Journal of Education and e-Learning Research
Vol. 7, No. 2, 130-152, 2020
ISSN(E) 2410-9991 / ISSN(P) 2518-0169
DOI: 10.20448/journal.509.2020.72.130.152

Online Instruction in Higher Education: Promising, Research-based, and Evidence-based Practices

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Abstract

The purpose of this study was to review the research literature on online learning to identify effective instructional practices. We narrowed our scope to empirical studies published 2013-2019 given that studies earlier than 2013 had become quickly outdated because of changes in online pedagogies and technologies. We also limited our search to studies with undergraduate and graduate students, application of an empirical methodological design, and descriptions of methodology, data analysis, and results with sufficient detail to assure verifiability of data collection and analysis. Our analysis of the patterns and trends in the corpus of 104 research studies led to identification of five themes: course design factors, student support, faculty pedagogy, student engagement, and student success factors. Most of the strategies with promising effectiveness in the online environment are the same ones that are considered to be effective in face-to-face classrooms including the use of multiple pedagogies and learning resources to address different student learning needs, high instructor presence, quality of faculty-student interaction, academic support outside of class, and promotion of classroom cohesion and trust. Unique to the online environment are user-friendly technology tools, orientation to online instruction, opportunities for synchronous class sessions, and incorporation of social media. Given the few studies utilizing methodological designs from which claims of causality can be made or meta-analyses could be conducted, we identified only faculty feedback as an evidence-based practice and no specific intervention that we could identify as research-based in online instruction.

Keywords: Online learning, Higher education, Blended instruction, College students, Hybrid instruction, Virtual learning.

Citation | Alison S. Lockman; Barbara R. Schirmer (2020). Online Instruction in Higher Education: Promising, Research-based, and Evidence-based Practices. Journal of Education and e-Learning Research, 7(2): 130-152.
History:
Received: 14 February 2020
Revised: 17 March 2020
Accepted: 20 April 2020
Published: 8 May 2020

Publisher: Asian Online Journal Publishing Group

Acknowledgement: Both authors contributed to the conception and design of the study.
Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no conflict of interests.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study was reported; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.
Ethical: This study follows all ethical practices during writing.

Contents

Contribution of this paper to the literature
This study contributes to existing literature by reviewing the research literature on online learning to identify effective instructional practices.

1. Introduction

Online learning has been a disruptive innovation in higher education from the point when personal computers became commonplace and enabled instruction to be delivered at the learner's fingertips. The dramatic increase in online instruction since the mid-1990s led to a study initiated by the U.S. Department of Education, Office of Planning, Evaluation, and Policy Development to provide policy makers and practitioners with research evidence on the conditions under which online education was effective. Means, Toyama, Murphy, Bakia, and Jones (2010) conducted a meta-analysis and literature review of studies conducted between 1996 to 2008 to identify the effectiveness of online compared to face-to-face instruction, effectiveness of supplemental online instruction in face-to-face courses for enhancing learning, and practices associated with more effective learning in online courses. The authors reported that their meta-analysis was based on few rigorous studies of the effectiveness of online learning. Findings showed modestly better learning in online than face-to-face conditions, pedagogy did not influence learning except for the greater effect sizes found for instructor-directed or collaborative learning rather than independent, self-directed learning. The authors concluded that findings did not support the superior learning in online instruction. Given the decade since publication of the Means et al. meta-analysis and literature review, advances in technologies used in online instruction, and widespread online course delivery among institutions of higher education in the U.S., we set out to identify the practices associated with effective online learning. Instead of beginning our search of research studies with a 2009 publication date, which was the point in time that the Means and colleagues had concluded their search, we narrowed our scope to 2014-2019 given that earlier studies had become quickly outdated because of changes in online pedagogies and technologies. We expected that researchers would have addressed the gaps, inconsistencies, and weaknesses in the earlier studies of online instruction. We also limited our search to studies of online instruction with undergraduate and graduate students.

2. Methodology

We searched the databases of ERIC, Education Source, and PsycInfo. Given our window of publication dates, we did not search the reference lists of pertinent articles because those would be older than our target. We also did not attempt to search a short list of journals as publication venues expressly for online learning have proliferated in the past decade and many studies are published across a broad range of topic areas. We limited our search terms to *online learning* and *college* without limiting Boolean operators to cast the widest possible net of pertinent studies. We identified 516 studies based on our criteria of publication date and topic. We narrowed this number to 125 studies based on the application of a quantitative or qualitative methodological design. Of this number, 22 studies were eliminated because they did not include descriptions of methodology, data analysis, and results with sufficient detail to assure verifiability of data collection and analysis. The final number of studies included in this review is 104.

As the terminology used to identify the differences in course delivery vary by author, we use the term *face-to-face* to refer to courses offered in person in a brick-and-mortar classroom, *online* to refer to courses offered fully online, and *blended* to refer to courses with online and face-to-face components. We recognize that this terminology has shifted over time and will likely shift in the future, such as *hybrid* instead of blended, and *in-ground* instead of face-to-face or brick-and-mortar. We use the terms *synchronous* to mean that all students participate online in real time but in different locations and *asynchronous* to mean that students participate in an online learning course at different times; however, we only use these terms when they are pertinent to the methodology and findings. Similarly, we do not use the umbrella terms *eLearning* or *electronic learning*, which refers to any type of instruction in a digital medium, or *distance education*, which refers to any type of instruction in which learners and instructors are in different locations unless these are the terms used by the authors.

The methodology we applied to reviewing the corpus of 104 studies involved the following steps:

1. Each study was analyzed with a technique developed by Schirmer (2018) that enabled us to identify and compare studies along the dimensions of the rationales, purposes, research questions, theoretical frameworks, participants and settings, procedures, interventions when appropriate, measures, data analyses, results, conclusions, and implications.
2. Themes across studies were identified that reflected patterns and trends in the 104 studies.
3. Within each theme, the studies were compared and contrasted.
4. Key findings for each theme were identified.
5. Studies were reviewed to identify those that incorporated common variables investigated with experimental designs that could be analyzed with meta-analysis.
6. Methodological considerations involving critical analysis, gaps and inconsistencies, and limitations within the body of research literature were identified.

3. Themes in the Research Literature on Online Learning

Our analysis of the patterns and trends in the corpus of research studies led to identification of five themes: course design factors, student support, faculty pedagogy, student engagement, and student

success factors. Table 1 provides descriptions of the methodological design, participants, and measures for each study.

3.1. Course Design Factors

Course design factors have been of interest to researchers since the inception of online learning. Until recently, most of these studies focused on straightforward comparisons between the effectiveness of fully online, blended, and traditional face-to-face instruction. Whereas participant numbers ranged dramatically from one course section to thousands of students in multiple courses, all of the studies compared instructional approaches with measures of course achievement (Carbone, 2018; Harris & Nikitenko, 2014; Jovanovic et al., 2015; Ryan, Kaufman, Greenhouse, She, & Shi, 2016; Xu & Jaggars, 2014). Results consistently showed no significant differences in student learning between the instructional modalities.

Several investigations focused on factors that might explain the similarities in learning outcomes across venues. Student social presence and autonomy have not explained differences in learning outcomes (Zacharias & Yiannis, 2017). Findings have also shown that venue is less important than student diligence and drive (McDonough, Roberts, & Hummel, 2014) and differences among students reflect preference with one venue versus dissatisfaction with the other venue (Forte, Schwandt, Swayze, Butler, & Ashcraft, 2016).

Beyond exploring the possibility of differential effectiveness in delivery mode, researchers have investigated course design elements. Results have shown that assessment strategies, encouragement of socialization , and promotion of critical thinking are significantly related to student satisfaction, self-perceived learning, and collaboration (Chen, Bastedo, & Howard, 2018; Jou, Lin, & Wu, 2016). It has been shown that groupwork is a challenging design element because students often lack interest and favorability toward online group work (Xu., Du, & Fan, 2015). Findings have demonstrated that the establishment of group trust, previous experience in online courses, peer- and learning-oriented reasons for working collaboratively with group members, providing and receiving feedback, and help-seeking are significant in predicting successful collaboration (Du et al., 2018; Xu. et al., 2015). Tirado, Hernando, and Aguaded (2015) examined the interaction of students in working groups who were assigned the task of resolving cases in their internships through in an online discussion forum. Cohesion among members of a group and the centrality of the most influential members of the group were found to be positively related to student knowledge building.

Other researchers have investigated student characteristics related to persistence, satisfaction, and success in the different delivery modes. Politis and Politis (2016) found that motivation was a key factor for enhancing students' skills and knowledge and, alternatively, easy access to synchronous online tools motivated students to be more engaged in the learning process. Investigations of the relationship between delivery mode and student satisfaction showed greater satisfaction with online and blended course modes for the Wiechowski and Washburn (2014) study and a significant relationship between satisfaction and use of technology and interactive course elements for the Marmon, Vanscoder, and Gordesky (2014) study.

The findings of two large-scale research studies showed a correlation between age and persistence in undergraduate online courses. James, Swan, and Daston (2016) found that students enrolled in only blended courses had 1.2 to 1.6 times greater odds of being retained than fully online students, and that students in only face-to-face courses had 1.3 to 1.6 times greater odds of being retained than fully online students. They also found that taking online classes was more harmful to retention for younger students and those without Pell grants. Similarly, Cochran, Campbell, Baker, and Leeds (2014) found that withdrawal rate was the highest for first-year students and decreased steadily for sophomores, juniors, and seniors.

Several research teams investigated factors related to student persistence. Gering, Sheppard, Adams, Renes, and Morotti (2018) found a correlation between persistence and cumulative grade point average, class standing, course level, degree level, race, high perceived academic support, high teaching presence, and high social support. Students identified the importance of time management, supportive family, teaching presence, student initiative, social presence, and self-initiative in their persistence. Other factors found to be associated with persistence include the use of multiple pedagogies, technologies, and learning resources (Sridharan, Deng, & Kinshuk, 2014) and student motivation, though motivation was lower for online courses than blended and face-to-face (Wong & Fong, 2014).

In two studies, researchers investigated the perceptions of students about the effectiveness of online course learning tools and faculty pedagogy. The students in the Wai and Seng (2015) study reported using power point predominantly, videos and online exercises moderately, and discussion tools and online lectures only slightly. Hixon, Barczyk, Ralston-Berg, and Buckenmeyer (2016) found that with greater experience in online courses, learners were more cognizant of the importance of clear expectations, alignment of instructional components, logical navigation, and ready availability of required tools and resources.

Smart and Saxon (2016) investigated the issues involved in persistence and success for students with learning challenges who were taking development English courses. Results showed that significantly

more students withdrew or received grades of D and F in the fully online and blended courses compared to the face-to-face courses.

3.1.1. Key Findings from Course Design Studies

Course design studies have involved examinations of differences in learning outcomes and student satisfaction between courses offered online, blended, and face-to-face. For straightforward comparisons based on course grades and student course evaluations, results have shown that student diligence predicts success regardless of venue and differences in satisfaction reflect personal preference for one venue rather than dissatisfaction with another venue.

Several course design elements were found to be effective in improving achievement and satisfaction including incorporation of multiple pedagogies and learning resources, feedback from the instructor and peers, user-friendly online tools, high instructor presence, and promotion of socialization, and group trust. The course design elements that showed less effectiveness included groupwork and online lectures. The one study that examined the performance of students enrolled in a college developmental English courses found significantly more of these students did more poorly in the fully online and blended courses.

