

5-7-2021

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Recommended Citation

Fuller, L. (2021). Negotiating a New Blend in Blended Learning: Research Roots. *Inquiry: The Journal of the Virginia Community Colleges*, 24 (1). Retrieved from <https://commons.vccs.edu/inquiry/vol24/iss1/6>

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Negotiating a New Blend in Blended Learning: Research Roots

Laura Fuller

Blended learning has a muddled history but is still evolving. Technological innovations and the COVID-19 pandemic of 2020 led higher education to create a new blend to blended learning, one that did not follow the generally accepted and most numerous definitions or previous examples of blended learning. This new blend of blended learning lacks the physical environment and face-to-face instruction and consists of all computer-mediated instruction in the form of both asynchronous online instruction and synchronous instruction via videoconferencing and computerized webinar tools. This arrival of a new blend of blended learning requires educators to develop and implement a new instructional mode. This paper aims to assist educators with their pursuit of effective strategies for the successful design and implementation of this new blend of blended learning by providing an overview and discussion of how research on blended learning may be interpreted and applied to equip educators to be more prepared to design and to implement their own new blend of blended learning courses. The origins of distance learning, the development of blended learning, blended learning's links to technological development, the ambiguity of terminology referring to these learning forms, and the advantages and drawbacks of blended learning are presented through a review of published research.

Education changes as society changes. Consequently, the methods and practices used in education have adjusted dramatically throughout the centuries (Christensen et al., 2011a; Ervin, 2019). With the COVID-19 pandemic of 2020, virtually all of society transformed, and education is adapting in response. This current reshaped educational culture has yet again modified the higher education learning context leading to the innovation of a new blend in blended learning, one that is a mixture of online asynchronous with online synchronous utilizing the videoconferencing and webinar tools, such as Zoom. In response, educators continue to pursue information for effective instructional practices to engage students in the learning process (Christensen et al., 2011a; Ervin, 2019).

Although education has always been called upon to make shifts, adjustments are not necessarily natural or always effectual. The disruptive innovation theory of Christensen et al. (2011a) referenced the catalyst for these necessitated innovations as *disruptions* and cautioned that they are “difficult because the definitions and trajectories of improvement change” (p. 44). However, Christensen et al.’s theory also suggested that specific procedures were available for

predictable success in innovation. Assisting educators with the pursuit of effective strategies for the successful design and implementation of this new blend of blended learning by providing an overview and discussion of how research on blending learning may be interpreted and applied is the purpose of this paper.

The relevance of this pursuit for effective utilization of this new blend of blended learning is a natural assumption as the ramifications of education ripple throughout society. However, the immediacy of the implementation of the new blend in an educational format without strong existing research regarding effectiveness demands careful and purposeful review and crafting of intended teaching strategies. Deschacht and Goeman (2015) remarked that while scholars and educators “believe blended learning holds the potential to make higher education more attractive, accessible and effective for adult learners,” research studies on the effects of blending learning on higher education students’ performance are insufficient, and the debate on the effects of blended learning on student retention and performance has not been resolved (p. 84).

Moreover, the sheer numbers of students and faculty being potentially affected by this transitional blend amplifies the significance of implementing this educational mode with conscious awareness of the best practices. In 2018 in the United States, nearly seven million higher education students (35.6% of all students at degree-granting postsecondary institutions) were enrolled in distance learning courses (U.S. Department of Education, National Center for Education Statistics, 2018). Approximately 17% of these distance learning students were enrolled in fully online courses, while the other approximate 18% took at least one online course (U.S. Department of Education, National Center for Education Statistics, 2018). Due to definitional ambiguities with the terms *blended learning*, assessing the exact number of United States higher education students who would be impacted by this new blend in blend learning is impossible. However, Dzuiban et al. (2018) referenced that in 2008, 35% of United States higher education institutions offered blended courses,

and 12% of the 12.2 million students enrolled in distance learning were in blended courses.

Projections indicate that distance/online learning will continue to grow (Ervin, 2019), supporting the importance of educators understanding how to effectively employ all forms of distance learning for the benefit of student instruction.

Defining Blended Learning

Part of the challenge of addressing educational strategies for effective implementation of this new blend in blended learning arises from a lack of an accepted definition for blended learning (Andrews, 2020; Picciano, 2019; Poon, 2013). What was once a clear line between traditional face-to-face and distance education has been blurred by the rise of hybrid/blended learning (Miller et al., 2017).

