assessment over distances of space and time, and responding to student skills. Article Three combined the results of the literature review and the research study in a discussion for educational leaders regarding online K-12 course development. Five principles for leading online course development were presented: the need for leaders to understand online education, the need for extensive planning, providing opportunities for collaboration and feedback, providing opportunities for professional development, and the need for time in the process. This study had implications for both further research and professional practice. It demonstrated the need for further research into online K-12 course development as a whole as well as greater study of supporting teachers in developing courses. Professionally, this study provided school leaders with principles in leading and supporting teachers who are learning new skills in order to transfer their existing content and instructional expertise into an online course.

Darrington, R. L. (2015). A multidimensional policy evaluation of the Utah statewide online education program (Order No. 3714909). Available from ProQuest Dissertations & Theses A&I. (1710460629).

[Author-provided abstract] The focus of this research is in the area of online learning policy. Online learning is rapidly gaining popularity and is becoming more and more an integral part of the K–12 education landscape. Such a study is important because there are very few policies that have been created to govern online learning differently than traditional brick-and-mortar classrooms. Utah’s Statewide Online Education Program (SOEP) has been largely marketed as policy that does transcend these barriers. This research uses a multidimensional mixed-method case study to evaluate the program. The findings from this research provide evidence that the SOEP falls short of providing policy that can guarantee implementation of the program’s goals and purposes and fails to ensure quality online learning for students. The main conclusions drawn from this study are that principals are hesitant to implement the SOEP because they are concerned about the potential loss of funding and a lack of confidence in the quality of online courses. This dissertation recommends the following: The creation of technology funding that guarantees full access to the Internet for all students, the creation of a performance-based assessment system for all students, and online learning in-service and professional development for both principals and teachers.

Davis N., Eickelmann, B., & Zaka, P. (2013). Restructuring of Educational Systems in the Digital Age from a Co-evolutionary Perspective. *Journal of Computer Assisted Learning*. 29(5), 438-450.

From Abstract: There have been repeated calls for restructuring of schooling to take advantage of information and communication technologies (ICT). This article recognizes an increasing range of radical restructuring resulting from the co-evolution of education and digital technologies in school systems and related activity in the global ecosystem. Research of previously innovative schools that did not sustain their innovative strategies with ICT has also helped to clarify relevant factors including the importance of leadership. Davis' co-evolutionary framework is illustrated with case studies of sustained transformation enabled by blended and online learning in New Zealand and the USA. Transformations include decoupling of the roles of a class teacher, plus decoupling of the services provided by a single school into provision by networked organizations, including a virtual school and web-based services. The diversity of transformed educational ecosystems is linked to local and regional variations in culture and conditions. The article concludes that teachers in a range of roles will remain the keystone species of K-12 education also in the 21st century and recommends that this co-evolutionary framework is applied globally to increase equitable provision.

Geer, D., Rice, M., & Dykman, B. (2014). Reviewing a decade (2004-2014) of published, peer-reviewed research on online learning and students with disabilities. In R. E. Ferdig & K. Kennedy (Eds.), *Handbook of Research on K-12 Online and Blended Learning* (pp. 135-162). Retrieved February 13, 2016 from http://press.etc.cmu.edu/files/Handbook-Blended-Learning_Ferdig-Kennedy-etal_web.pdf

[Author Article Abstract] - This chapter reviews published, peer-reviewed research from the most recent decade at the nexus or intersection of K12 online learning and students with disabilities. Previous reviews of research on this topic are summarized. These reviews assert that there is not enough research on the topic. The authors of this chapter employed a multifaceted coding process on articles that were located for review. This process included reading for broad topics, multiple readings by each author, and a negotiated process for final designations. Research in online learning for students with disabilities in K12 settings in the last decade focuses on (1) curriculum evaluation, (2) student achievement (as broadly defined) (3) stakeholder perceptions and (4) policy structures presently in place for online learning for this special population. Blended learning studies that fit the goals of this review were practically non-existent. Several tables capture the major findings of these studies from which implications are drawn about the ever-present need for more research in this area, but also for research that is more rigorous, and is made available in published, peer-reviewed journals. Implications are also offered for practitioners and policy makers” (p. 135). [QM Reviewer’s Note] - The chapter provides summary charts from a review of the research literature. Topics include policy and practice, online strategy instruction (for example, a simple course design and accessible technology), academic performance in a specific content area (for example, importance of teacher interaction and feedback), content based e-learning environments (importance of learner support), information technology and transition skills , social competence intervention (for example, learning support and scaffolding activities). Many of those studies, specifically those related to online course design, are documented in the QM Research Library. The chapter is in the book Ferdig, R. E., & Kennedy, K. (Eds.) (2014). Handbook of Research on K-12 Online and Blended Learning. Retrieved from <http://press.etc.cmu.edu/content/handbook-research-k-12-online-and-blended-learning-0> and available for free download.

Golden, S. (2014). Impact of communication modes on discussion in K-12 online education. Retrieved November 2 2016, from https://etd.ohiolink.edu/!etd.send_file?accession=kent1405679223&disposition=inline

From Abstract: With the growth of online education, decision makers inside and outside of academia raise questions about the methodologies involved with this approach to learning. This study explores the views of high school students who attend a K–12 school regarding the effect of communication and delivery modes in problem-solving discussions. Participants are given scenarios to discuss in a peer-group environment in a face-to-face setting, synchronous audio conferencing, and asynchronous discussion forums. From student surveys, individual interviews, researcher evaluation, and transcription analysis a deeper understanding of how the different modes influence interaction among students were explored. With a greater awareness of the characteristics of the different communication approaches, educators, parents, and others interested in online education will better comprehend how students interact in this environment.

Hardin, J. C. (2015). The public school response to cyber charter programs: Fiscal considerations, retention and recruitment strategies, and participant experiences (Order No. 3712394). Available from ProQuest Dissertations & Theses A&I. (1706911469).

[Author-provided abstract] The purpose of this descriptive case study was to determine contributing factors for students' and parents' decisions to remain in, or return to, a district's cyber school program. This study also sought to determine the efficacy of a school district's cyber program, and how efficacy specifically contributed to students' and families' decision-making process about where to attend online learning. This study examined the practices that one public school district employed in its management of cyber programming, as well as its retention and recruitment plans as they related to in-district cyber education in K–12 schools. The primary research questions of this study were: What are the experiences of administrators, students, and parents involved with the in-district program? Why are students remaining in the district's cyber program? Why are students returning to the district's cyber program? What are the factors that influence a student to either remain in or return to the district's cyber program? What role do teachers have regarding student persistence and student retention? The researcher used semi structured interview questions to determine the most effective means of student retention, recruitment, and cyber program development while understanding experiences of students, parents, and school administrators. The researcher attempted to find a relationship between district cyber programmatic design and student academic interest or need as well as parental responses that indicated vital programmatic characteristics from their perspective. Ideally, the results of this study will eventually lead to the development of a template for K–12 in-district cyber program success after viewing the results from the district in this case study research. Seven themes emerged from the semi structured interviews: teacher quality, retention and recruitment, program perception, support, flexibility, social interaction and costs/financials. Results points toward the importance of having in-district teachers involved in the program to ensure quality feedback from teacher to student both online and face to face, which is important in supporting student success. Schedule flexibility is an excellent byproduct of the in-district program; increasing program understanding through advertising as it could further support retention and recruitment. It is also important to pay close attention to costs associated with students leaving the district for cyber charter programs, as they can be extremely high. Recommendations point toward increasing advertising associated with in-district cyber programming, analyzing the quality of purchased cyber courses, and reviewing current retention and recruitment practices.