3.2. Student Support

A substantial body of the recent research literature has involved support for students within online coursework. Though regional accreditation of institutions of higher education in the U.S. requires that student in online coursework receive equivalent access to support services as those attending classes on campus, these studies have addressed the challenges of offering comparable support within virtual modes and the researchers have sought to identify the specialized support needed by students in fully online classes.

Categories of support needed by online students was the subject of two investigations. Gaytan (2013) found that student self-discipline, quality of faculty-student interaction, and mandatory orientation were rated as the most important factors affecting student retention in online courses. Netanda, Mamabolo, and Themane (2019) examined the perceptions of online students and instructors. The students identified financial, technological, and academic support interventions as the most salient support services needed. They viewed barriers to online success as the unavailability of lecturers through telephones and emails, feelings of isolation, and lack of interaction between students and their instructors. The instructors identified academic support as the most crucial need and lack of student self-directedness as a barrier to student success.

Researchers have also examined the relationship between specific support factors and student performance in online courses. Motivational support, cognitive learning strategies, social support, and sense of community have been found to predict student engagement and course achievement, but no significance has been found for interactivity and metacognitive support (Park & Yun, 2017; Vayre & Vonthron, 2017; Yılmaz & Keser, 2017). Wang (2014) found that students' perceptions of trustworthiness in online coursework was influenced by prior positive experience and good reputation of the online learning system or instructor, good accessibility and usability of the online learning system, instructor responsiveness, sense of care and community created by the instructor, and understandable privacy and security policies. The feedback from the students with disabilities showed that because of trust issues, the majority initially held reservations about requesting accommodations.

Two studies have involved experimental investigations of support interventions. Fricker (2013) examined the effect of a dedicated graduate teaching assistant on student retention and course completion. Fricker reported that 19 of the 20 students completed the course with a C or better and credited the support provided by the teaching assistant. Taylor, Dunn, and Winn (2015) investigated the influence of a video course orientation tutorial on online course completion rates. Their results showed significant improvement in grades and reduction in withdrawals for only some of the courses.

Two other approaches for improving student success in online coursework have involved prerequisite coursework designed to build knowledge and skills for college-level courses and instructors' use of frequent data about student learning to modify instruction. Bookallil and Rolfe (2016) examined the records of all first-time enrollments in enabling programs during a 10-year period. Enabling programs in Australian universities provide a second chance pathway to college enrollment. Results showed that enrollments into enabling programs increased during the decade but no concomitant increases in program completions and articulations to undergraduate study. Lu, Huang, Huang, and Yang (2017) provided instructors with suggestions based on student clickstream data during learning activities and found that student learning outcomes and levels of engagement were greater for students who used clickers in response to instructional activities.

3.2.1. Key Findings from Student Support Studies

Student support studies have involved identification of categories of support needed by online students and relationships between these factors and student success. The factors found to be important to student achievement in online coursework include orientation to online instruction prior to beginning coursework, quality of faculty-student interaction, academic support for students, and establishment of

trust and a sense of community in the online course. Trust was identified as particularly important in one study that included the perceptions of students with learning disabilities.

3.3. Faculty Pedagogy

Faculty pedagogy in online instruction has been a topic of great interest to researchers seeking to identify approaches with evidence of effectiveness for improving learner achievement and satisfaction. Topics have included the use of online discussion forums, social media, video clips, and flipped learning. Researchers have also examined components of effective online instruction such as the use of feedback, culturally responsive teaching, problem-based learning, metacognitive support, and instructor presence.

3.3.1. Discussion Forums

Discussion forums are a staple of online instruction. They are typically designed to engage students in sharing their insights and ideas about a topic, usually through a question or statement prompt, and to encourage student-student and student-faculty interaction.

Given that the value of discussion forums is dependent on the extent to which students participate, several studies have involved the examination of factors that improve or weaken the number and quality of students' discussion posts. Results have shown that the number of instructor posts influences the number and level of thinking in the student posts, but types of prompts have mixed effectiveness on student learning (Howell, LaCour, & McGlawn, 2017; Ringler et al., 2015; Tibi, 2018). Liu and Yang (2014) found that discussions were most effective when instructor presence encouraged talk about the students' personal lives rather than only discussion of factual material and theory. Results of the Hoey (2017) investigation indicated that the frequency of instructor Interaction did not influence student perceptions of the quality of instruction though significantly related to student satisfaction and achievement outcomes.

Several studies incorporated strategies for increasing student participation in discussion forums. Results have shown a positive association between the number of visual materials accessed and number of discussion posts, significant relationship between written assignment scores and attendance at a preparation contact session, and significant difference between the final exam scores of students who used an online discussion forum and students who did not use this forum (Bonafini, Chae, Park, & Jablokow, 2017; Olivier, 2016). Madden, Jones, and Childers (2017) used synchronous web-based conferencing and asynchronous discussion boards and found complementary attributes with the synchronous mode enabling students to receive immediate answers and the discussion forum promoting greater reflection on course material. Hou, Wang, Lin, and Chang (2015) combined discussion forums and Facebook during online group project collaborations. They found that the students posted more messages on Facebook than on the discussion forum; however, discussion forum posts were more task-oriented and Facebook posts were more often off-topic indicating that Facebook facilitated social interaction and the discussion forum facilitated task completion.

3.3.2. Online Videos

A recent interest in an instructional strategy referred to as flipped learning has led to studies involving the use of online instructional videos that students are expected to review as preparation for class. In flipped learning, content traditionally presented in class through lecture format is flipped to content presented online prior to class. Class time is then used for activities such as discussion and application. Much of the research on flipped learning in college classrooms involves the use of videos.

Instruction in the Nagy (2018) study involved traditional classroom teaching, electronic textbook readings, practice exercises, and online videos. Results showed positive correlations between video usage, ease of use, usefulness, learning performance, and Internet self-efficacy but not between learner satisfaction and learner-learner interaction. Unlike the Nagy study in which videos were used throughout the course, several studies incorporated videos for a few class sessions. Findings from these investigations showed greater in-class engagement though mixed effects on learning gains, learner attitudes, reflective thinking, self-efficacy, and perceptions of the instructor during supplementary video-based instruction (Chyr, Shen, Chiang, Lin, & Tsai, 2017; Freguia, 2017; Kim & Thayne, 2015; Makarem, 2015). Students in these studies reported that the video lectures provided a good change in pace from regular lectures and were helpful when studying for exams because they could replay segments but were not as important as other activities connected to performance evaluation. The results of two other studies indicate that the mixed results for course achievement may be related to student preference for traditional instruction and low interest in accessing the videos (Evans & Cordova, 2015; Guy, Byrne, & Dobos, 2018).

Unlike videos that replicate lectures and PowerPoint slides, video case studies are commonly used in teacher education classes to present scenarios of instructional situations and problems. Similar to findings from studies using videos as part of a flipped learning method, results have shown no significant differences in knowledge acquisition, and engagement with online video cases waxed and waned during the course (Mirriahi, Jovanovic, Dawson, Gašević, & Pardo, 2018; Saltan, 2017).

3.3.3. Social Media

Given the ubiquity and popularity of social media, researchers have explored the use of social network sites within blended and fully online courses. Most of these studies have used the private groups feature of Facebook. The course instructor is the de facto administrator who invites students into the group, creates events, and uploads pictures, videos, or files for the students to access. As a closed Facebook group, students have a private forum for sharing ideas, posting updates, and working collaboratively.

Significant relationships have been found between student interaction on course Facebook sites, academic performance, and course satisfaction (Al-Dheleai & Tasir, 2017; Davidovitch & Belichenko, 2018). Moorthy et al. (2019) examined the factors related to using Facebook for learning and found a positive correlation between perceived ease of use and intention to use Facebook for learning but not between usefulness and intention to use Facebook. Their finding is similar to that of Hou et al. (2015) who found that Facebook facilitated social interaction but did not facilitate learning academic material.

Bozkurt, Karadeniz, and Kocdar (2017) explored students' social network site preferences for communication and interaction. Results showed that students primarily used social network sites to find information, seek opinions, and keep in touch with friends and family. Regarding other uses, they expressed the belief that social network sites have potential for education purposes.

3.3.4. Technologies

As new technologies are developed and older technologies are adapted to learning environments, researchers have explored applications to online learning. One such technology is synchronous web-based conferencing that enables all users to see the same screen or each other from multiple remote locations. Web conferencing has improved during the past few years with greater Internet speed, built-in computer webcams, and availability of free software.

Wdowik (2014) found that the interactive nature of a synchronous online learning community encouraged active learning, meaningful interactions, and engagement. Taking a different approach, Politis and Politis (2016) examined the influence of learner characteristics on knowledge acquisition within a web-based synchronous online classroom environment. Results showed that proficiency with e-technologies and student motivation were significantly related to better learning outcomes in web-based synchronous online classes.

With the easy availability and relatively low cost of smartphones and tablets, students can carry a computer operating system, Internet access, and software applications almost anywhere. In one study of using smartphone apps to enhance student learning, Vázquez-Cano (2014) found that the students felt the smartphones apps had a positive influence on their learning of course content.

Blackburn (2015) investigated the technological capability of embedding pictorial stories into online course elements as a technique for illustrating abstract statistical concepts with icons. Results indicated that the pictorial stories had a positive influence on subject matter understanding, attentiveness, enthusiasm, and participation. The embedding technique investigated by Hollingsworth and Lim (2015) involved web-based modules focused on a practice or process for working with young children and families. They found that the students met the learning objectives but differed in their preferences for web-based modules versus traditional instruction.

3.3.5. Qualities of Faculty Online Teaching

Specific qualities of faculty teaching in online environments have been investigated in several studies. The largest segment of this research has focused on the format, quality, and effectiveness of feedback to students.

McCarthy (2017) examined the perspectives of university students regarding the usefulness of instructor feedback, face-to-face peer feedback, and online peer feedback. Results demonstrated that though students responded positively to providing and receiving feedback from peers, they valued the feedback from instructors more highly than peer feedback and reported their discomfort with providing critical feedback to peers. Similarly, Bonafini et al. (2017) had found that students rarely disagreed with others in the discussion forum in their study. Yang (2018) investigated the effectiveness of online peer and instructor feedback for improving the writing skills of students and found that less proficient writers made significant writing improvement whereas proficient writers made relatively slight writing progress.

In a different approach to identifying characteristics of effective feedback in online coursework, Zimbardi et al. (2017) examined the effect of students' use of feedback with subsequent performance on similar tasks. They found that the immediacy and usefulness of the feedback had the greatest impact on improvement with similar tasks, and students who showed high levels of interaction with the feedback made the greatest improvement. Alternatively, Webb and Moallem (2016) found little direct effect of feedback on student performance, though they concluded that instructor feedback should be frequent, timely, motivating, informative, and precise. They also recommended that feedback should be written, verbal, and dialogic.