Attempts have been made to construct a definition of blended learning. Miller et al. (2017) defined blended learning as “the delivery of education through a combination of instructor- and technology-led instruction,” but they indicated that no guidelines exist for how much education is delivered by technology versus in person (p. 4). For the various learning modes, Allen and Seaman (2016) suggested blended learning be defined as having 30-79% online instruction, face-to-face be constructed of 0% - 29%, and online consist of 80% or more.

Even the root of development for blended learning is debated as some researchers have seen its evolution from hybrid learning, and the terms of *hybrid* and *blended* are often used interchangeably (Miller et al., 2017; Yamagata-Lynch, 2014). Other researchers have viewed blended learning as arising from face-to-face and distance/online learning modes (Poon, 2013). Still, others have claimed that blended learning resulted from distance education without influence from traditional face-to-face education (Aoki, 2012).

Generally, blended learning has had recognized association with distance learning, and divisions between the two are frequently blurred in research. The beginnings of distance learning

date back to the early 18th century (Kentnor, 2015). Distance education's first formalized program began in 1873 by Anna Ticknor, who formed a "network of women teaching women by mail" called the Society to Encourage Studies at Home (Bergmann, 2001, p. 447). The first widely offered and quite successfully enrolled distance education program was provided by the University of Chicago in 1892 (Kentnor, 2015). From these beginnings, the development of distance learning can be viewed in five generations (Taylor, 2001). Aoki (2012) attributed generational visualization due to "the evolving use of technologies" (p. 1184).

The first generation, the Correspondence Model, utilized asynchronous with no interactivity learning to geographically separated instructors and learners with mainly print technology and postal services (Aoki, 2012; Taylor, 2001). This generation ended in 1960 (Andrews, 2020). The Multi-media Model, the second generation, utilized the technologies of print, audio, and video (Taylor, 2001). This second generation, with its use of print materials with radio and television as instructional media, was able to reach mass audiences worldwide (Aoki, 2012). This generation, lasting approximately 25 years, remained asynchronous with geographically separated instructors and students (Andrews, 2020). The third generation, the Telelearning Model, applied telecommunication technologies to offer the first synchronous distance learning (Taylor, 2001). This generation has been divided into two time periods of 1985-1995, representing the introduction of personal computing, and 1995-2005, exhibiting the launch of Internet learning (Andrews, 2020). Both audio and videoconferencing were utilized, allowing content delivery and interactivity among students and instructors (Aoki, 2012). The fourth generation of online instruction via the Internet is titled the Flexible Learning Model (Taylor, 2001) and allows "personalization of content depending upon learners' learning preferences" (Aoki, 2012, p. 1185). Taylor (2001) asserted that a fifth generation was emerging due to newer technologies. This Intelligent Flexible Learning Model, a derivative of the fourth generation, utilizes the interactive nature of the Internet, such as Web 2.0 (Aoki, 2012).

This generational history review of distance/online learning reveals the third generation allowed learning asynchronously, synchronously, or as a combination of both, which resulted in the potential for the emergence of blended learning.

Additionally, some of the difficulty with establishing a definition of blended learning arises from its close connection to technology. If blended learning is defined by the technology utilized in its implementation, then its definition and instructional methods must change as technology evolves (Andrews, 2020). Miller et al. (2017) indicated that new technologies had required new terms for emerging educational modes of distance learning. Hence, since technology continues to develop into new forms, the name and design of blended learning also display a tendency to change, contributing to some of the ambiguity of educators and researchers in understanding it.

Despite the varying claims of its origin, blended learning is broadly recognized as “some combination of virtual and physical environments” (Poon, 2013, p. 274). Graham et al. (2005) defined blended learning as combining face-to-face instruction with computer-mediated instruction. Picciano (2019) stated that “blended learning is perceived as some nebulous combination of online and face-to-face instruction” (p. 8). However, in 2020, the new blend of blended learning represents a diversion from what has previously been defined as blended learning. The new blend of blended learning consists of all computer-mediated instruction in the form of both asynchronous online instruction and synchronous instruction via videoconferencing and computerized webinar tools; the physical environment and face-to-face instruction are absent.

A lack of a clear and stable definition of blended learning, the inability to differentiate the contributions of the various learning formats, the novelty of its emergence during a disruption in worldwide society, and its continual evolution due to its linkage to technology further complicate educators’ efforts to effectively utilize this new blend of blended learning for productive student learning. Acknowledgment of this challenge came from Cheng and Chau (2016), who indicated that

blended learning could be composed of different combinations with some effective and some ineffective. One suggested approach came from Andrews (2020), who posited that educators must consider the type or combination of blended learning being utilized. Consideration of how the blended learning format integrates these four dimensions should be involved in their evaluation: physical space (F2F vs. computerized); time (asynchronous vs. synchronous); fidelity (media vs. text), and humanness (human vs. machine) (Graham et al., 2005; Andrews, 2020).