Haynes, C. A. (2017). Digital learning implementation framework for education: A delphi study of international baccalaureate educational technology leaders (Order No. 10282619). Available from ProQuest Dissertations & Theses A&I. (1936057730).

[Author-provided abstract] While student-centered and personalized learning have become priorities to transform learning in many K-12 schools, it is rare for elementary, primary, middle school, or high schools to have complete strategies for implementing digital learning. This study sought to provide an instrument to guide K-12 international school leaders to build and evaluate school capacity to support digital learning implementation. The purpose of this Delphi study was the development of the Digital Learning Implementation Framework for Education (D-LIFE) to identify enablement criteria for digital learning in international schooling. Using a modified Delphi Method, the study was conducted

over six iterative online survey rounds with a panel of 37 geographically dispersed experts in digital learning and international schooling. The panel agreed on 148 enablement criteria, assembled as the D-LIFE framework, that school administrators and policy-makers should consider for strategic planning and evaluation of technology implementation for learning. Additionally, the study compared D-LIFE to prominent international frameworks showing close alignment with ISTE Essential Conditions and provides a school-based framework for K-12 schooling not addressed in existing international standards or frameworks.

Huld, D. K. (2014). From the whiteboard to the web: equipping administrators to recruit, hire, and induct top quality K-12 online teachers. (Doctoral dissertation). Available from ProQuest Dissertation and Theses database. (UMI No. 1650706532)

[Author provided abstract] Online learning is taking our nation by storm and changing the face of education forever. By 2014 we are projected to have 10 million students taking at least one online class (Nagel, 2009). The online revolution is one of the greatest changes the field of education has seen in the last 25 years (Greenway & Vanourek, 2006). This major shift in education also represents a major shift in how our teachers are prepared and what great teaching looks like in online settings. The online classroom is distinctly different than the brick-and-mortar classroom, and success in the classroom does not necessarily translate into the online environment (Watson, Murin, Vashaw, Gemin, & Rapp, 2011). Our students deserve the best online teachers to ensure the potential of online learning is fulfilled (Cavanaugh, Gillan, Kromrey, Hess, & Blomeyer, 2004). Top quality online teachers are those who have mastered or can demonstrate the ability to quickly learn the specific skills of technology, online instructional design and delivery, communication, and online learning professional development. This study will explore and analyze the impact of the website K-12 Online Staffing Solutions on the recruitment, hiring, and induction practices for K-12 online administrators. Using the research and development research model, developed by Borg and Gall (1989), the website will undergo a series of qualitative feedback and product revision cycles with participants. The results of the study showed that the website tool was easy to use and impacted the practice of virtual school administrators in Oregon. The results have implications beyond virtual charter schools in Oregon. Online learning is growing and administrators need practical, accessible, and research based tools to successfully meet the need for online K-12 options.

Irbe, A. G. (2016). Application of universal design for learning in corporate technical training design: A quantitative study (Order No. 10014050). Available from ProQuest Dissertations & Theses A&I. (1766504285).

[Author provided abstract] With the rise of a globalized economy and an overall increase in online learning, corporate organizations have increased training through the online environment at a rapid pace. Providing effective training the employee can immediately apply to the job has driven a need to improve online training programs. Numerous studies have identified that the application of Universal Design for Learning (UDL) principles to course development in the K-12 environment and university settings reached a more diverse audience and in turn, improved

learning outcomes In contrast, little research exists regarding how the application of the UDL principles to instructional design practices and strategies affects participant achievement in self-paced online training in the corporate setting. To provide insight into if and how the application of UDL on the design of a corporate self-paced, online course influences the learner posttest results, this study used an experimental, quantitative approach applying a randomized two-group design to compare the posttest results of two self-paced online courses with the same technically-focused content designed with traditional and UDL instructional design strategies, respectively. Additionally, the study explored to what extent the application of UDL as an instructional design strategy impacted participant posttest achievement in the cognitive and psychomotor learning domains. A t-test was used to analyze the overall posttest scores, followed by the use of a Multivariate Analysis of Variance (MANOVA) to examine the dependent variables (cognitive and psychomotor domain) posttest scores. The participants in the study included only corporate or federal employees. Overall, the study concluded that application of UDL did not positively or negatively change participant overall scores or affect the participants' overall posttest results for the knowledge based (cognitive) section. However, participant achievement was positively influenced in the skills-based (psychomotor) section. Based on these findings UDL should be considered and further researched as an instructional design strategy for online training and online training in the corporate environment, especially for the development of skills-based content.

Judd, J. D. (2015). CTO mentor program: Examining the effectiveness of the CTO mentor program and its impact on the K-12 technology leader's career (Order No. 3700023). Available from ProQuest Dissertations & Theses A&I. (1680014678).

[Author-provided abstract] In order to support the 21st century learning initiatives facing California K-12 educational agencies--including the influx of mobile devices, common core standards, online high stakes testing, and student privacy--an educational organization must employ a well-trained, knowledgeable, and effective technology leader. The California Educational Technology Professionals' Association's (CETPA) Chief Technology Officer (CTO) Mentor Program certification provides assurance that the chosen technology leader has been exposed to, is familiar with, has a working knowledge of, and can apply the leadership, educational, and technology skills necessary to be a successful technology leader. The findings from this study suggest that the CTO Mentor Program provides a course of study that is relevant to the technology leader in K-12 educational agencies, meets the needs of adult learners, and provides a return on investment for the learner, his or her educational agency and the sponsoring organization, CETPA.

Kellogg S. (2015). Massively Open Online Course for Educators (MOOC-Ed) Network Dataset. *British Journal of Educational Technology*. 46(5), 977-983.

From Abstract: This paper presents the Massively Open Online Course for Educators (MOOC-Ed) network dataset. It entails information on two online communication networks resulting from two consecutive offerings of the MOOC called The?Digital?Learning?Transition in?K-12?Schools in spring and fall 2013. The courses were offered to educators from the USA and abroad. Though based on the same course, minor controlled variations were made to both MOOCs in terms of the course length, discussion prompts and group size. The dataset provides opportunities to examine how participants leverage online communication forums to support their learning. In particular, it allows modeling network mechanisms to better understand factors that facilitate or impede the exchange of information among educators.

Kereluik, K. M. (2013). Scaffolding self-regulated learning online: A study in high school mathematics classrooms. Retrieved November 2 2016, from ProQuest Dissertations and Theses Database Web Site: <http://www.proquest.com/en-US/products/dissertations/individuals.shtml>.