Trad, Katt, and Miller (2014) explored the concept of face threat mitigation as a factor in students' ability to benefit from instructor feedback in online courses. Face threat mitigation is an approach to reducing the potentially threatening nature of feedback when nonverbal cues are not available through face-to-face discussion to soften the impact. In face threat mitigation, the instructor uses verbal and

linguistic strategies to mitigate the potentially threatening nature of the feedback. In the Trad et al. (2014) study, high-face threat mitigation language was used in one condition and low-face threat mitigation language in the other condition. Results showed that high-face threat mitigation within carefully crafted feedback enhanced the students' perception of instructor credibility and improved their motivation.

Similar to the Trad et al. (2014) study, Cutsinger, Wall, and Tapps (2018) investigated the issue of instructor presence in online versus face-to-face instructional environments. Results showed a significant relationship between perception of instructor presence and course satisfaction but not for course outcomes. Cole et al. (2017) also examined the relationships between instructor presence and motivation but added student reactions to feedback. They found that the students who perceived higher levels of teaching presence demonstrated higher levels of motivation; however, the more that students reacted negatively to instructor feedback, the less motivated they were.

Several other qualities of faculty teaching with substantial bodies of research in face-to-face classrooms have been investigated in online classrooms. Heitner and Jennings (2016) investigated the knowledge and practices of online instructors toward culturally responsive teaching to meet the needs of diverse learners. They found that instructors recognized the need for culturally responsive teaching but their knowledge fell short of addressing this need. Chen. and Chang (2014) examined the importance of the learning partner for the effectiveness of problem-based learning in online environments. They described problem-based learning as student-centered, small group, cooperative problem-focused learning activities. Results showed that the groups whose learning partners were recommended completed the problem-solving tasks significantly better than the groups without learning partner recommendations. Yilmaz, Olpak, and Yilmaz (2018) added metacognitive support within flipped learning classrooms. When the online component included notes offering metacognitive support, results showed that the students earned significantly higher scores in forethought, self-regulation, and self-reflection.

3.3.6. Key Findings from Faculty Pedagogy

Studies of faculty pedagogy have largely addressed the use of discussion forums, online videos, social media, and specific technology. A smaller body of research has focused on distinguishing the characteristics of effective online faculty teaching.

Findings from the research on discussion forums have shown a positive relationship between the number of student posts and course learning. Results are mixed on whether the number and quality of instructor posts are related to student participation on discussion forums and course achievement. Similarly, interventions designed to increase student participation in discussion forums – such as incorporation of orientation sessions, visual materials, and social media venues – have shown mixed effectiveness.

Studies on the use of video in blended courses are fundamental to the flipped learning approach. Although students expressed a positive attitude toward viewing videos as preparation for in-class sessions and tests, no significant correlations to learning outcomes have been reported. Similarly, studies of case study videos in teacher education programs have shown no effect on course achievement. Results also indicated that students were inconsistent in accessing videos.

Despite the role of social media in the personal lives of most students today, there is relatively little research on using social media within online learning environments and only a few studies have addressed learning effectiveness. The limited findings indicate that social media facilitated student-to-student interaction but not academic learning.

The few findings on synchronous online learning and other technologies are promising but considerably more research Is needed. For example, it has been found that synchronous environments encouraged active learning but required greater student motivation and proficiency with the technology. The research on smartphone apps, embedded Images, and online learning modules are also promising but there are too few studies to draw conclusions.

Most of the studies on the qualities of faculty online teaching have involved the characteristics of effective feedback to students. Results have shown that faculty feedback is more important to students than peer feedback, and timeliness and usefulness are qualities of effective feedback. Given the student perception that feedback can feel threatening, findings from a few studies indicate that perception of instructor presence can mitigate these feelings and improve student motivation.

The studies involving other aspects of pedagogy have shown that instructors appreciate the importance of culturally responsive teaching but are not skilled in techniques that incorporate the valuing of diversity among students, metacognitive support improves student higher level thinking, and selection of learning partners in group activities is a factor in student success.

3.4. Student Engagement

Student engagement has been long considered a major factor in academic success and satisfaction. So, it comes as no surprise that researchers have been interested in the differences involved in engaging students effectively within online courses given the challenges involved in learners who never meet in person with one another and instructors. The research we identified largely explored the relationships between engagement, success, and satisfaction.

One focus of the research on student engagement has involved examining the effect of student interaction patterns on course satisfaction. Results have shown no differences between patterns of student interactions in face-to-face and online sections of the same course (Almeda et al., 2018) a significant relationship between interaction and student confidence in performing Internet-related tasks (Kuo, 2014) and significant correlations between student satisfaction and learner-learner interaction, learner-instructor interaction, learner-content interaction, and student social online presence (Alsadoon, 2018; Kuo, 2014) Unlike Kuo's results, however, Gameel (2017) found that only learner-content interaction positively predicted learner satisfaction and concluded that interaction with content was more important to students than their interaction with instructors or peers.

The perceptions of students about the role of engagement in an online community has served as another focus of this body of research. In the Smith, Erlam, Quirke, and Sylvester (2014) study, tutors and advisors were assigned to every course. Results demonstrated that perceptions of connectedness with tutors more strongly related to connectedness with other students than perceptions of connectedness with advisors. Athens (2018) found that students who perceived high engagement with peers and interaction with course content earned better course grades. In an investigation of engagement when students were required to participate in teamwork assignments within a culture that emphasized competition and individualism, Aydin and Gumus (2016) found a positive but weak relationship between the students' perceptions of sense of classroom community and success in team development, but students' preference for individual study rather than teamwork was unchanged.

Several studies used the Community of Inquiry framework to investigate the application to online learning. The Community of Inquiry model describes learning as occurring in the intersection of social, cognitive, and teaching presence (Garrison, 2017). Results indicate that the Community of Learning constructs of social, teaching, and cognitive presence are not related to learning achievement though (Cutsinger et al., 2018; Maddrell, Morrison, & Watson, 2017) and the promotion of one presence may be detrimental to the others (Costley & Lange, 2016). Hoey (2017) concluded that the findings from her study both supported and challenged recommendations made by proponents of the Community of Inquiry model because instructor encouragement, acknowledgement, and reinforcement of student contributions did not influence student perceptions of the course, instructor, or their learning. Conversely, student perception of instructors and course quality were found to be higher when instructors engaged in conversational forum posts and discussions that sometimes concerned the students' personal lives rather than only discussion of factual material and theory.

One study involved exploration of the factors that affect faculty engagement when teaching online. Seaton and Schwier (2014) found that all instructors were aware of the importance of engaging their students but had difficulty establishing social presence through devices such as discussion boards because the students frequently lacked social presence. They also found that online teaching often led to feelings of isolation from colleagues and though online teaching did not take more time, it commonly took more effort.

Bigatel and Edel-Malizia (2018) found that high levels of student engagement occurred when instructors used various computer technologies to communicate, incorporated meaningful and challenging activities, provided timely and effective student feedback, prompted students to reflect on course content, related course content to students' work and life experiences, and used a variety of assessment techniques. However, making presentations and assignments that involved using research skills were negatively correlated with engagement.

Ronen and Shonfeld (2017) examined differences in engagement among students with and without learning disabilities. Their results showed that the students with learning disabilities ranked the lecturer's activity in the course and contribution to their learning higher and their involvement in the course lower than the other students. No differences were found between the students with learning disabilities and the others on self-learning ability, evaluation of the online learning environment, and student satisfaction with the online course.

3.4.1. Key Findings from Student Engagement

Findings from the research on patterns of student interaction and their perceptions of online community engagement have shown that greater interaction with online course content is related to better course grades and satisfaction, but peer and instructor interaction are not consistently related to course satisfaction. The studies that applied the Community of Inquiry framework that describes online learning as occurring in the intersection of social, cognitive, and teaching presence have provided no evidence that the framework can be used to improve learner engagement. The one study that examined the engagement of students with diverse learning needs found that the students with learning disabilities considered the instructor's presence to be important to engaging them.

3.5. Student Success Factors

Given concerns about attrition in online programs, researchers have sought to identify factors that predict student success in online coursework. This body of research has been largely concentrated on identifying student characteristics that are amenable to instructional or design interventions with the potential to improve course persistence and achievement.

Cigdem and Yildirim (2014) found that among students enrolled in vocational education, highest readiness for online learning was in the dimension of motivation for learning, followed by self-directed learning and learner control. The lowest readiness was found in the dimensions of computer and Internet self-efficacy. Gering et al. (2018) identified seven individual factors that were significantly related to success in online learning: three personal variables (cumulative grade point average, race, and perceived academic control), two circumstantial variables (class standing and degree level), and two course variables (course level and instructor presence). Puspitasari and Oetoyo (2018) found academically successful students were highly motivated, were attending college to further their career development, studied 3-4 hours per course per day, and regularly attended academic support programs. Results of the Kintu and Zhu (2016) study showed that workload management and learner interactions predicted learning achievement and satisfaction whereas learner attitudes only predicted satisfaction. Lu et al. (2018) found that final academic performance was predicted by the sixth week of a semester and the factors that most affected final academic performance included weekly number of activities and video viewing, participation in tutoring, weekly practice of course concepts, homework scores, and quiz scores.

Several studies have involved the role of learning styles on student success. Cimermanová (2018) described learning styles as involving social interaction based on three characteristics: competitive-collaborative, avoidant-participant, and dependent-independent. Regardless of the learners' defined learning style, Cimermanová found no effect on academic achievement. Wu (2014) defined learning styles along the dimensions of visual, auditory, or tactile preferences for learning and found no correlation with course satisfaction. Neroni, Meijs, Leontjevas, Kirschner, and De Groot (2018) were specifically interested in differences among students with mastery versus performance goal orientation. Students with mastery orientation are focused on developing knowledge and skills whereas students with performance orientation are focused on performing better than others. They found performance goal orientation to be positively related to better academic outcomes and mastery orientation to be unrelated to academic outcomes. Wu. and Hou (2015) categorized students as having holistic or serialist cognitive learning styles. They described holist individuals as preferring to learn with a global approach and to explore relationships between concepts early in the learning process; they described serialist individuals as preferring to learn one concept at a time before exploring the relationships between concepts. Results showed that all students spent most time sharing and comparing information on the discussion forum, holist students exhibited discovery behaviors during discussions, and serialist students preferred to discuss issues one by one. They also found that the holist students neglected negotiation and co-construction of knowledge and the serialist students displayed limited time for new discussions because they continued unresolved topics from previous discussions. Yu-Ching (2015) categorized learning styles as assimilating, diverging, accommodating, and converging. Assimilating learning style favors using abstract concepts, observing, and reflecting before taking action in learning. Diverging learning style favors using concrete experiences, synthesizing observations, and relying on thoughts and feelings in learning. Accommodating learning style prefers learning by doing, forming and carrying out plans, and being open-minded when learning. Converging learning style favors abstract concepts, experimentation, and creating new ideas. Results showed that students with assimilating and diverging learning styles performed better and demonstrated higher self-efficacy than those with accommodating and converging learning styles.

Several groups of researchers have Investigated self-efficacy among more and less successful online students. Results have shown a significant correlation between distance learning self-efficacy and academic achievement (Tladi, 2017) high Internet self-efficacy and final course exam grades (Chang et al., 2014) e-learning self-efficacy and academic achievement (Zhang, Yin, Luo, & Yan, 2017) and self-efficacy and academic achievement (Bradley, Browne, & Kelley, 2017; Broadbent, 2016).