Investigation into the generational picture of distance learning also allows a view of some of the confusion with the determination of the origins of blended learning and a preferred approach to its effective implementation. Some researchers indicated that face-to-face learning and online/blended learning were equivalents (Demirer & Sahin, 2013). Some researchers stated that online/blended learning was not as effective as face-to-face learning (Xu & Jaggars, 2014). Other researchers have claimed that blended learning exceeds face-to-face learning (Tseng & Walsh, 2016). Nevertheless, a point of consideration in the studies is what is actually being measured and how. As in the contemplation of any research, the study and its findings need to be carefully reviewed. For example, in Tseng and Walsh's (2016) study, the results were determined by students' self-reports. The results were that the students *reported* "significantly higher overall learning motivation," and the students *reported* "higher levels of learning outcomes," yet the final grades between the blended courses and the face-to-face courses had no significant difference (Tseng & Walsh, 2016, p. 50). The presence of conflicting research reports further complicates an educator's pursuit of effective implementation of this new form of blended learning.

The determination of what would be sufficient learning theories to apply to blended learning is also debated. As blended learning was emerging, the scholarly thought was that the theories of learning that applied to face-to-face learning could also explain distance learning (Andrews, 2020). As cited in Andrews (2020), Keegan (1986) advocated the need for a specific theory for distance

learning, which contributed to Simonson's (1999) equivalency theory. The equivalency theory states "distance education's appropriate application should provide equivalent learning experiences for all students - distant and local - in order for there to be expectations of equivalent outcomes of the educational experience" (Simonson, 1999, p. 7). Simonson stated that distance learning and local learning are "*fundamentally* different, even when interactive technologies are used" (p. 7). However, even though the learning experiences may be different, they should be equivalent, and the location of the learners should not mean that any learner should have "different, possibly lesser, instructional experiences" (Simonson, 1999, p. 7).

Bernard et al. (2004) continued research with the equivalency theory's premise of relative effectiveness and the nature and extent of the impact on essential outcomes and concluded that "methodology and pedagogy are more important than media in predicting achievement" (pp. 379, 399). The theory has been further advanced by the work of Dell et al. (2010), which concluded that to achieve equivalent outcomes, "methods of instruction are more important than the delivery platform" (abstract). As an educator is designing and implementing this new blend of blended learning courses, the challenge of bringing all of these aspects of research, debate, theory, history, and association will inform design.

Research on Blended Learning

Utilization of research into blending learning assists educators with their creation of informed design for and implementation of the new blend of blended learning. However, research will not reveal a clear-cut path to the successful implementation of a blended course with effective instructional practices to engage students in the learning process. The earlier discussions of this paper clearly indicate the muddled paths by which blended learning has arrived in higher education. Additionally, discerning in research which study is based on online learning or blended learning is difficult as

terms, such as *distance learning*, *online learning*, and *blended learning* are not necessarily used with much specificity. Studies of higher education environments also do not necessarily define their populations well, and confusion can exist with classifications of collegiate students and adult learners. Furthermore, Christensen et al. (2011a) warned that the many variables in delivery methods of online learning make conclusions about effectiveness difficult. However, with consideration of these cautions, research can be a worthwhile contributor to educators revealing the advantages, drawbacks, and research-supported approaches to blending learning.

Advantages

In general, many scholars and educators support blended learning's potential of making higher education "more attractive, accessible and effective for adult learners" (Deschacht & Goeman, 2015, p. 83). In much of published research, the themes of convenience, flexibility, and popularity recur regarding the advantages of blended learning. Deschacht and Goeman (2015) reported the convenience of blended learning for students who are combining jobs, family, and education, who live in remote areas, or who have specific learning needs. The reduced classroom contact hours with study materials, assessments, and coaching delivered online are conveniences for learners (Deschacht & Goeman, 2015). Distance learning allows students the convenience of determining the setting in which they learn best (Kentnor, 2015). Poon (2013) listed flexibility as a leading factor in students' preference for blended learning. According to Christensen et al. (2011), ample research on online learning worldwide supports its popularity. Owston et al.'s (2013) research claimed the benefits of flexibility, efficiency, convenience, and learner engagement and found that high achieving learners were more satisfied with the blended learning environment than low achieving students. High achievers found blended learning more convenient and engaging, felt they learned course concepts better than in face-to-face courses, and would prefer to take a blended

course again; low achievers were least satisfied, least likely to take another blended learning course, and preferred face-to-face learning (Owston et al., 2013).