From Abstract: This research explores the implementation and utilization of self-regulated learning (SRL) scaffolds (i.e. videos, journals, surveys) in online K-12 courses. This project is grounded in research on online education as well as theory and research around self-regulated learning in both online and offline contexts. This research is conducted through Michigan Virtual School's (MVS) learning management system (LMS) over two academic terms in six high school mathematics courses. Participating students (N = 69) completed the pre-survey consisting of the PISA Student Characteristics Questionnaire (Artelt, Baumert, Julius-McElvany, & Peschar, 2003), a self-regulated learning assessment (Cleary and Zimmerman, 2004) and an online learning readiness assessment (Roblyer & Davis, 2008). Following the pre-survey participants were randomly assigned to one of three conditions (experimental, control I, control II) and received either self-regulatory, general interventions (in the form of videos, journals, and short surveys), or no interventions--respective of condition. Research questions were as follows: 1) can computer mediated contexts be designed to fully facilitate and support adolescents' use of self-regulated learning processes in learning; 2) does the presence of SRL scaffolding in online K-12 courses lead to gains in adolescent learners' a) self-efficacy and motivation or b) individual and environmental control, do a. and b. vary across dimensions of preparedness; 3) does the presence of SRL scaffolding lead to greater a) domain knowledge? b) student retention in online K-12 courses; 4) how does SRL scaffolding influence adolescent learners' ability to successfully regulate their learning to produce improved student achievement outcomes in computer mediated contexts? Exposure to interventions had no effect on self-efficacy, motivation, individual, or environmental control outcomes nor did initial preparedness for online learning. Further neither exposure to interventions or initial preparedness had an effect on final course grade or retention. These results along with design considerations related to integrating SRL scaffolds in online K-12 courses are discussed and possible reasons for the lack of effectiveness are outlined as well as future design iterations that may lead to effective SRL scaffolds for online K-12 students. [The dissertation citations contained here are published with the permission of ProQuest LLC. Further reproduction is prohibited without permission. Copies of dissertations may be obtained by Telephone (800) 1-800-521-0600. Web page: <http://www.proquest.com/en-US/products/dissertations/individuals.shtml>.]

Kong, S. C., Chan, T.-W., Griffin, P., et al. (2014). E-learning in School Education in the Coming 10 Years for Developing 21st Century Skills: Critical Research Issues and Policy Implications. *Educational Technology & Society*, 17 (1), 70–78.

[Provided abstract] One of the curriculum goals of e-learning in school education is to develop learners for 21st century skills through their daily learning activities. This paper aims to discuss the research issues and policy implications critical for achieving such a curriculum goal. A review of literature in the related fields indicates that K-12 schools should take advantage of e-learning to maximize learning opportunities of learners for the development of 21st century skills. We identify six research issues critical for e-learning in school education, namely the realization of developing 21st century skills of learners; the bridging of the gap between curriculum in school and situations in society; the maximization of learning opportunities in the learning process; the collection of evidence of improvement and building awareness of progress; the assessment of 21st century skills; and the provision of teacher development for enculturating learners to develop 21st century skills. We recommend the relevant stakeholders across different countries/regions to consider policies on the goal-setting of curriculum addressing 21st century skills development and bridging gap between school and society; on the availability of digital technology for school education; on the privacy/legal issues of learning data in e-learning process; and on the teacher development for pre-service and in-service teachers. [This article provides international support for the importance of quality online courses that promote development of 21st century skills.]

LaFrance J. A. (2014). Mapping the Terrain: Educational Leadership Field Experiences in K-12 Virtual Schools. *Educational Administration Quarterly*. 50(1), 160-189.

These five case studies reveal a great degree of consistency between the different states. For example, most of the full-time virtual schools in each of the five states were independent (i.e., not run by EMOs). However, the vast majority of students attend a virtual school that is operated by an EMO. Virtual schools also had far more students for each teacher compared to traditional public schools. Further, virtual school students underperformed compared to their traditional public school counterparts. In addition to the similarities across the cases, when it came to student enrollment, student characteristics, and student performance, with the exception of Michigan there was a general lack of empirical research related to full-time virtual schools (and almost no research related to blended schools). Finally, with the exception of Idaho, there was also a general lack of legislative activity over the two years reviewed for this report.

Luo, T., Murray, A., & Crompton, H. (2017). Designing authentic learning activities to train pre-service teachers about teaching online. *International Review of Research in Open and Distributed Learning*, 18(7). Retrieved from <http://www.irrodl.org/index.php/irrodl/article/view/3037/4440>

[Abstract] Online learning is increasingly being used in K-12 learning environments. A concomitant trend is found towards learning becoming authentic as students learn with tasks that are connected to real-world occupations. In this study, 48 pre-service teachers use an online environment to engage in authentic practice as they developed online learning experiences for their future students. Using a design-based research methodology, the researchers were involved in planning, designing, implementing, and evaluating the higher education class across two macro cycles. An authentic learning framework was utilized in the development of the class. Findings explicate the design of the course and how it aligned to the authentic learning framework. It appears that web-based tools were beneficial as the pre-service teachers designed their own K-12 online classes. Findings show that the pre-service teachers' comfort increased when using the using online web building applications in the authentic environment. Furthermore, a high level of engagement in reflective and collaborative learning was uncovered during the activities. This research acts as a springboard for educators who are interested in designing online higher education courses incorporating authentic learning experiences.

McAllister, L. & Graham, C. (2016). An analysis of the curriculum requirements for K-12 online teaching endorsements in the U.S. *Journal of Online Learning Research*, 2(3), 247-282. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved from <http://files.eric.ed.gov/fulltext/EJ1148412.pdf>

[Author-provided abstract] This study examined existing K-12 online teacher preparation programs in the United States to ascertain the degree to which teachers are prepared to function in online/blended classroom learning environments. This study used a content analysis approach. Research specifically targeted online teacher preparation programs implemented in institutions of higher education. The researcher collected data from state offices of education and institution deans through email surveys inquiring about the existence and capacity of K-12 online teaching endorsements, course descriptions and other course documents. [Quotes from conclusion] State and institution online teacher preparation programs are expanding but not at a comparable rate to the rapid increase of K-12 online student enrollments. Only nine of fifty states presently offer online teaching endorsements. In two of the nine, no institution offers the online teaching endorsement.... If teaching in an online learning environment is a different skill set than teaching in a face-to-face learning environment, which we believe it is, and if endorsement programs are few, which we know them to be, then administrators are in a tight spot when choosing preparation programs for online teaching. These administrators will have to decide whether preparation will come through pre-service courses, an endorsement, or professional development. The institutional data gathered and analyzed here indicate that current programs focus on online/blended pedagogy, instructional design, and the foundations of online/blended learning. ... Not enough programs include curriculum for online privacy, acceptable use policies, safety, and legal issues. Safety is an important aspect of the online/blended classroom because it is different than face-to-face classrooms. Additionally, there does not appear to be widely used or accepted resources for preparing online teachers. A variety of texts and resources supplement the courses that this study examined. (pp. 278-279)

Mohamad, G. (2017). A librarian-teacher collaboration: Integrating information literacy and technology in the K-12 classroom (Order No. 10745746). Available from ProQuest Dissertations & Theses A&I. (2019646774).

[Author-provided abstract] The focus of this mixed-methods study was to build a profile of library program characteristics and how they foster collaborative relationships between librarians and faculty in New Jersey K–12 schools. The study was an exploration of librarians’ perceptions regarding the factors that affect the level of their collaboration with faculty, especially those related to systems thinking theory, and to examine how librarian–teacher collaboration affects the role of the librarian as a technology integrationist and what impact could it have on students’ performance. Despite the emphasis by the federal government and initiatives such as Partnership for 21st Century Learning on information literacy skills as an indicator of college and career readiness of students in K–12, little attention is being given to collaborative teaching activities with school librarians. School libraries and their associated standards are developed specifically to address information literacy in a technology-rich environment. In this explanatory, sequential, mixed-methods study, a 10-item online survey was sent to the members of the New Jersey Association of School Librarians (NJASL); the results from the survey informed the selection of eight librarians for open-ended, semi structured phone interviews. The study results indicated four conclusions. First, certain library program characteristics have an impact on librarian–teacher collaboration such as staffing, scheduling and hours of operation, librarians’ activities, resources, and provision of professional development. Second, the five disciplines of systems thinking theory (i.e., personal mastery, shared vision, mental models, team learning, and systems thinking) had a positive impact on the librarian–teacher collaborative relationship. Third, the collaboration between librarians and teachers facilitated the roles of school librarians as instructional designers, educators, information technologists, and liaisons. Finally, in general, the collaboration between librarians and teachers enhance students’ learning outcomes in terms of meeting their educational standards objectives and developing their interpersonal abilities. Collaboration also enhanced students’ resource-based skills regarding critical thinking capabilities and awareness of the ethical use of information.