Similar in focus to learning styles and self-efficacy, the role of self-regulation has been explored. Cho and Heron (2015) investigated the extent to which self-regulated learning predicts student achievement in online coursework. They found that motivational and emotional variables significantly predicted student achievement and satisfaction. No significance was found for cognitive strategies. In the List and Nadasen (2017) study, motivation was found to be significantly correlated with online course achievement; however, no correlation was found between self-regulation and course achievement.

Students' digital literacy and electronic learning skills have been the emphasis of a few studies. Rasouli, Rahbania, and Attaran (2016) found a significant relationship between academic achievement and the readiness of students to apply e-learning. Similarly, Tang and Chaw (2016) found that effective learning in online environments requires strong digital literacy skills. Their results suggested that despite the widespread use of digital devices, students need training in the technology required for electronic learning.

Other factors that have been investigated include time perspective and emotional intelligence. Romero and Usart (2014) identified time perspective along dimensions of past negative (focus on past negative and traumatic experiences and has a pessimistic outlook), past positive (focus on past positive experiences and has an optimistic outlook), past hedonist (oriented toward immediate pleasure and living in the present), present fatalist (feelings of powerlessness and helplessness about the future), and future time perspective (achievement oriented and good expectations for the future). Results showed that online students showed a higher orientation to past negativism and lower future time orientation. Engin (2017)

found a significant relationship between student online learning readiness and emotional intelligence. Engin concluded that individuals with high social skill and well-being may have greater self-confidence, self-efficacy, and self-control when dealing with online learning expectations.

3.5.1. Key Findings from Student Success Factors

Studies of learning styles and self-efficacy comprise the greatest proportion of research on student success factors. Definitions of learning styles vary by study but regardless of definition, no correlations were found between student learning style and online course achievement. Conversely, self-efficacy is defined consistently in the research literature and findings have shown that personal self-efficacy and Internet self-efficacy predict online academic achievement. Several individual factors have also been found to be positively related to online course achievement. These include past academic success, motivation, family support, workload management, and digital literacy.

Table-1. Methodological Designs, Participants, and Measures in Reviewed Studies.

Research Study	Methodological Design	Participants	Measures
Al-Dheleai and Tasir (2017)	Correlational	49 students enrolled at a university in Malaysia during one semester	Survey questionnaire on students' perception of course-related interactions on Facebook and academic performance
Almeda et al. (2018)	Correlational	143 students enrolled in a face-to-face section and 90 students in an online section of a humanities course at a large public university	Number of times a student viewed readings, forums, and videos; number and quality of students' comments; number of distinct student replies to and from others; and final course performance
Alsadoon (2018)	Correlational	73 students enrolled in three courses using mobile technology	Survey questionnaire on student demographics and students' perception of social presence and course satisfaction
Athens (2018)	Correlational	9,716 students enrolled in online courses and 33,844 students enrolled in face-to-face courses	Survey questionnaire of student perceptions of engagement and the learning community
Aydin and Gumus (2016)	Correlational	118 second-year students enrolled in an online information management program at a university in Turkey	Survey questionnaire on students' perceptions of teamwork and classroom community, perceived satisfaction with teamwork, and student demographics
Bigatel and Edel-Malizia (2018)	Correlational	344 students enrolled in online courses at a research university	Student engagement survey questionnaire
Blackburn (2015)	Quantitative descriptive	385 undergraduate students enrolled in an introductory statistic course in Australia	Pre-post tests of fundamental statistical concepts
Bonafini et al. (2017)	Mixed methods qualitative and correlational	222 students enrolled in a creativity, innovation, and change MOOC over six weeks that focused on the students' creative potential and ability to transform their personal lives, organizations, and community	Number of videos watched, number of discussion posts and content of posts, and students' responses to a survey questionnaire of demographics, employment status, intention to complete the course, and preferred language
Bookallil and Rolfe (2016)	Correlational	9,820 first-time enrollments in enabling programs during a 10-year period	Student records
Bozkurt et al. (2017)	Correlational	2,065 students enrolled in distance education programs at a public university in Turkey	Students' perceptions of social network sites and potential for pedagogic purposes in distance education
Bradley et al. (2017)	Correlational	266 undergraduate students enrolled in online psychology courses	Online academic success indicators scale, Internet self-efficacy scale, motivation for learning questionnaire, self-regulated learning questionnaire, and

			course grades
Broadbent (2016)	Correlational	310 students enrolled in a first-year online health psychology course at a university in Australia	Course grades, academic self-efficacy scale, academic locus of control scale, academic motivation scale, and learning management system data on student logins, discussion posts, and resources reviewed
Carbone (2018)	Quasi-experimental	346 students in beginning level psychology courses offered in face-to-face, online, and web-enhanced formats each of four semesters	End-of-term multiple-choice test created from items in the test bank provided by the textbook publisher
Chang et al. (2014)	Correlational	80 students enrolled in a culture and mental health course at a university in northern Taiwan	Internet self-efficacy questionnaire and course performance
Yu-Ching (2015)	Mixed methods quasi-experimental and qualitative	124 students enrolled in an electronic commerce course at a university in Taiwan	Pre-post test scores on learning outcomes, survey questionnaire on using Facebook, students' feelings regarding their experience of using Facebook in the class, and learning style questionnaire
Chen et al. (2018)	Correlational	537 undergraduate students from 15 online and 5 blended courses across 12 colleges	Survey questionnaire on online course design elements that impact students' satisfaction and perceptions of their learning
Chen. and Chang (2014)	Mixed methods random control trial experimental and qualitative	33 students enrolled in an online library and information science program in China who were randomly assigned to an experimental and control group	Completion of learning stages and interactive messages between groups
Cho and Heron (2015)	Correlational	229 students enrolled in an online college developmental mathematics course	Survey questionnaire on motivated strategies for learning
Chyr et al. (2017)	Quasi-experimental	First-year university students in Taiwan taking a compulsory class with 33 students in one class that involved a blended flipped learning and online academic help-seeking, 34 students in another class that involved a blended flipped learning only, and 35 students in a third control group class that involved face-to-face teaching only	Course learning performance and survey questionnaires of personal involvement, self-efficacy, and self-directed learning
Cigdem and Yildirim (2014)	Correlational	725 students between the ages of 17-21 who were enrolled in vocational education	Online learning readiness scale and student demographics questionnaire
Cimermanová (2018)	Quasi-experimental	81 fifth-year students in an online section or face-to-face section of English-as-a-foreign-language course	Learning style inventory and course achievement
Cochran et al. (2014)	Correlational	2,314 undergraduate students enrolled in online courses during one semester	Student demographic variables and course completions
Cole et al. (2017).	Correlational	190 students enrolled in online undergraduate communications classes	Survey questionnaire of teaching presence, motivation, and demographic information
Costley and	Correlational	219 students in an English	Discussion forum posts

Lange (2016)		for teaching and learning in the classroom course. The class is for students majoring in English education and is an entrance requirement for teachers in Korea.	
Cutsinger, Wall, and Tapps (2018	Correlational	65 community college students enrolled in two sections of an allied health course, with one section taught predominantly online and one section predominately face-to-face	Survey questionnaire with questions on instructor presence that were based on the Community of Inquiry survey, assignments, students' expectations, course satisfaction, and self-identified demographics
Davidovitch and Belichenko (2018)	Correlational	150 undergraduate students enrolled in an online program in Samaria	Survey questionnaire on the effectiveness of Facebook groups on student's achievements, satisfaction, atmosphere among students, and demographics
Du et al. (2018)	Correlational	411 undergraduate and graduate students, approximately half of each, who were clustered into 103 groups of four each, with one group of three participants	Survey questionnaire on group trust, communication media, interactivity, and collaboration in online learning
Engin (2017)	Correlational	95 students in an intermediate computer course	Online learning readiness scale and trait emotional intelligence scale
Evans and Cordova (2015)	Quasi-experimental	55 students in one section and 60 in another section of a political science course	Student demographics and mid-semester and end-of-semester student evaluations of the course and instructor
Forte et al. (2016)	Causal-comparative	765 class sections for 15 courses during three semesters; 277 were distance education classes and 488 were face-to-face classes	Student course evaluations
Freguia (2017)	Correlational	41 students enrolled in a fourth-year chemical engineering elective course on industrial wastewater and solid waste management	In-class participation, data on frequency of student access to the online videos, student self-report of number of hours spent out of class on course work, and self-perception of students' own engagement
Fricker (2013)	Qualitative case study	20 undergraduate students in an online intermediate skills level computer literacy course	Course grades
Gameel (2017)	Correlational	427 arts and culture, 978 energy and earth Sciences, 532 business and management, and 148 health and safety students enrolled in a MOOC offered by a large southwestern university	Survey questionnaire about learner satisfaction with and the importance of interactions with teaching staff, other students, and MOOC content; teaching and learning aspects of the MOOC; and the availability of course resources after the course ended.
Gaytan (2013)	Qualitative case study	15 experts on retention in online courses	Open-ended survey questionnaire on critical factors affecting student retention in online courses
Gering et al. (2018)	Mixed methods correlational and qualitative	27,095 archived course records of students who had received a C- or better, 257 completed online surveys, and 12 individual interviews.	Archived course records; online surveys on circumstantial, personal, and course-based variables; and 12 individual interviews
Guy et al. (2018)	Correlational	137 first-year nursing students enrolled in a	Survey questionnaire about students' learning approaches and

		biomedical and physical science course	the use of course video clips
Harris and Nikitenko (2014)	Mixed methods causal-comparative and qualitative	33 students enrolled in three sections of a quantitative methods course, one online and two face-to-face	Pre-post test covering course content and a qualitative rubric assessment of the students' final research projects
Heitner and Jennings (2016)	Quantitative comparison	47 instructors with at least two years of undergraduate or graduate online teaching experience and who had taught at least five courses fully online	Survey questionnaire on the principles and tenets of culturally responsive teaching
Hixon et al. (2016)	Correlational	3,160 students who had taken or were currently enrolled in online for-credit courses at 31 colleges or universities across 22 states	Online survey consisting of 43 questions based on the Quality Matters™ program of quality assurance for online courses
Hoey (2017)	Mixed methods ex post facto and qualitative	546 students enrolled in 36 online sections of 13 graduate courses in education	Discussion board posts, student course evaluations, and student course achievement
Hollingsworth and Lim (2015)	Mixed methods single group experimental and qualitative	19 undergraduate students enrolled in a course on early childhood exceptionality and/or a course on supporting social and emotional development in early childhood	Students' written module activities and students' perceptions of instruction with web-based modules
Hou et al. (2015)	Quantitative comparison	50 college sophomores enrolled in an introduction to computer networks course at a university in Taiwan	Discussion board posts
Howell et al. (2017)	Quasi-experimental	65 online graduate students enrolled in an instructional design course with one section as the experimental and one section as the control group	Discussion board posts
James et al. (2016)	Correlational	Student academic records of 213,056 enrolled in five brick-and-mortar community colleges, 113,036 enrolled in five brick-and-mortar four-year universities, and 330,166 enrolled in four primarily online institutions	Student records and course delivery modes
Jou et al. (2016)	Quasi-experimental	60 undergraduate students enrolled in a mechanism design course in a computer-aided classroom divided into an experimental group and control group	Pre-post tests on learning motivation, critical thinking skills, and critical thinking dispositions for all students and pre-post tests of knowledge management and student satisfaction for students in the experimental group
Jovanovic et al. (2015)	Quasi-experimental	374 students enrolled in a hybrid course and 417 students in the traditional face-to-face course section	Course grades and instructors' assessment of the attainment of course objectives
Kim and Thayne (2015)	Quasi-experimental	22 students in the experimental group and 11 students in the control group	Pre-post tests of learner attitudes and self-efficacy, four tests of the learner-instruction relationship, and pre-post tests of learning
Kintu and Zhu (2016)	Correlational	270 sophomores enrolled in blended courses in Uganda	Survey questionnaires on online self-regulated learning, inventory on intrinsic motivation, and questionnaire on learner