Other advantages attributed to blended learning are presented in the research. Andrews (2020) reported that students who prefer blended learning appreciated more time for processing and reflecting upon the course content. Ervin (2019) suggested that students valued blended learning's opportunities for personalization of their learning. Other students, according to Ervin, prized the accessibility factor of blended learning. Christensen et al. (2011b) claimed learners who are not able to physically attend on-campus classes or have financial barriers preventing commuting or living on campus benefited from blended learning's accessibility. Furthermore, from a higher education institution's viewpoint, Maloney et al. (2015) claimed cost savings of blended learning over face-to-face learning.

Some studies found multiple perspectives when comparing blended learning to face-to-face learning. For example, Andrews (2020) reported that some research showed no difference in competency between the two groups of students, but the rate of satisfaction of blended students was significantly higher. Spanjers et al. (2015), however, found students were equally satisfied with both learning types. Student satisfaction is an often-mentioned advantage of distance/blended learning (Andrews, 2020; Deschacht & Goeman, 2015; Kintu et al., 2017; Reissman et al., 2015; Willging & Johnson, 2009). Studies across a span of years indicate that interaction, either instructor to student or student to student, contribute to high student satisfaction in distance learning (Arbaugh, 2000; Eom et al., 2006; Garrison & Kanuka, 2004; Kintu and Zhu, 2016; Kintu et al., 2017; Abou Naaj et al., 2012; Swan, 2001). Student satisfaction becomes an important contributor to course completion. Willging and Johnson (2009) named student satisfaction in online/blended learning as a strong factor for its effectiveness. Deschacht and Goeman (2015) suggested that students' satisfaction is a crucial element in reducing dropouts in blended learning.

Some studies showed both advantages and drawbacks to blended learning. For instance, Deschacht and Goeman (2015) found blended learning led to higher exam scores and slightly higher course pass rates but did not improve the course persistence of certain students. The researchers aptly reminded readers that the positives of the study need to be viewed with the following consideration: If more students drop out, the remaining learners (those who continued) may have been better students, and, accordingly, without the dropout students' low scores, the exam results and pass rate have been skewed. Hence, the effects of blended learning may be overestimated if only exam scores are investigated (Deschacht & Goeman, 2015). A complete review of the studies should be conducted as educators are considering both the advantages and drawbacks of blended learning. With knowledge of the advantages, educators understand what works well with blended learning and can edify those strengths in their courses. A review of the drawbacks is also useful to educators as they are preparing their courses.

Drawbacks

Research reports drawbacks to blended learning as well. The first consideration is a reminder that since there are so many blends to distance education, not all varieties are effective (Koch & McAdory, 2012). As with the review of research on the advantages of blended learning, educators must look carefully at the many variables of a study and be cognizant of the muddled history, terminology, and varying formats of blended learning. Student retention is often cited as a drawback to distance learning (Deschacht & Goeman, 2015; Xu & Jaggars, 2014). Higher education blended learning courses have a higher dropout rate than face-to-face courses (Andrews, 2020; Deschacht & Goeman, 2015). The reasons are many, but the research provides educators with areas to address in their course design and implementation.

Chyung (2001) reported that students drop out because their interests and the course structure do not match or because they lack confidence in a distance learning environment. Students have to adjust psychologically to teaching differences (Szeto & Cheng, 2016). Furthermore, Kintu et al., (2017) listed “one big challenge” in blended learning is how to be sure learners can successfully use technology as “users getting into difficulties with technology may result in abandoning learning” (p. 1). System functionality may lead to either success or failure as poor quality in technology destroys user satisfaction, but quality technology positively affects satisfaction (Kintu et al., 2017). An indicator of success in blended learning is the user’s continued navigation through the technology of the learning management system (Kintu et al., 2017). If the user can effectively use the learning management system and its various tools, then learning outcomes improve, but a lack of computer skills causes failure (Kintu et al., 2017).