Nordstrom, L. (2015). The Impact of Written Text and Narration on Learning in an Online Middle School Math Lesson. Retrieved from ProQuest Dissertations and Theses Database. (UMI No. 3714750).

From Abstract: The use of computer-based and online lessons in K-12 math classrooms has increased dramatically in the last decade. However, there is a lack of research on whether the theories developed to support the design of such lessons, such as the cognitive theory of multimedia learning, apply equally to adults and younger learners. Based on the redundancy principle of the cognitive theory of multimedia learning, which focuses on the selection of media elements in the design of instruction, this study explored the effect of presenting only narration, only text, or both in a commercially available online math lesson to a group of 112 sixth grade students. In order to increase the relevance and importance of

the lesson to the participants, the lesson on a required topic in the curriculum took place in a school computer lab during regular math class. To measure learning, participants took a paper and pencil pre-test, an immediate post-test, and a delayed post-test three weeks later. Results revealed that mode of presentation did not significantly impact either immediate or delayed quiz score, meaning there was no positive or negative effect of redundancy for students at any achievement level. However, math achievement did have a significant, curvilinear relationship with quiz score growth from the pretest to the immediate posttest, indicating that participants with the highest math achievement gained the most from the lesson while those who were approaching proficiency learned the least. Participants with the lowest math achievement and those considered proficient showed approximately equal gains that were midway between the groups with the highest and lowest gains. This relationship held for all modes of presentation. While there was no significant effect of redundancy, the results point to the importance of considering prior knowledge, in this case math achievement, when deciding to use self-paced online math instruction.

Oviatt, D., Graham, C. R., Borup, J., & Davies, R. S. (2016). Online student perceptions of the need for a proximate community of engagement at an independent study program. *Journal of Online Learning Research*, 2(4), 333–365.

[Author-provided abstract] "Research suggests that collaborative learning designs, which require interaction with teachers and peers, can promote engagement and learning for online courses. Many K-12 students seek supplemental online courses to meet graduation requirements and desire flexibility, which often conflicts with required interactions. This paper asserts that online independent study learners may create a proximate community of engagement (PCE) to provide the benefits of collaboration and interactions. Using the adolescent community of engagement (ACE) framework as a lens for identifying interactions, this study surveyed K-12 independent study students to assess their perception of the need for interaction with a support community while completing an online course. Results showed that students perceive the benefits of such a community and plan to receive support from parents, teachers, and counselors proximate to their location. The perception of the need was significantly greater for students taking a course for credit recovery than those taking the course for the first time. Course providers can coach independent study students and family on how to create a proximate community of engagement" (p.2). "The ACE framework (Borup et al., 2014) proposed three different community roles external to the student: teacher, parent, and peer. From literature studying effective online instruction, framework elements were identified: roles, tasks, functions, and activities. The activities (actions or interactions) lead to increased engagement and learning. For example, the elements defined for the teacher role include the following: • Three different functions (facilitating interaction, organizing and designing course materials, and instructing students) • Ten different tasks, such as nurturing student relationships, monitoring and motivating student engagement, and providing intellectual and scholarly leadership • Thirty-two actions or interactions, such as facilitating parent-instructor interactions, asking questions, or providing constructive feedback" (p. 11). [QM Reviewer's comment] Helpful graphic showing relationship among student, peer, parent, and teacher engagement in the adolescent community of engagement presented in Figure 1 of "ACE framework from Borup et al. (2014, p. 111)" (p. 12).

Parrilla, J. E. (2016). What are reasons that cause parents to withdraw their children from full-time cyber charter schools? (Order No. 10241872). Available from ProQuest Dissertations & Theses A&I. (1858568692).

[Author-provided abstract] This research study examines the contexts and situations that influence student attrition at a K-12, fulltime, comprehensive, cyber (online) charter school in the Commonwealth of Pennsylvania. As compared to their bricks and mortar counterparts, the attrition rate of students attending online K-12 schools appears to be higher. Research shows that student attrition in K-12 online schools and programs appears to be an ongoing phenomenon experienced in other states where cyber schools operate as well. In fact, the attrition phenomenon has been documented to be true even for adults that attend online courses at the college and university level. While there is scholarly research addressing the phenomenon at the university level, there's a dearth of empirical research at the K-12 level. As such, this study will provide an opportunity to carefully investigate the myriad situations and complexities involved in parent decision-making, as they decide to withdraw their children attending the cyber-school.

The research study consults scholarly literature of student persistence in online, higher education programs and adapts some of those concepts, ultimately incorporating them into a cogent conceptual framework. The analysis undertaken is conducted utilizing a case study approach, incorporating mixed methodologies. After surfacing a brief history of online education, the research study applies binomial logistic regression on variables uncovered through data collection. It then progresses to qualitative analysis of a variety of historical school provided data and selected participant interviews. The research provides a first-hand view of the myriad issues and concerns that combine in decision-making as students and parents involve themselves in cyber learning. It also highlights the operational demands that make K-12 cyber education a dynamic environment.

Pickett, J. A. (2015). The principal and the K-12 school library: A Delphi study (Order No. 3664326). Available from ProQuest Dissertations & Theses A&I. (1727739714).

[Author-provided abstract] The purpose of this study was to describe the knowledge, skills, and dispositions used by the effective K-12 principal to facilitate a strong library program. Specifically, experts in the field of K-12 administration, K-12 librarianship, and higher education preparation of K-12 librarians developed consensus regarding what the effective principal knows, does, and values in order to position the library for maximal support of student learning. Additionally, K-12 principal oversight of the school library was examined within the conceptual framework of the national Interstate School Leaders Licensure Consortium (ISLLC) Standards. The review of literature focused on three perspectives on the issue: research at the nexus of libraries and pre-service preparation of administrators, literature pointing to principal preparation as bearing the weight of educational reform, and the school library as key to equitable access to quality education. Method - Information regarding the

knowledge, skills, and dispositions needed by K-12 administrators to direct strong school library programs involved three Delphi expert profile groups: distinguished K-12 administrators, nationally-recognized librarians, and professors from distinguished graduate librarian preparation programs, all recognized by the American Association of School Librarians. Across those three profile groups, 23 panelists participated in three rounds of a Delphi online questionnaire. Findings - A high degree of consensus across the expert groups led to 44 statements of real-life application for administrators and those who prepare them. Implications for administrators included supervision, hiring, and assessment within the practice of supervising the strong school library. Findings relevant for principal preparation and professional development comprised discrete details of knowledge and skills that can be taught and studied, as well as values that can inform practice. The essential place of the strong library among the K-12 educational leaders' resources was confirmed.