			characteristics
Kuo (2014)	Correlational	54 African American nontraditional students enrolled in two undergraduate online research courses offered during summer at a designated Historically Black College and University	Survey questionnaire on student background information and perception of learner–instructor interaction, learner–learner interaction, learner–content interaction, Internet self-efficacy, and student satisfaction.
Lee, Lim, and Kim (2017)	Mixed methods single group experimental and qualitative	18 students enrolled in a blended college algebra course	Pre-post survey questionnaires including the students' views of mathematics, students' reflections about the flipped learning design of the class, and students' satisfactions about the course overall
List and Nadasen (2017)	Correlational	344 college students who had transferred to a four-year online university	Motivation scale, self-regulation scale, and family structure and employment status questionnaire
Liu and Yang (2014)	Mixed methods qualitative and single group experimental	36 fourth-year undergraduate students enrolled in an information ethics course at a technical university	Message units in the discussion forums, instructor's reflective notes, and survey questionnaire on the students' attitudes toward online discourse
Lu et al. (2018)	Causal-comparative	59 students enrolled in a college Calculus course	Video-viewing behaviors, out-of-class practice, homework assignments, and quiz scores
Lu et al. (2017)	Quasi-experimental	102 first-year college students enrolled in an introductory computer science courses; 48 in the experimental and 54 in the control group	Levels of student engagement measurement algorithm and self-regulation strategies questionnaire
Madden et al. (2017)	Mixed methods quantitative comparison and qualitative	22 science teachers in rural schools enrolled in a graduate science methods class offered as part of a distance education master's program in science education	Asynchronous threaded discussion board postings and transcripts of synchronous spoken and chat box communication during web conferencing
(Maddrell et al., 2017)	Correlational	51 students enrolled in five undergraduate blended courses during the same semester	Instructors' assessment of student achievement and a twice-administered survey questionnaire of students' perception of social, teaching, and cognitive presences, perceived learning, demographic data, and satisfaction with the course
Makarem (2015)	Mixed methods quasi-experimental and qualitative	86 junior and senior level college students enrolled in two sections of an upper-level marketing course on buyer behavior; 38 students in the control group and 48 students in the experimental group	Two exams of course content and a survey questionnaire of student satisfaction
Marmon et al. (2014)	Mixed methods correlational and qualitative	34 graduate students in a learning technologies program; three were also interviewed	Survey questionnaire representing the elements that would affect the level of satisfaction in online courses (i.e., learning management system, synchronous meeting sessions and community building) and interviews
McCarthy (2017)	Qualitative case study	118 first-year university students in two required	Survey questionnaire at the end of each semester that included

		media art courses	student demographic information and responses to questions asking the students to consider and compare the three feedback models used for the formative assessment tasks during the semester
McDonough et al. (2014)	Quantitative comparison	81 students enrolled in an upper division psychology course: 32 students in the face-to-face section, 26 students in the blended section, and 23 students in the online section	Average of four multiple choice exam grades, average of two applied written case studies, final course grades, and end-of-semester student course evaluations
Mirriahi et al. (2018)	Correlational	127 teachers enrolled in a professional development program at a research university in Australia	Log data from the students' engagement with the video annotation tool in each module of the program
Moorthy et al. (2019)	Correlational	298 undergraduate students enrolled in three private universities in Malaysia	Survey questionnaire on perceived usefulness and ease of use of Facebook for learning, intention to use Facebook for learning, perceived enjoyment of Facebook for learning, and self-efficacy
Nagy (2018)	Correlational	89 students at a college in Hungary enrolled in a business mathematics course during two different spring semesters	End-of-course survey questionnaire of students' perceptions about the use of course videos
Neroni et al. (2018)	Correlational	1,128 college students enrolled in a distance university in The Netherlands	Achievement goal survey questionnaire, exam grades, and survey questionnaire about students' study time and other student course information
Netanda et al. (2019)	Qualitative case study	Participants and setting were not identified	Student questionnaire and instructor interviews to identify important support interventions they believed were most needed during and after student admission
Olivier (2016)	Quasi-experimental	121 students attended a written assignment contact session and 694 students did not before submitting an assignment; 209 students attended an examination preparation contact session and 806 students did not prior to the final examination; 132 students used the online discussion forum and 883 did not prior to the final examination	Academic performance on the written assignment and final examination grades
Park and Yun (2017)	Correlational	63 undergraduate and 78 graduate students enrolled in an introductory educational technology course	Motivational regulation strategy questionnaire and cognitive learning strategy scale
Politis and Politis (2016)	Correlational	84 part-time engineering management students	Survey questionnaire on Blackboard Collaborate online learning environment attributes, student motivation, and student demographics
Puspitasari and	Mixed methods	93 academically successful	Survey questionnaire on student

Oetoyo (2018)	quantitative descriptive and qualitative	students who had completed at least four semesters of coursework and earned a minimum grade point average of 2.5 at a university in Indonesia	demographics, motivation, learning habits, and grade point average; six students were interviewed
Rasouli et al. (2016)	Quantitative descriptive	347 arts majors at four universities in Iran	Survey questionnaire on readiness to learn in an online course
Ringler et al. (2015)	Mixed methods qualitative and correlational	Phase 1 involved five full-time graduate faculty in a school of business and management with considerable experience in using discussion boards. Phase 2 involved all discussion board posts taught be 11 full-time and 27 adjunct business administration faculty members	Focus groups, number of student and instructor discussion board posts, and quality of student discussion board posts
Romero and Usart (2014)	Quantitative comparison	56 college students in a face-to-face educational psychology course and 101 students in the online sections of the same course	Time perspective inventory
Ronen and Shonfeld (2017)	Correlational	85 college students enrolled in online courses during one academic year; 32 were students with learning disabilities	Survey questionnaire on students' self-learning ability, involvement in the online course, and course satisfaction
Ryan et al. (2016)	Quasi-experimental	524 students enrolled in 29 blended and fully online courses and 110 students enrolled in 10 face-to-face sections of the same courses at a community college	Pre-post assessments of student learning outcomes
Saltan (2017)	Quasi-experimental	160 students in a preservice education classroom management course; 78 students in the experimental groups and 82 in the control groups	Pre-post tests on students' technological, pedagogical, and content knowledge
Seaton and Schwier (2014)	Qualitative grounded theory	12 instructors selected because they did not have an extensive background in online education techniques or research experience in online teaching and learning	Interviews
Smart and Saxon (2016)	Quasi-experimental	20 sections of a developmental English course offered over four semesters face-to-face, blended, and online	Course grades and course withdrawals
Smith et al. (2014)	Correlational	114 students enrolled in courses that each had has its own tutor and two part-time advisors.	Survey questionnaire of student demographics and students' perceptions of their sense of connectedness with other students, tutors, and academic advisors and their perceived value about different technologies used to access course content
Sridharan et al. (2014)	Correlational	210 online learners and instructors	Survey questionnaire about characteristics of online learning effectiveness
Tang and Chaw	Correlational	161 students enrolled in	Survey questionnaire on perceptions of

(2016)		blended coursework	learning delivery, digital literacy constructs, effective learning constructs, usage of the learning management system, and demographic questions
Taylor et al. (2015)	Single group experimental	817 students enrolled in their first course at a university serving predominantly adult students	Questionnaire about the orientation video, withdrawal rates, and grade distributions before and after insertion of the video into the learning management system
Tladi (2017)	Correlational	263 students enrolled for the first time at university in South Africa	Three self-efficacy scales
Tibi (2018)	Mixed methods qualitative and random control trial experimental	57 students in two online computer science courses at two different universities in Israel	Responses to an evaluation of the discussion forum at the end of the course
Tirado et al. (2015)	Mixed methods qualitative and correlational	73 third-year students enrolled in a social education graduate course at a university in Spain	Student communication on the learning management system
Trad et al. (2014)	Random control trial group experimental	218 undergraduate students enrolled in a university introduction to communication course randomly assigned to an experimental and control group	Face threat mitigation scale, feedback orientation scale, motivation scale, and perceptions of instructor credibility
Vázquez-Cano (2014)	Single group experimental	388 students majoring in pedagogy and enrolled in a curriculum design and innovation course	Survey questionnaires on students' perceptions of using smartphones as mobile learning devices
Vayre and Vonthron (2017)	Correlational	255 students enrolled in an online university course int France	Scales for academic engagement, academic self-efficacy, perceived social support, and sense of belonging to a community
Wai and Seng (2015)	Quantitative survey	150 randomly selected business students	Survey questionnaire on technology usage, usage of online course tools, and perceptions of the effectiveness of blended courses for teaching and learning
Wang (2014)	Correlational	221 undergraduate and 140 graduate students	Survey questionnaire on trust-inducing factors
Wdowik (2014)	Single group experimental	30 third-year students in corporate finance at a university in Australia during one semester	Survey questionnaire on student demographics and transactional engagement
Webb and Moallem (2016)	Mixed methods qualitative and single group experimental	11 graduate students enrolled in an instructional technology course	Notes from synchronous class observations, discussion forums, students' postings on the course learning management system, instructor feedback on assignments, and student questionnaire on demographics, perceptions of the feedback provided during the course, and satisfaction with the feedback
Wiechowski and Washburn (2014)	Correlational	4,163 students who took 171 finance and economics courses over a period of four semesters; 68 were online, 26 were blended, and 77 were face-to-face	Five questions from the end-of-semester course evaluation survey and course grades
Wong and	Correlational	323 students enrolled in an	Survey questionnaire on

Fong (2014)		introductory accounting course	perceptions of learning effectiveness, impact of motivation on learning outcomes, importance of social interaction, and preference for online learning
Wu (2014)	Correlational	23 undergraduate students enrolled in a contemporary worldviews course	Learning style inventory and survey questionnaire on course satisfaction
Wu. and Hou (2015)	Quantitative descriptive	36 freshmen taking an introduction to digital contents course in a department of Chinese literature	Study preferences questionnaire and discussion forum posts
Xu. et al. (2015)	Correlational	298 graduate students recruited from one online course who were randomly assigned to groups of six groups of two, 34 groups of three, or 46 groups of four	Number of previous online courses, scales assessing feedback by group members and the instructor, scales assessing reasons, interest, favorability toward online groupwork, and help seeking behavior
Xu and Jaggars (2014)	Quantitative comparison	51,017 degree-seeking students from the point of initial enrollment through a five-year period	Student academic records
Yang (2018)	Mixed methods quasi-experimental and qualitative case study	54 students in a writing program during an 18-week course at a university in Taiwan	Pre-post tests of students' writing proficiency, web-based log of feedback, evaluation of final compositions, and questionnaire on students' perceptions about the feedback
Yılmaz and Keser (2017)	Mixed methods qualitative and correlational	127 first-year college students enrolled in an online computer course	Achievement test covering information security content in the online course, self-perception scale of course interactivity, and survey of students' opinions of the online learning environment
Yilmaz et al. (2018)	Random control trial experimental	102 first-year college students enrolled in a blended learning applied computing course	Self-regulation scale administered pre-post
Zacharias and Yiannis (2017)	Causal-comparative	82 students enrolled in an online fluid mechanics seminar and 123 in the face-to-face seminar section	Survey questionnaire on students' perceptions of social presence and autonomy
Zhang et al. (2017)	Correlational	230 students in China enrolled in an online MOOC course	Survey questionnaire on students' perceptions of ease of use and usefulness of MOOC, learner control of MOOC, intention for future MOOC enrollment, online learning self-efficacy, and learner characteristics
Zimbardi et al. (2017)	Correlational	2,048 undergraduate students enrolled in required biomedical science courses with 1,705 enrolled in level 1 courses that focused on the conventions for writing a scientific report and 343 in level 2 courses that focused on writing a publishable scientific article	2,013 laboratory reports submitted online and log records of students' access to instructor feedback

4. Methodological Considerations

The methodological designs in the body of research literature on online teaching predominantly have involved the identification, comparison, and correlation of variables potentially pertinent to online learning effectiveness. A small body of studies involved the experimental manipulation of variables. Investigations using qualitative designs were usually part of mixed-methods research. Most studies

addressed gaps and weaknesses in prior research though the designs were not always linked to a theoretical framework.

Essential elements for quality research were applied to the corpus of research studies to evaluate the extent to which the body of research on online instruction met standards established by pre-eminent professional organizations including the American Educational Research Association (2006); Council for Exceptional Children (2014) and Institute of Education Sciences and National Science Foundation (2013). Regardless of the methodological component we evaluated, we found that it was rare for the authors to provide enough information to enable replication of the study.

Participants were almost always selected from convenience samples and so diversity reflected the ages, genders, ethnicities and countries of origin of the sample rather than an effort to seek diversity that represented the population at large. Our corpus included just one study in which the authors disaggregated data for students with disabilities and one study in which the sample was chosen explicitly to represent students at-risk academically. Authors rarely justified sample sizes with power analyses for quantitative studies or data saturation for qualitative studies. The context for the studies was infrequently described in detail and some authors offered no description of the setting. For studies employing a qualitative design, the role of the researchers in gathering data was seldom explained. Though descriptions of procedures are often abbreviated in published research studies because of journal page limitations, few studies included even brief detail on the chronology followed in carrying out the investigations.

Measures for the quantitative studies were almost always identified, described clearly, and appropriate for answering the research questions. For the many studies that utilized survey questionnaires as data sources, there was typically little information provided about trustworthiness to reliably and validly capture the constructs and phenomena of interest or assurance that the individuals who completed the questionnaires represented the targeted respondents. For the correlational studies, potentially intervening variables were not often identified during data collection. Unlike the measures for the quantitative studies, the procedure for collecting interview and other data for the qualitative studies was rarely described in detail. Specifically, descriptions of qualitative data collection seldom included interview protocols or sample questions, observational protocols and schedules, use of recording devices or field notes, document analysis, or establishment of chain of evidence. Thus, we were unable to assess whether the qualitative data were dependable, trustworthy, and adequate for answering the research questions.

The methodological considerations we found in the body of research literature we reviewed are not markedly different from the issues found in the literature reviewed by Means et al. (2010). They noted that when comparing studies, conditions differed in time spent, curriculum, and pedagogy, and often included small sample sizes, unreported attrition rates in the different conditions, and potential bias of authors who held a dual role as researchers and instructors. We found that when researchers examined similar variables, conditions also varied in time spent, curriculum, and pedagogy. However, the studies we reviewed included a large range of sample sizes, with some studies incorporating thousands of participants in the data source, although the number of participants was rarely justified by reference to expert sources for the research design. The issue of the dual roles of the authors was not often obvious as it was rare for the authors to address their role in data collection and analysis.

5. Discussion and Conclusions

Comparing the outcomes for fully online, blended, and face-to-face milieus was important during the earlier days of online instruction, but the important questions today involve the conditions and strategies that promote student learning, satisfaction, and persistence. In applying current definitions of research-based and evidence-based practices (Cook, Smith, & Tankersley, 2012) with research-based reflecting approaches supported by research and evidence-based as approaches supported by high-quality experimental research, our findings point to many promising practices but few that could be considered research-based or evidence-based.

Most of the strategies with promising effectiveness in the online environment are the same ones that are considered to be effective in face-to-face classrooms including the use of multiple pedagogies and learning resources to address different student learning needs, high instructor presence, quality of faculty-student interaction, academic support outside of class, and promotion of classroom cohesion and trust. Unique to the online environment are user-friendly technology tools, orientation to online instruction, opportunities for synchronous class sessions, and incorporation of social media. As with face-to-face learning, greater interaction with course content is related to better course grades and satisfaction.

Given the few studies utilizing methodological designs from which claims of causality can be made or meta-analyses could be conducted, we identified only faculty feedback as an evidence-based practice in online instruction. Our identification of research-based practices is based on studies utilizing methodological designs from which claims of causality cannot be made but offer evidence of effectiveness. We found no specific intervention that we could identify as research-based but found that the research supported the importance of student past academic success, motivation, family support, workload management, and digital literacy in online course success and satisfaction.

The research on online teaching and learning has largely involved the search for a wide net of factors potentially important to student success, satisfaction, and persistence to course completion and degree attainment. To a lesser degree, the research has involved investigations of interventions designed to mitigate the influence of negative factors or enhance the integration of positive factors into faculty pedagogies and online course designs. The result is a mélange of promising practices with insufficient research to support guidelines for online pedagogy, program revisions, new program formation, student academic support, faculty professional development, and future directions for the role of online instruction in higher education.

Findings from our review of the research on online instruction and learning point to few implications for practice but many paths for future research. Given it is well established that learning outcomes are comparable for online, blended, and face-to-face milieus, no further research seems warranted unless outcomes are the measure for investigating the effectiveness of instructional interventions. The lines of research inquiry that would lead to identifying evidence-based practices in online instruction include pedagogies and learning resources that promote critical thinking, problem solving, communication skills, self-efficacy, and creativity.

As colleges and universities cannot stand still while rigorous research is conducted on the conditions that promote learning, satisfaction, and persistence in online coursework, a few implications for practice are indicated from the research to date. We preface these by noting that organizations such as Quality Matters (2018) offer standards for online course designs that can assure at least minimal quality. These standards are based on published research with the same limitations in rigor and consistency that we found in the research we reviewed. Given these limitations, one implication is the use of feedback that is differential in what the student accomplished well and what needs to be improved, precise in exactly what the issues are that need to be addressed in a revision or future assignments, respectful of the student's effort and current stage of learning, and timely in offering feedback relatively soon after an assignment is submitted. Others involve the importance of instructor presence within online collaborative learning tools, instructor accessibility, quality of instructional materials, and student academic and technology support.

References

Al-Dheleai, Y. M., & Tasir, Z. (2017). Using Facebook for the purpose of students' interactions and its correlation with students' academic performance. *Turkish Online Journal of Educational Technology-TOJET*, *16*(4), 170-178.

Almeda, M. V., Zuech, J., Baker, R. S., Utz, G., Higgins, G., & Reynolds, R. (2018). Comparing the factors that predict completion and grades among for-credit and open/MOOC students in online learning. *Online Learning Journal*, *22*(1), 1-19.Available at: https://doi.org/10.24059/olj.v22i1.1060.

Alsadoon, E. (2018). The impact of social presence on learners' satisfaction in mobile learning. *Turkish Online Journal of Educational Technology*, *17*(1), 226-233.

American Educational Research Association. (2006). Standards for reporting on empirical social science research in AERA publications. *Educational Researcher*, *35*(6), 33–40.Available at: https://doi.org/10.3102/0013189x035006033.

Athens, W. (2018). Perceptions of the persistent: Engagement and learning community in underrepresented populations. *Online Learning*, *22*(2), 27-57.Available at: https://doi.org/10.24059/olj.v22i2.1368.

Aydin, I. E., & Gumus, S. (2016). Sense of classroom community and team development process in online learning. *Turkish Online Journal of Distance Education*, *17*(1), 60-77.

Bigatel, P., & Edel-Malizia, S. (2018). Predictors of instructor practices and course activities that engage online students. *Online Journal of Distance Learning Administration*, *21*(1), 1-19.

Blackburn, G. (2015). Effectiveness of eLearning in statistics: Pictures and stories. *E-Learning and Digital Media*, *12*(5-6), 459-480.Available at: https://doi.org/10.1177/2042753016653704.

Bonafini, F., Chae, C., Park, E., & Jablokow, K. (2017). How much does student engagement with videos and forums in a MOOC affect their achievement? *Online Learning Journal*, *21*(4), 223-240.Available at: https://doi.org/10.24059/olj.v21i4.1270.

Bookallil, C., & Rolfe, J. (2016). University-based enabling program outcomes: Comparing distance education and internal study. *Australian Journal of Adult Learning*, *56*(1), 89-110.

Bozkurt, A., Karadeniz, A., & Kocdar, S. (2017). Social networking sites as communication, interaction, and learning environments: Perceptions and preferences of distance education students. *Journal of Learning for Development*, *4*(3), 348-365.

Bradley, R. L., Browne, B. L., & Kelley, H. M. (2017). Examining the influence of self-efficacy and self-regulation in online learning. *College Student Journal*, *51*(4), 518-530.

Broadbent, J. (2016). Academic success is about self-efficacy rather than frequency of use of the learning management system. *Australasian Journal of Educational Technology*, *32*(4), 38-49.

Carbone, D. J. (2018). Assessing learning across pedagogical modalities and learning retrieval conditions for college learners in introductory psychology. *Community College Journal of Research and Practice*, *42*(5), 340-349.Available at: https://doi.org/10.1080/10668926.2017.1310066.

Chang, C.-S., Liu, E. Z.-F., Sung, H.-Y., Lin, C.-H., Chen, N.-S., & Cheng, S.-S. (2014). Effects of online college student's Internet self-efficacy on learning motivation and performance. *Innovations in Education and Teaching International*, *51*(4), 366-377.Available at: https://doi.org/10.1080/14703297.2013.771429.

Chen, B., Bastedo, K., & Howard, W. (2018). Exploring design elements for online STEM courses: Active learning, engagement & assessment design. *Online Learning*, *22*(2), 59-75.Available at: https://doi.org/10.24059/olj.v22i2.1369.

Chen., C.-M., & Chang, C.-C. (2014). Mining learning social networks for cooperative learning with appropriate learning partners in a problem-based learning environment. *Interactive Learning Environments*, *22*(1), 97-124.Available at: https://doi.org/10.1080/10494820.2011.641677.

Cho, M.-H., & Heron, M. L. (2015). Self-regulated learning: The role of motivation, emotion, and use of learning strategies in students' learning experiences in a self-paced online mathematics course. *Distance Education*, *36*(1), 80-99.Available at: https://doi.org/10.1080/01587919.2015.1019963.