Pope, C. (2013). Digital distance learning communities: Teachers' beliefs about community in K-12 online education. (Order No. 3559853, Rutgers The State University of New Jersey - New Brunswick). ProQuest Dissertations and Theses. Retrieved from <http://search.proquest.com/docview/>

[Author-supplied abstract] This study was designed to look at K-12 teacher beliefs about the role that community plays in their online learning classes and how instructors use communication, technology and pedagogical methodologies to form class communities. This study sought to answer three major questions: 1) What are instructor beliefs about the role that community plays in online learning and what are the challenges to forming those communities? 2) Which methodologies and technologies do instructors use to promote a feeling of community for their online students? 3) Which artifacts of teaching provide evidence of the formation and continuation of digital distance education communities? This study used a qualitative multi-case research methodology which included teacher interviews and teaching artifact observations from eight online instructors who taught high school online credit classes. Findings from the study indicated that among the sample population, teachers who believed in the value of community, integrated community building features into their courses. Secondly, technologies which permitted interactive online classes produced the highest operating online learning communities. Finally, institutional support of online educational communities, including technology availability and high expectations, produced the highest operating communities. This study is important because community features such as trust, interdependence and feelings of connectedness have been associated with student persistence in online higher education and this study demonstrates these features have been found to be important in K-12 education too. Also, significant shifts of educational delivery are expected to include more digital distance education and future course designers can utilize this information as they build new K-12 online learning communities.

[QM reviewer's note: This study points out that designing K-12 online courses to include a sense of community is as important as it has been noted in higher education.]

Repetto, J. B., & Spitler, C. J. (2014). Research on at-risk learners in K-12 online learning. In R. E. Ferdig & K. Kennedy (Eds.), Handbook of Research on K-12 Online and Blended Learning (pp. 107-134). Retrieved February 13, 2016 from http://press.etc.cmu.edu/files/Handbook-Blended-Learning_Ferdig-Kennedy-etal_web.pdf

[Author Article Abstract] - "Students who fail to graduate high school with a diploma or its equivalent set in motion a pattern of low wages, poor health, and risk of incarceration that will impact their future quality of life. This pattern negatively impacts society with fewer wage earners, lower taxes, and less spending, along with a strong potential of needing to support these students through some form of welfare. Due to its flexible scheduling, individual mentoring, safe communities in which to learn, and varied methods of teaching, online learning has shown promise as a conduit to engage at-risk students in learning so that they stay in school and earn a diploma. In this chapter, research along with essential strategies that allow online programs to meet the needs of at-risk learners to improve their educational outcomes are presented. Additionally, implications for policy, practice, and future research are discussed" (p. 107). [QM Reviewer's Note] - The authors in a chapter in the book Ferdig, R. E., & Kennedy, K. (Eds.) (2014). Handbook of Research on K-12 Online and Blended Learning. Retrieved from <http://press.etc.cmu.edu/content/handbook-research-k-12-online-and-blended-learning-0> Reported on concept of 5 Cs that is suggested from triangulating the special education, general education, and distance education literatures to impact practice and improve educational outcomes (p. 115). The 5 Cs of student engagement framework include: curriculum, caring community, control, climate, and connect. While approaching from a macro- Cyber School perspective, rather than a micro-course design level, the authors pointed out the importance of at-risk students being able "to see that there is a connection" between their current concerns and/or learning objectives (p. 116) and that there is "ample amount of time to master specific learning objectives (p. 120), in a safe and supporting climate with a sense of community (p. 118), with students receiving instruction on targeted academic, social, and behavioral interventions" (p. 118), as well as engaging learning activities. Related to course design, the authors suggest employing the principles of UDL (p. 123).

Richardson, J. W., Beck, D., LaFrance, J., & McLeod, S. (2016). Job attainment and perceived role differences of Cyberschool leaders. *Educational Technology & Society*, 19 (1), 211–222.

As cyberschooling options expand, it is vital that we understand the nuances of these particular learning opportunities. Because little research exists on leaders of K-12 cyberschools, this exploratory case study had two purposes. We first examined how 18 cyberschool leaders in the United States obtained their position. Second, we explored the perceptions of cyberschool leaders regarding the differences between their job and that of a traditional brick-and-mortar school leader. We found that cyberschool leaders tend to be predominantly new, technology savvy administrators who have some background in online learning. Main differences between cyberschool leadership and brick-and-mortar school

leadership included interactions with students, teacher supervision, provision of professional development, and management of the day-to-day operations.

Roy, M., & Boboc, M. (2016). Professional development needs of online teachers. *Journal of Online Learning Research*, 2(3), 283-302. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved <http://files.eric.ed.gov/fulltext/EJ1148428.pdf>

[Author-provided abstract] Keeping in mind the rising rate of K-12 enrollment, and the increased demand for online teachers, the need for professional development of online teachers is keenly felt. The skills needed for teaching in face-to-face environments are not always transferable to online settings. There is a pointed change in the way teaching takes place in an online format, which calls for an understanding of teacher roles and the competencies prompted by this paradigm shift. A lack of understanding of the pedagogical transformations required by online teaching could lead to teacher stress. The purpose of this study was to understand the extent to which educators teaching in K-12 online settings in Ohio are equipped to work in such environments by relying on specific competencies and skill sets. This understanding would then enable the development of programs designed to address their professional development needs. [Quotes from conclusion] "...41% of the K-12 online teachers participating in this study reported they did not have reinforcement or feedback of any sort after the initial professional development sessions. Unless these practices are reinforced and refined through constant feedback from mentors and colleagues, they may tend to be just ritualistic practice....teachers not only need to be cognizant of emerging theories of online learning, but also why this understanding will equip them to be better online teachers. They also need to know which online tools they need in order to facilitate learning and why. Additionally, teachers must understand how these online tools significantly enhance the learning experiences of the students. Along with PD sessions based on teacher qualities, technological competence, and experiencing an online as a student, online teachers need interactions with fellow instructors through professional development sessions that are 'open spaces' for sharing pedagogical practices. (pp. 300-301)

Roy, M., & Boboc, M. (2016). Professional development needs of online teachers. *Journal of Online Learning Research*, 2(3), 283-302. Waynesville, NC USA: Association for the Advancement of Computing in Education (AACE). Retrieved <http://files.eric.ed.gov/fulltext/EJ1148428.pdf>

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teacher roles and the competencies prompted by this paradigm shift. A lack of understanding of the pedagogical transformations required by online teaching could lead to teacher stress. The purpose of this study was to understand the extent to which educators teaching in K-12 online settings in Ohio are equipped to work in such environments by relying on specific competencies and skill sets. This understanding would then enable the development of programs designed to address their professional development needs. [quotes from conclusion] "...41% of the K-12 online teachers participating in this study reported they did not have reinforcement or feedback of any sort after the initial professional development sessions. Unless these practices are reinforced and refined through constant feedback from mentors and colleagues, they may tend to be just ritualistic practice....teachers not only need to be cognizant of emerging theories of online learning, but also why this understanding will equip them to be better online teachers. They also need to know which online tools they need in order to facilitate learning and why. Additionally, teachers must understand how these online tools significantly enhance the learning experiences of the students. Along with PD sessions based on teacher qualities, technological competence, and experiencing an online as a student, online teachers need interactions with fellow instructors through professional development sessions that are 'open spaces' for sharing pedagogical practices. (pp. 300-301)

Rozitis, C. P. (2014). Instructional design competencies for online high school designers-by-assignment: A Delphi study. Retrieved from ProQuest Dissertations and Theses Database. (UMI No. 3645854)