Chyr, W.-L., Shen, P.-D., Chiang, Y.-C., Lin, J.-B., & Tsai, C.-W. (2017). Exploring the effects of online academic help-seeking and flipped learning on improving students' learning. *Journal of Educational Technology & Society*, *20*(3), 11-23.

Cigdem, H., & Yildirim, O. G. (2014). Effects of students' characteristic on online learning readiness: A vocational college example. *Turkish Online Journal of Distance Education*, *15*(3), 80-93.Available at: https://doi.org/10.17718/tojde.69439.

Cimermanová, I. (2018). The effect of learning styles on academic achievement in different forms of teaching. *International Journal of Instruction*, *11*(3), 219-232.Available at: https://doi.org/10.12973/iji.2018.11316a.

Cochran, J. D., Campbell, S. M., Baker, H. M., & Leeds, E. M. (2014). The role of student characteristics in predicting retention in online courses. *Research in Higher Education, 55*(1), 27-48.Available at: https://doi.org/10.1007/s11162-013-9305-8.

Cole, A. W., Nicolini, K. M., Anderson, C., Bunton, T., Cherney, M. R., Fisher, V. C., & Allen, M. (2017). Student predisposition to instructor feedback and perceptions of teaching presence predict motivation toward online courses. *Online Learning, 21*(4), 245-262.Available at: https://doi.org/10.24059/olj.v21i4.966.

Cook, B. G., Smith, G. J., & Tankersley, M. (2012). Evidence-based practices in education. In K. R. Harris, S. Graham, T. dan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), APA educational psychology handbook: Theories, constructs, and critical issues (Vol. 1, pp. 495-527): American Psychological Association.

Costley, J., & Lange, C. (2016). The relationship between social presence and critical thinking: Results from learner discourse in an asynchronous learning environment. *Journal of Information Technology Education: Research, 15*, 89-108.Available at: https://doi.org/10.28945/3418.

Council for Exceptional Children. (2014). Council for exceptional children: Standards for evidence-based practices in special education. Retrieved from https://www.cec.sped.org/~/media/Images/Standards/CEC%20EBP%20Standards%20cover/CECs%20Evidence%20Based%20Practice%20Standards.pdf.

Cutsinger, M. M., Wall, T. J., & Tapps, T. (2018). Differences of instructor presence levels in predominately online versus predominantly not online courses within the community college setting. *Online Journal of Distance Learning Administration, 21*(2), n2.

Davidovitch, N., & Belichenko, M. (2018). Using Facebook in higher education: Exploring effects on social climate, achievement, and satisfaction. *International Journal of Higher Education, 7*(1), 51-58.Available at: https://doi.org/10.5430/ijhe.v7n1p51.

Du, J., Wang, C., Zhou, M., Xu, J., Fan, X., & Lei, S. (2018). Group trust, communication media, and interactivity: Toward an integrated model of online collaborative learning. *Interactive Learning Environments, 26*(2), 273-286.Available at: https://doi.org/10.1080/10494820.2017.1320565.

Engin, M. (2017). Analysis of students' online learning readiness based on their emotional intelligence level. *Universal Journal of Educational Research, 5*(n12A), 32-40.Available at: https://doi.org/10.13189/ujer.2017.051306.

Evans, H. K., & Cordova, V. (2015). Lecture videos in online courses: A follow-up. *Journal of Political Science Education, 11*(4), 472-482.Available at: https://doi.org/10.1080/15512169.2015.1069198.

Forte, G. J., Schwandt, D. R., Swayze, S., Butler, J., & Ashcraft, M. (2016). Distance education in the US: A paradox. *Turkish Online Journal of Distance Education, 17*(3), 16-30.

Freguia, S. (2017). Webcasts promote in-class active participation and learning in an engineering elective course. *European Journal of Engineering Education, 42*(5), 482-492.Available at: https://doi.org/10.1080/03043797.2016.1192110.

Fricker, D. (2013). The 24/7 always available always on graduate/ teaching assistant: A case study of nearly perfect retention and completion in an online course. *Review of Higher Education and Self-Learning, 6*(21), 144-152.

Gameel, B. G. (2017). Learner satisfaction with massive open online courses. *American Journal of Distance Education, 31*(2), 98-111.Available at: https://doi.org/10.1080/08923647.2017.1300462.

Garrison, D. (2017). *E-learning in the 21st century: A community of inquiry framework for research and practice* (3rd ed.): Routledge.

Gaytan, J. (2013). Factors affecting student retention in online courses: Overcoming this critical problem. *Career and Technical Education Research, 38*(2), 145-155.Available at: https://doi.org/10.5328/cter38.2.147.

Gering, C. S., Sheppard, D. K., Adams, B. L., Renes, S. L., & Morotti, A. A. (2018). Strengths-based analysis of student success in online courses. *Online Learning, 22*(3), 55-85.Available at: https://doi.org/10.24059/olj.v22i3.1464.

Guy, R., Byrne, B., & Dobos, M. (2018). Optional anatomy and physiology e-learning resources: Student access, learning approaches, and academic outcomes. *Advances in Physiology Education, 42*(1), 43-49.Available at: https://doi.org/10.1152/advan.00007.2017.

Harris, R. A., & Nikitenko, G. O. (2014). Comparing online with brick and mortar course learning outcomes: An analysis of quantitative methods curriculum in public administration. *Teaching Public Administration, 32*(1), 95-107.Available at: https://doi.org/10.1177/0144739414523284.

Heitner, K. L., & Jennings, M. (2016). Culturally responsive teaching knowledge and practices of online faculty. *Online Learning, 20*(4), 54-78.Available at: https://doi.org/10.24059/olj.v20i4.1043.

Hixon, E., Barczyk, C., Ralston-Berg, P., & Buckenmeyer, J. (2016). The impact of previous online course experience on students' perceptions of quality. *Online Learning, 20*(1), 25-40.Available at: https://doi.org/10.24059/olj.v20i1.565.

Hoey, R. (2017). Examining the characteristics and content of instructor discussion interaction upon student outcomes in an online course. *Online Learning, 21*(4), 263-281.

Hollingsworth, H. L., & Lim, C.-I. (2015). Instruction via web-based modules in early childhood personnel preparation: A mixed-methods study of effectiveness and learner perspectives. *Early Childhood Education Journal, 43*(2), 77-88.Available at: https://doi.org/10.1007/s10643-014-0642-9.

Hou, H.-T., Wang, S.-M., Lin, P.-C., & Chang, K.-E. (2015). Exploring the learner's knowledge construction and cognitive patterns of different asynchronous platforms: Comparison of an online discussion forum and Facebook. *Innovations in Education and Teaching International, 52*(6), 610-620.Available at: https://doi.org/10.1080/14703297.2013.847381.

Howell, G. S., LaCour, M. M., & McGlawn, P. A. (2017). Constructing student knowledge in the online classroom: The effectiveness of focal prompts. *College Student Journal, 51*(4), 483-490.

Institute of Education Sciences and National Science Foundation. (2013). *Common guidelines for education research and development.* Washington, DC: Authors.

James, S., Swan, K., & Daston, C. (2016). Retention, progression and the taking of online courses. *Online Learning, 20*(2), 75-96.Available at: https://doi.org/10.24059/olj.v20i2.780.

Jou, M., Lin, Y.-T., & Wu, D.-W. (2016). Effect of a blended learning environment on student critical thinking and knowledge transformation. *Interactive Learning Environments, 24*(6), 1131-1147.Available at: https://doi.org/10.1080/10494820.2014.961485.

Jovanovic, A., Jankovic, A., Jovanovic, S. M., Peric, V., Vitosevic, B., & Pavlovic, M. (2015). When going hybrid is not enough: Statistical analysis of effectiveness of blended courses piloted within tempus BLATT project. *International Journal of Education and Development using Information and Communication Technology, 11*(2), 138-152.

Kim, Y., & Thayne, J. (2015). Effects of learner–instructor relationship-building strategies in online video instruction. *Distance Education, 36*(1), 100-114.Available at: https://doi.org/10.1080/01587919.2015.1019965.

Kintu, M. J., & Zhu, C. (2016). Student characteristics and learning outcomes in a blended learning environment intervention in a Ugandan University. *Electronic Journal of e-Learning, 14*(3), 181-195.

Kuo, Y.-C. (2014). Accelerated online learning: Perceptions of interaction and learning outcomes among African American students. *American Journal of Distance Education, 28*(4), 241-252.Available at: https://doi.org/10.1080/08923647.2014.959334.

Lee, J., Lim, C., & Kim, H. (2017). Development of an instructional design model for flipped learning in higher education. *Educational Technology Research and Development, 65*(2), 427-453.Available at: https://doi.org/10.1007/s11423-016-9502-1.

List, A., & Nadasen, D. (2017). Motivation and self-regulation in community college transfer students at a four-year online university. *Community College Journal of Research and Practice, 41*(12), 842-866.Available at: https://doi.org/10.1080/10668926.2016.1242096.

Liu, C.-J., & Yang, S. C. (2014). Using the community of inquiry model to investigate students' knowledge construction in asynchronous online discussions. *Journal of Educational Computing Research, 51*(3), 327-354.Available at: https://doi.org/10.2190/ec.51.3.d.

Lu, O. H., Huang, A. Y., Huang, J. C., Lin, A. J., Ogata, H., & Yang, S. J. (2018). Applying learning analytics for the early prediction of students' academic performance in blended learning. *Journal of Educational Technology & Society, 21*(2), 220-232.

Lu, O. H., Huang, J. C., Huang, A. Y., & Yang, S. J. (2017). Applying learning analytics for improving students engagement and learning outcomes in an MOOCs enabled collaborative programming course. *Interactive Learning Environments, 25*(2), 220-234.Available at: https://doi.org/10.1080/10494820.2016.1278391.

Madden, L., Jones, G., & Childers, G. (2017). Teacher education: Modes of communication within asynchronous and synchronous communication platforms. *Journal of Classroom Interaction, 52*(2), 16-30.

Maddrell, J. A., Morrison, G. R., & Watson, G. S. (2017). Presence and learning in a community of inquiry. *Distance Education*, *38*(2), 245-258.
Makarem, S. C. (2015). Using online video lectures to enrich traditional face-to-face courses. *International Journal of Instruction*, *8*(2), 155-164.Available at: https://doi.org/10.12973/iji.2015.8212a.
Marmon, M., Vanscoder, J., & Gordesky, J. (2014). Online student satisfaction: An examination of preference asynchronous course elements. *Current Issues in Education*, *11*(3), 1-11.
McCarthy, J. (2017). Enhancing feedback in higher education: Students' attitudes towards online and in-class formative assessment feedback models. *Active Learning in Higher Education*, *18*(2), 127-141.Available at: https://doi.org/10.1177/1469787417707615.
McDonough, C., Roberts, R. P., & Hummel, J. (2014). Online learning: Outcomes and satisfaction among underprepared students in an upper-level psychology course. *Online Journal of Distance Learning Administration*, *17*(3), n3.
Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2010). *Evaluation of evidence-based practices in online learning: A meta-analysis and review of online learning studies*. Washington, DC: U.S. Department of Education, Office of Planning, Evaluation, and Policy Development.
Mirriahi, N., Jovanovic, J., Dawson, S., Gašević, D., & Pardo, A. (2018). Identifying engagement patterns with video annotation activities: A case study in professional development. *Australasian Journal of Educational Technology*, *34*(10), 57-72.Available at: https://doi.org/10.14742/ajet.3207.
Moorthy, K., T'ing, L. C., Wei, K. M., Mei, P. T. Z., Yee, C. Y., Wern, K. L. J., & Xin, Y. M. (2019). Is Facebook useful for learning: A study in private universities in Malaysia. *Computers & Education*, *130*, 94-104.Available at: https://doi.org/10.1016/j.compedu.2018.12.002.
Nagy, J. T. (2018). Evaluation of online video usage and learning satisfaction: An extension of the technology acceptance model. *International Review of Research in Open and Distributed Learning*, *19*(1), 160-184.Available at: https://doi.org/10.19173/irrodl.v19i1.2886.
Neroni, J., Meijs, C., Leontjevas, R., Kirschner, P. A., & De Groot, R. H. (2018). Goal orientation and academic performance in adult distance education. *International Review of Research in Open and Distributed Learning*, *19*(2), 192-208.Available at: https://doi.org/10.19173/irrodl.v19i2.3440.
Netanda, R. S., Mamabolo, J., & Themane, M. (2019). Do or die: Student support interventions for the survival of distance education institutions in a competitive higher education system. *Studies in Higher Education*, *44*(2), 397-414.Available at: https://doi.org/10.1080/03075079.2017.1378632.
Olivier, B. (2016). The impact of contact sessions and discussion forums on the academic performance of open distance learning students. *International Review of Research in Open and Distributed Learning*, *17*(6), 75-88.Available at: https://doi.org/10.19173/irrodl.v17i6.2493.
Park, S., & Yun, H. (2017). Relationships between motivational strategies and cognitive learning in distance education courses. *Distance Education*, *38*(3), 302-320.Available at: https://doi.org/10.1080/01587919.2017.1369007.
Politis, J., & Politis, D. (2016). The relationship between an online synchronous learning environment and knowledge acquisition skills and traits: The Blackboard Collaborate experience. *The Electronic Journal of e-Learning*, *14*(3), 196-222.
Puspitasari, K. A., & Oetoyo, B. (2018). Successful students in an open and distance learning system. *Turkish Online Journal of Distance Education*, *19*(2), 189-200.Available at: https://doi.org/10.17718/tojde.415837.
Quality Matters. (2018). Higher education course design rubric. Retrieved from: https://www.qualitymatters.org/qa-resources/rubric-standards/higher-ed-rubric.
Rasouli, A., Rahbania, Z., & Attaran, M. (2016). Students' readiness for e-learning application in higher education. *Malaysian Online Journal of Educational Technology*, *4*(3), 51-64.
Ringler, I., Schubert, C., Deem, J., Flores, J., Friestad-Tate, J., & Lockwood, R. (2015). Improving the asynchronous online learning environment using discussion boards. *I-Manager's Journal of Educational Technology*, *12*(1), 15-27.
Romero, M., & Usart, M. (2014). The temporal perspective in higher education learners: Comparisons between online and onsite learning. *European Journal of Open, Distance and e-Learning*, *17*(1), 190-209.Available at: https://doi.org/10.2478/eurodl-2014-0013.
Ronen, I., & Shonfeld, M. (2017). The contribution of online (web-based) courses as perceived by students with learning disabilities and "average" students. *International Journal on E-learning*, *16*(4), 395-416.
Ryan, S., Kaufman, J., Greenhouse, J., She, R., & Shi, J. (2016). The effectiveness of blended online learning courses at the community college level. *Community College Journal of Research and Practice*, *40*(4), 285-298.Available at: https://doi.org/10.1080/10668926.2015.1044584.
Saltan, F. (2017). Online case-based learning design for facilitating classroom teachers' development of technological, pedagogical, and content knowledge. *European Journal of Contemporary Education*, *6*(2), 308-316.Available at: https://doi.org/10.13187/ejced.2017.2.308.
Schirmer, B. R. (2018). Framework for conducting and writing a synthetic literature review. *International Journal of Education*, *10*(1), 94-105.Available at: https://doi.org/10.5296/ije.v10i1.12799.
Seaton, J., & Schwier, R. (2014). An exploratory case study of online instructors: Factors associated with instructor engagement. *International Journal of E-Learning & Distance Education*, *29*(1), 1-16.
Smart, B. M., & Saxon, D. P. (2016). Online versus traditional classroom instruction: An examination of developmental English courses at an Alabama community college. *Community College Journal of Research and Practice*, *40*(5), 394-400.Available at: https://doi.org/10.1080/10668926.2015.1065777.
Smith, N., Erlam, C., Quirke, N., & Sylvester, G. (2014). Establishing a sense of connectedness amongst theology students in distance education. *Journal of Open, Flexible, and Distance Learning*, *18*(2), 11-28.
Sridharan, B., Deng, H., & Kinshuk. (2014). Does supply always come on the heels of demand? Matches and mismatches in e-learning. *Issues in Educational Research*, *24*(3), 260-280.
Tang, C. M., & Chaw, L. Y. (2016). Digital literacy: A prerequisite for learning environment? *Electronic Journal of e-Learning*, *14*(1), 54-65.
Taylor, J. M., Dunn, M., & Winn, S. K. (2015). Innovative orientation leads to improved success in online courses. *Online Learning*, *19*(4), 112-120.Available at: https://doi.org/10.24059/olj.v19i4.570.
Tibi, M. H. (2018). Computer science students' attitudes towards the use of structured and unstructured discussion forums in fully online courses. *Online Learning*, *22*(1), 93-106.Available at: https://doi.org/10.24059/olj.v22i1.995.
Tirado, R., Hernando, Á., & Aguaded, J. I. (2015). The effect of centralization and cohesion on the social construction of knowledge in discussion forums. *Interactive Learning Environments*, *23*(3), 293-316.Available at: https://doi.org/10.1080/10494820.2012.745437.
Tladi, L. S. (2017). Perceived ability and success: Which self-efficacy measures matter? A distance learning perspective. *Open Learning: The Journal of Open, Distance and e-Learning*, *32*(3), 243-261.Available at: https://doi.org/10.1080/02680513.2017.1356711.
Trad, L., Katt, J., & Miller, A. N. (2014). The effect of face threat mitigation on instructor credibility and student motivation in the absence of instructor nonverbal immediacy. *Communication Education*, *63*(2), 136-148.Available at: https://doi.org/10.1080/03634523.2014.889319.
Vayre, E., & Vonthron, A.-M. (2017). Psychological engagement of students in distance and online learning: Effects of self-efficacy and psychosocial processes. *Journal of Educational Computing Research*, *55*(2), 197-218.Available at: https://doi.org/10.1177/0735633116656849.
Vázquez-Cano, E. (2014). Mobile distance learning with smartphones and apps in higher education. *Educational Sciences: Theory and Practice*, *14*(4), 1505-1520.Available at: https://doi.org/10.12738/estp.2014.4.2012.
Wai, C. C., & Seng, E. L. K. (2015). Measuring the effectiveness of blended learning environment: A case study in Malaysia. *Education and Information Technologies*, *20*(3), 429-443.Available at: https://doi.org/10.1007/s10639-013-9293-5.
Wang, Y. D. (2014). Building student trust in online learning environments. *Distance Education*, *35*(3), 345-359.Available at: https://doi.org/10.1080/01587919.2015.955267.
Wdowik, S. (2014). Using a synchronous online learning environment to promote and enhance transactional engagement beyond the classroom. *Campus Wide Information Systems*, *31*(4), 264-275.Available at: https://doi.org/10.1108/CWIS-10-2013-0057.

Webb, A., & Moallem, M. (2016). Feedback and feed-forward for promoting problem-based learning in online learning environments. *Malaysian Journal of Learning and Instruction, 13*(2), 1-41.Available at: https://doi.org/10.32890/mjli2016.13.2.1.

Wiechowski, L., & Washburn, T. L. (2014). Online finance and economics courses: A comparative study of course satisfaction and outcomes across learning models. *American Journal of Business Education, 7*(1), 37-48.Available at: https://doi.org/10.19030/ajbe.v7i1.8318.

Wong, L., & Fong, M. (2014). Student attitudes to traditional and online methods of delivery. *Journal of Information Technology Education: Research, 13*(1), 1-3.Available at: https://doi.org/10.28945/1943.

Wu, D. C. (2014). Learning styles and satisfaction in distance education. *Turkish Online Journal of Distance Education, 15*(4), 112-129.Available at: https://doi.org/10.17718/tojde.31724.

Wu., S.-Y., & Hou, H.-T. (2015). How cognitive styles affect the learning behaviors of online problem-solving based discussion activity: A lag sequential analysis. *Journal of Educational Computing Research, 52*(2), 277-298.Available at: https://doi.org/10.1177/0735633115571307.

Xu, D., & Jaggars, S. S. (2014). Performance gaps between online and face-to-face courses: Differences across types of students and academic subject areas. *The Journal of Higher Education, 85*(5), 633-659.Available at: https://doi.org/10.1353/jhe.2014.0028.

Xu., J., Du, J., & Fan, X. (2015). Students' groupwork management in online collaborative learning environments. *Journal of Educational Technology & Society, 18*(2), 195-205.

Yang, Y.-F. (2018). New language knowledge construction through indirect feedback in web-based collaborative writing. *Computer Assisted Language Learning, 31*(4), 459-480.Available at: https://doi.org/10.1080/09588221.2017.1414852.

Yilmaz, F. G. K., Olpak, Y. Z., & Yilmaz, R. (2018). The effect of the metacognitive support via pedagogical agent on self-regulation skills. *Journal of Educational Computing Research, 56*(2), 159-180.Available at: https://doi.org/10.1177/0735633117707696.

Yılmaz, R., & Keser, H. (2017). The impact of interactive environment and metacognitive support on academic achievement and transactional distance in online learning. *Journal of Educational Computing Research, 55*(1), 95-122.Available at: https://doi.org/10.1177/0735633116656453.

Yu-Ching, C. (2015). Linking learning styles and learning on mobile Facebook. *International Review of Research in Open and Distributed Learning, 16*(2), 94-114.Available at: https://doi.org/10.19173/irrodl.v16i2.2038.

Zacharias, G., & Yiannis, G. (2017). Differences between regular and distance education in a teacher's training program. *European Journal of Open, Distance and e-Learning, 20*(2), 17-29.Available at: https://doi.org/10.1515/eurodl-2017-0014.

Zhang, M., Yin, S., Luo, M., & Yan, W. (2017). Learner control, user characteristics, platform difference, and their role in adoption intention for MOOC learning in China. *Australasian journal of educational technology, 33*(1), 114-133.Available at: https://doi.org/10.14742/ajet.2722.

Zimbardi, K., Colthorpe, K., Dekker, A., Engstrom, C., Bugarcic, A., Worthy, P., & Long, P. (2017). Are they using my feedback? The extent of students' feedback use has a large impact on subsequent academic performance. *Assessment & Evaluation in Higher Education, 42*(4), 625-644.Available at: https://doi.org/10.1080/02602938.2016.1174187.