From Abstract: This study is situated within the field of instructional design and sought to identify competencies specific to online designers-by-assignment in high school learning environments. Since existing instructional design standards currently available to guide designers-by-assignment differ from one another, a lack of clarity remains about which specific standards actually benefit this emerging professional group in the process of developing and revising courses they eventually teach. The purpose of this qualitative Delphi study was to identify, through expert agreement, instructional design competencies that can benefit high school online designers-by-assignment and the instructional design profession. This study employed the qualitative Delphi design to achieve consensus among experts in five fields (high school online practitioners, instructional design academics, university pre-service instructors, online high school administrators and high school online instructional designers). The Delphi design enables experts in related fields and separated by physical distance to make and refine judgments without stress and with anonymity to achieve consensus. Based on a majority (75+ %) vote, experts went through three rounds of the Delphi technique to reduce 116 competencies from seven organizations (American Educational Communication and Technology Standard; International Board of Standards for Training, Performance and Instruction -Instructional Design Competencies; International Association for K-12 Online Learning; Standards for Digital Learning Content in British Columbia; Wilson; National Education Association; and Southern Regional Education Board) to 10. The 10 competencies were reworded for uniformity and sorted into the following five categories: communication, content, assessment, technology, and professionalism. Experts, theories of distance education, models of instructional design and learning theories support the final

competencies. Based on the outcomes of the study, professionals with the responsibility for training and hiring online high school educators have a clearly defined set of instructional design competencies that will support professional development of online high school designers-by-assignment.

Rupp, N. K. (2016). Online learning and effective leadership: The importance of relationship building and culture (Order No. 10125657). Available from ProQuest Dissertations & Theses A&I. (1808028463)

[Author-provided abstract] Online and blended learning are becoming more important in K-12 public schools because of their flexibility and increased opportunity for students in urban as well as rural environments. Implementing and sustaining technology-based learning is a complex process that requires educational leaders to have a broad spectrum of knowledge and skills, which are critical to the success of online programs. This case study research used in-depth interviews to gather data on how one district was able to provide a successful program using effective leadership skills. Three areas critical to success were identified in the data: clear vision and achievable goals, appropriate resources, and relationship building. The emphasis leadership put on orchestrating a culture of support, trust, open communication, and collaboration was an important aspect of the success and expanded capacity of the district's program. The study suggests that the changing roles of educational leaders in a technological world involve shared responsibility, flexible rather than rigid hierarchy, and teamwork in order to anticipate the needs of students facing a technology driven future.

Sailors, K. M. (2014). Advance organizers in an online social studies unit to promote self-regulation in middle school students. ProQuest, UMI Dissertations. Retrieved from <http://search.proquest.com/docview/1618233273>

From Abstract: As the popularity and enrollment in online courses continues to expand, researchers have investigated strategies and methods to support student learning. Little attention has been focused on what instructional supports are needed for students enrolled in an online K-12 environment. The current research study investigated the effects of adding advance organizers in an online setting on middle school students' self-regulation. This quasi-experimental study was designed using a repeated-measures counter-balanced method. During the study, 106 middle school students, living in the Midwest, participated in two online social studies units. The study included two online instructional units designed to include a treatment (inclusion of an advance organizer) and a control. Students were placed into two groups, based on their school (TC: treatment-control; CT: control-treatment). Each group was exposed to both the treatment and control but in opposite order. Students were asked to complete the self-regulation survey at the beginning of the study, as a baseline, and at the end of each instructional unit to determine if the advance organizer changed the student perception about self-regulation. Additional data collected during this study recorded how students interacted with the online materials and the frequency to which they viewed the content. At the conclusion of the data collection process, 45 students had completed the online required elements, fewer than estimated for adequate power, therefore limiting the results of the study. The analyses of student perception of self-regulation revealed no statistically significant effect for the advance organizer. Results indicated on

average students (TC group) who received the advance organizer first viewed the online content more frequently than those in the CT group. This evidence could be interpreted that the TC group were exposed to the advance organizer first actually changed their learning behaviors in the control unit and therefore recorded greater activity than the CT group. At the conclusion of the study students completed a feedback survey about the online unit. The majority of respondents were positive towards the advance organizer and the online units. Results from this study are encouraging and may be used by others to further investigate the implications for advance organizers on middle school student self-regulation.

Savakinas, C. A. (2012). The effect of professional development on teacher attitudes toward online learning in K--12 education. (Order No. 3512464, Wilkes University). ProQuest Dissertations and Theses. Retrieved from <http://search.proquest.com/docview/>

[Author-provided abstract] The purpose of this study was to examine how teacher attitudes toward online learning in K-12 education vary before, during, and after participation in a professional development program focused on ePedagogy and online course development. The study also examined which Key Design Factors, as identified by Wells (2007), [Wells, J. G. (2007). Key design factors in durable instructional technology professional development. *Journal of Technology and Teacher Education*, 15(1), 101-122. Retrieved from <http://search.proquest.com/docview/>] influence teachers' attitudes toward online learning in K-12 education. This study utilized a one-group, repeated measures design. Attitudes from 27 K-12 educators were measured using the Online Learning Attitude Scale (OLAS) adapted from an instrument developed by MacArthur, Wang, & Crosby (2003) and modified in a further study by Uzunboylu (2007). Data was collected from the OLAS at three points during a professional development program. The data was analyzed within-subjects and between-subjects. Within-subjects data analyzed how attitudes in the aggregate varied before, during, and after the professional development program. Between-subjects data compared attitudes based upon previous experience with online learning and years of teaching experience. The results of this study revealed that teacher attitudes toward online learning in K-12 education did not vary before, during, and after participation in a professional development program focused on ePedagogy and online course development with one exception. Significant results were found among participants with 9-13 years of teaching experience. All five Key Design Factors were included in the program and may have influenced the score improvements in the group with teaching experience from 9-13 years. [QM Reviewer's note: While this study does not specifically address the design of online course, it does provide evidence of the resilience of teachers' attitudes towards online learning.]

Segedy, J., Kinnebrew, J., & Biswas, G. (2013). The effect of contextualized conversational feedback in a complex open-ended learning environment. *Educational Technology Research and Development*, 61 (1), 71-89. DOI: 10.1007/s11423-012-9275-0

[Author-provided abstract] Betty's Brain is an open-ended learning environment in which students learn about science topics by teaching a virtual agent named Betty through the construction of a visual causal map that represents the relevant science phenomena. The task is complex,

and success requires the use of metacognitive strategies that support knowledge acquisition, causal map construction, and progress monitoring. Previous research has established that middle school students struggle at such tasks without proper scaffolding and feedback. In Betty's Brain, this feedback is provided by Betty and Mr. Davis, another virtual agent designed to provide guidance and suggestions as students work. To explore the effect of contextualized conversational (CC) feedback, this paper presents an experimental study comparing CC feedback to a baseline non-conversational feedback approach (PA), called prompt-based action-oriented feedback in Betty's Brain. Forty-four eighth-grade students from 2 intact middle Tennessee science classrooms, taught by the same teacher, were divided by classroom into two treatment groups: PA and CC. The two groups differed only by the agent interactions that occurred while they used the system: students in the PA condition received PA feedback, and students in the CC group received CC feedback. This paper discusses our implementation of contextualized conversational (CC) feedback, and then presents the results of an experimental study exploring the effects of this feedback in two 8th-grade science classrooms. The results illustrate some advantages of the CC feedback in comparison with a baseline dialogue mechanism that presents similar strategies in a non-conversational, non-contextualized form. While both groups showed significant pre-to-post test learning gains, the difference in learning gains between the groups was not statistically significant. However, students who received CC feedback more often performed actions in accordance with the advised strategies, and they created higher quality causal maps. [QM reviewer note: While this study was done in a K-12 (8th grade) learning environment, it does provide evidence support impact of contextualized feedback as students engage in causal map construction.]

Smistad, K. E. (2013). Student feedback in elementary online learning: A phenomenological study using person-centered instruction. ProQuest Dissertations and Theses Database. (UMI 3559881)

From Abstract: Online learning is becoming increasingly attractive as an option for learning at the K-12 level. However, most research in online learning is done with adults or university participants—a population with a different developmental level and different reasons for learning than those still in compulsory schooling. This study examined the phenomenon of peer feedback among elementary school participants learning online using the Person-Centered Instruction (PCI) instructional design model created by Miller and Mazur (2001). Ten-year-old participants participated in a four-week online course in the subject of health utilizing the PCI instructional design model. Using the model, students in groups collaborated with the instructor to design a student-centered learning experience taking into consideration interest, ability, prior knowledge and need while adhering to state learning standards. The project plans were then carried out in collaboration with group members. Data collected included online participant discussion, reflective journals, and interviews. Participant interviews and reflective journals were analyzed using a phenomenological methodology. Online participant discussion was analyzed using the qualitative content analysis instrument: Interaction Analysis Model for Examining Social Construction of Knowledge in Computer Conferencing authored by Gunawardena, Lowe, and Anderson (1997). It was found that feedback was perceived as either good or bad according to the emotions engendered by the receiver, the

nature of student feedback within the course was isolating for the participants, and feedback was mediated by student relationships. Recommendations for practice resulting from the study include providing developmentally appropriate scaffolding for the implementation of effective student feedback, implementing voice or video recording capabilities within the design of the courseroom, increased instructor presence, and the implementation of student facilitators within courseroom groups. [The dissertation citations contained here are published with the permission of ProQuest LLC. Further reproduction is prohibited without permission. Copies of dissertations may be obtained by Telephone (800) 1-800-521-0600. Web page: <http://www.proquest.com/en-US/products/dissertations/individuals.shtml>.]

Smith, S. J., & Harvey, E. E. (2014). K-12 online lesson alignment to the principles of universal design for learning: the Khan Academy. *Open Learning*, 29(3), 222-242.

[Author Article Abstract] - "The field of K-12 education is being transformed, with an influx of students, including those with identified disabilities, engaging in blended and fully online learning. While online learning shows promise for students with disabilities through flexible content and personalised instruction, concerns regarding accessibility and appropriateness of online learning for this population still exist. In order to examine this concern, researchers developed and used a Universal Design for Learning (UDL) Scan Tool to measure lesson content and alignment with UDL principles, guidelines and checkpoints. Four hundred and seventy-eight math, science and world history Khan Academy lessons were randomly selected and evaluated for this study. The paper highlights the results of the study, in terms of the lessons' alignment with UDL principles and guidelines, as well as a discussion on limitations and future research" (p. 222.) [QM Researcher's Note] - The UDL scan tool was not included in the article, however, some basic info on UDL was provided: "UDL is based on research within the neurosciences, developmental psychology and learning differences (Rose & Gravel, 2012) that suggests teachers should consider how to integrate three principles into their instruction and assessment practices that are based on three interrelated types of brain networks (recognition, strategic and affective networks). The principles are the following: multiple means of representation, multiple means of action and expression, and multiple means of engagement. These three principles are further expanded and clarified through nine unique guidelines, three per principle and various checkpoints that should be considered, if not followed, for instructional planning and when determining whether practice is truly aligned to UDL" (p. 225). [Readers might want to investigate the Universal Design for Learning guidelines from CAST at <http://www.cast.org/our-work/about-udl.html#.VI8yL781YZw>]. Topical areas include: proving multiple means of representation; multiple means of action and expression; and multiple means of engagement (p.12).

VanVooren, S. E. (2017). The K-12 Online Teaching Dynamic: A study of educators at multiple cyber charter schools in Pennsylvania. (Doctoral dissertation).

[Author-provided abstract] This study harvested and synthesized information on K-12 online educators within the State of Pennsylvania through structured interviews and artifact evaluations. As parents, students, and the greater K-12 educational community look for innovative ways to increase rigor and student achievement in the 21st century, educational technology is viewed as the conduit to that end. Using a multi-site case study approach, comprehensive research brought to the surface a profile of effective K-12 online educators teaching at various Pennsylvania cyber charter schools. This study sought to answer the following questions: What are the characteristics and competencies of effective K-12 online educators in Pennsylvania cyber charter schools? What evidence displays skills that are specific to effective K-12 online educators in Pennsylvania? These educators rely on their skills acquired during traditional pre-service training to teach in an online environment. Study participants stated they require skills that go above and beyond traditional knowledge, skills collectively known as digital pedagogy. In the 21st century, digital pedagogy skills are moving to the forefront of teacher usage and knowledge base. This is evidenced from the study participants' statements and the adoption of online teacher certification and credentialing by state departments of education.

Viano, S. L. (2018). At-risk high school students recovering course credits online: what we know and need to know. *The American Journal of Distance Education*, 32(1). Retrieved from <https://www.tandfonline.com/doi/full/10.1080/08923647.2018.1412554>

[Author provided abstract] The majority of American high school students enrolling in online education are doing so in credit recovery courses. These are online courses specifically for students who previously failed a face-to-face version of the course. Despite the popularity of credit recovery courses, the literature on online learning largely ignores credit recovery courses and students. Assuming credit recovery students are similar to other online learners can be misleading. In this article, the existing literature on credit recovery is reviewed in 3 specific areas: the proliferation of credit recovery courses, the student experience in credit recovery courses, and outcomes and impacts of credit recovery. Suggestions are given for how to advance the credit recovery literature in future research of online learning. [QM Reviewer's notes] In conclusion author argues, " the research base on online learning should shift to include more studies either focusing exclusively on credit recovery or including credit recovery as an important subgroup to analyze separately" and that "research should investigate if offering credit recovery is in fact effectively allowing students to accumulate more course credits followed by graduating from high school" (p. 25).

Waters, L. H., Menchaca, M. P., & Borup, J. (2014). Parental Involvement in K-12 Online and Blended Learning. In R. E. Ferdig & K. Kennedy (Eds). *Handbook of Research on K-12 Online and Blended Learning* (pp. 303-323). Retrieved from https://www.academia.edu/attachments/45882727/download_file?st=MTUyMzU2NTQ3Niw2Ny4yMzQuNS4xNjQsNTcxMTQyMTQ%3D&s=work_strip

[Author-provided abstract] Research indicates children generally fare better in traditional schools when parents are involved. However, scant research exists in alternative settings such as blended and online schooling. This comprehensive review of the few studies in such settings found that: (a) categorization of technologically-mediated schools is ill-defined; (b) levels of parental involvement vary and are influenced by many factors; (c) links between parent involvement and student achievement exist in these alternative settings but further research is needed; (d) there are implications for public policy; and (e) finally, the review provides specific suggestions for further research. [From conclusion] research in this area of K-12 online learning is only beginning to surface. The authors of this chapter urge researchers to continue to examine, investigate, and explore parental involvement in these unique school settings in order to add to the body of knowledge and inform policy and practices to improve student achievement with K-12 online environments. ...While research in this nascent field is still emerging, much of the research contained within this chapter provides a solid foundation from which to understand the fundamentals of parental involvement in K-12 online learning. For instance, the research has examined how parental involvement can be viewed along a continuum of support, where some parents are more involved than others. The research has posited that this could be explained in part because some parents get more involved when they see their students struggling with the content or when they have received failing grades (Black, 2009; Borup, 2013). Others have suggested that since parents must proactively choose to place their students in these schools they may be motivated to increase their involvement by factors other than those faced by parents of traditional school students (Beck et al., 2013). Some research also has found that parents, whose students who are self-motivated, responsible, engaged, and well organized, believe that they can ease off their support (Curtis, 2013; Litke, 1998). However, it is difficult to generalize the findings from any of these studies because they involved small, less diverse participant populations than might be found within the larger population of students in K-12 online schooling. Research conducted by Black (2009) and Borup et al. (2013) begins a much-needed examination of how parental involvement in these unique settings may contribute to student academic success. (p. 319)

Weber, V. S. (2015). Instructional design for online learning: Are pre-service teachers prepared? (Order No. 3709669). Available from ProQuest Dissertations & Theses A&I. (1699298672).

[Author provided abstract] The rapid expansion of online learning opportunities in the K-12 environment has increased the demand for qualified teachers with the knowledge, skills, and attitudes to design instruction for the online learning environment. Prior to this study, limited research existed to explain how teacher education programs prepared pre-service teachers with the knowledge, skills, and attitudes needed to create online learning environments. This study examined how pre-service teachers in undergraduate preparatory programs learn instructional design competencies, including the knowledge, skills, and attitudes necessary to deliver instruction in the online learning environment. Research conducted for this study also observed how pre-service teacher programs, specific courses, and objectives within courses addressed instructional design theories, models, or strategies. Participants for the study included deans, department chairs, faculty, pre-service teachers,

and former students currently working in the online environment from two teacher education programs in Minnesota. This qualitative, embedded, multiple case study followed a six-step research model design developed by Yin (2009) that included Plan, Design, Prepare, Collect, Analysis, and Share. Analysis used to answer the two research questions occurred in two distinct sections. Analysis in Section 1 focused on the connections between the essential 2012 International Board Standards for Training, Performance, and Improvement (ibstpi) Instructional Design Competencies and the knowledge, skills, or attitudes of pre-service teachers and their respective teacher education programs. Analysis for Section 2 concentrated on how teacher education programs reflected foundational concepts of instructional design for online learning as determined by the literature. As determined by research, this study proposes a recommended sequence to improve the practice of instructional design for online learning in teacher education programs. Any continued research on this topic leads to improvements that benefit the advancement of instruction design in the K-12 online learning environment.

Weiss, A. E. (2017). Should I stay or should I go?: Educator (member) retention in an online learning community for professional development (Order No. 10629147). Available from ProQuest Dissertations & Theses A&I. (1920145205).

[Author-provided abstract] Professional development (PD) can be effective in addressing K-12 science, technology, engineering and mathematics (STEM) educators' content and pedagogical needs, if it is conducted over the course of many weeks or months. Given budget, geographic and time constraints on educators, one proposed method for delivering this ongoing PD is online learning communities (OLCs), which are designed to also encourage long-term collaboration. However, many OLC members rarely return, a situation strikingly similar to student departure from traditional higher education institutions between the first and second years of enrollment. Since education professionals have different capacities and motivations for engaging with online PD, one possible explanation for the observed departure was that some members' characteristics matched well with an OLC (goodness-of-fit) while others did not (poorness-of-fit). To test this hypothesis, member information and usage data covering a 22-month period were obtained from the NASA Educators Online Network (NEON) OLC for STEM education professionals. Using analysis of covariance (ANCOVA) and step-wise multivariate linear regression methods, combinations of members' background characteristics and markers of initial or subsequent activity in the NEON environment were evaluated for goodness-of-fit. Despite research design and Type 1 error constraints, results indicated that the idea of applying quantitative methods and a goodness-of-fit framework to understand OLC member activity had some merit. With matches found between STEM PD needs, members' initial perceptions of NEON as potentially capable of meeting those needs, and subsequent activity in this OLC designed to deliver STEM content, the study appeared to lend support to the notion that a goodness-of-fit existed, to varying degrees, between NEON and its members. This fit was most pronounced for female K-12 in-service educators, who comprised a majority of the audience that NEON was designed for and who also stood to gain the most from the kind of collaborative PD in STEM content offered by this OLC. iv Implications from these findings, which should be interpreted with consideration of the study's limitations in mind, included a need for more purposeful strategies in training administrative members, which would

aid in alignment of educator OLC activity with local school district needs, as well as a more clearly delineated program for documenting PD hours earned from individualized activities that are more relevant to an educator's curiosity and need. Future qualitative analysis of members' discussion forum activity would help to further understand how this particular form of online PD matches with educators' professional goals, a useful insight for managers designing the next generation of online learning communities for long-term professional development, learning and collaboration.

Woo, M. M., Chu, S.K.W, & Xuanxi, L. (2013). Peer-feedback and revision process in a wiki mediated collaborative writing. *Educational Technology Research and Development*, 61 (2), 279-309. DOI: 10.1007/s11423-012-9285-y

[Abstract provided by authors] This study investigated the use of a wiki for collaborative writing among primary levels five (P5) and six (P6) students (n=119) in a Chinese primary school in Hong Kong where English is taught as a second language (L2). Three classes of students and their English subject teachers participated in a three-month English language writing programme using a wiki. Quantitative and qualitative data were analyzed from activities recorded in the wiki system, including posted edits and comments, students' group writings and student and teacher interviews. The wiki page history revealed information on the types of revisions that occurred, showing that different types of feedback elicited actual revisions, which may have resulted in better group writing. Findings from the study may shed light on how wikis can help provide support for students' collaborative writing process with wikis, and how peer-feedback can influence this process. [QM reviewers note: This study K-12 provides support for using wikis as peer-feedback. Study conducted in Hong Kong where English is a second language. While study not focused on online learning, it does provide information about educational technology designed as component of learning interactions that can enhance learning.]

Wraga, W. G. (2011). What's the problem with a "rigorous academic curriculum"?: setting new terms for students' school experiences. *The Clearing House*, 84, 59-41. doi: 10.1080/00098655.2010.511307

[Author-provided abstract] "An analysis of the ubiquitous but taken-for granted term "rigorous academic curriculum" reveals that by definition it is not an academically rigorous term. The term contains multiple meanings, negative connotations, and a constricted conception of the school curriculum. It is associated with a discredited learning theory and in practice tends to function more as a status marker than as a substantive educational experience. We should shift our thinking and teaching away from the imprecise and potentially miseducative notion of a rigorous academic curriculum and toward the ideal of a vigorous educative curriculum" (p. 59).

[QM Reviewer note] Worth read as reminder of how platitudes, buzz words are tossed around education assuming common definitions. Author connects word "rigor" with discredited learning theory: "The use of the words rigor and rigorous in connection with the academic curriculum is probably a survival from the learning theory called mental discipline. Widely accepted during the nineteenth century and earlier, the theory of mental discipline held in part that the mind was like a muscle in that it could be strengthened through strenuous—that is, rigorous—exercise. The thinking was that the more severe the academic experience with any subject, the more it strengthened the mind. Put simply, the belief was, the harder the subject came, the smarter the student became. The problem with the theory of mental discipline is that about a hundred years ago educational psychologists discredited it. Researchers found insufficient evidence to support the claim..." (p. 61).