Additionally, the use of some of the technology is still developing and lacks conclusive research on effectiveness and best practices. Computer-mediated communication (CMC) in the form of computer conferencing has been gaining popularity since the last century as Garrison et al. (1999) presented in their study on its more common use in higher education. The new blend in blended learning utilizes CMC in the form of videoconferencing and webinars through Zoom, a desktop video conferencing service, to take the place of what has previously been the face-to-face component in blended learning. However, practitioners, writers, and associations are advocating that a phenomenon named Zoom fatigue is affecting users of the Zoom platform. Unfortunately, the phenomenon is so new that scholarly research is lacking, but some media sources have printed information. For instance, the American Heart Association and Zoom Video Communications, Inc., published “a multi-facet strategy to combat burnout and address mental wellbeing” to address the “concern over virtual fatigue” (Press Release, 2020, para. 1, 6). Kobie (2020) published an article in *PC Pro*, acknowledging the problem. Wiederhold (2020) reported on the new phenomenon that

researchers and journalists have begun calling “Zoom fatigue.” Even though researched information is not yet available, educators should be aware of this technological downside.

Another drawback suggested in research is the overloading of learners (Andrews, 2020). The demands of blended learning should be considered in course design as well as the students’ perceptions of the course’s work. Spanjers et al.’s (2015) study reported a negative effect size for investment, which meant that students perceived blended learning to be “more demanding and/or less appropriate with regard to the required investments compared with more traditional learning” (p. 69). Spanjers et al. concluded that although their research had some limitations, it did support the assertion that Sitzmann et al. (2006) found, which suggested that blended learning may be more demanding than face-to-face learning. The researchers also asserted, however, that the investment of more time, effort, and work in the blended course might have been a contributing factor in the studies’ concluding that blended learning had higher effectiveness (Sitzmann et al., 2006; Spanjers et al., 2015).

In addition to the student considerations, blended learning instruction is a new or different experience for many instructors. Andrews (2020) stated that instructors must adjust a face-to-face course in order to blend it with an online component. Some instructors were found to be unsure about how to modify their classes for the blended environment (Freeman & Tremblay, 2013). Purposeful design, including working with an instructional designer, and transformation of teaching are supported in research (Capra, 2014; Szeto & Cheng, 2016). Additionally, Koch and McAdory (2012) indicated that sometimes there is resistance to the teaching of blended instruction by instructors who feel classroom presence is what makes a difference in teaching. Others resisted moving to blended learning as they felt that reviewing online activities was too much loss of in-class teaching or felt online components contained too much extraneous information (Freeman &

Trambley, 2013). Both parties of students and instructors need to be considered in the design and implementation of this new blend of blended learning.

Concluding Charge to Readers

Higher education institutions and educators continue to adapt to the changing needs of society. Innovations, such as those created by new technology, as well as disruptions, such as the COVID-19 pandemic of 2020, modify the modes of learning instruction. Increased reliance on more computerized technology and mobility restrictions due to the pandemic have created a new blend of blended learning. Unlike the vast majority of previous forms of recent blended learning that utilized a mixture of face-to-face and online delivery, this new blend is entirely computerized, but not exclusively asynchronous online learning. This new blend is partially asynchronous online delivery and partly synchronous instruction via computer-mediated communication of videoconferencing and webinars via tools such as Zoom, a desktop video conferencing service. This paper aims to assist educators with their pursuit of effective strategies for the successful design and implementation of this new blend of blended learning.

Gaining an understanding of the muddled history of blended learning and developing an awareness of its advantages and drawbacks equip the higher education practitioner with knowledge for course design and implementation of this new blend of blended learning. A review of some of the research of distance learning in order to more fully understand blended learning reveals the ambiguity with and sometimes simultaneous use of terms, such as *distance*, *online*, *blended*, *e-learning*, and *hybrid* to refer to similar or the same instructional methodology. Additionally, the higher education practitioner utilizing research must scrutinize studies to ascertain applicability for his or her instructional needs. For instance, in the research studies, settings should be considered as some might be corporate, as the corporate arena began to use computers for educational purposes during

the 1980s while higher education did not begin online courses until the early to mid-1990s (Kentnor, 2015). Additionally, studies have varied populations from elementary to graduate students.

Distance learning has a recognized history of approximately 300 years (Kentnor, 2015), although others such as Keegan (2014), as cited in Andrews (2020), will argue that its use existed centuries ago dating to biblical times through the letters of Apostle Paul. The rapid growth of distance learning, however, began in the late 1990s with online technology's influence (Kentnor, 2015), and eventually birthed blended learning with online components. To understand the breadth of blended learning, an educator should view research from the last approximate 20 years. Blended learning is not static; with its continual association with evolving technology, each new reiteration of educational technology affects blended learning and researchers. "Innovative pedagogical approaches through the use of technology in teaching and learning" are necessities, according to Kintu et al. (2017), for a worthwhile blended learning environment (p. 18). To effectively design and implement blended learning, practitioners should meld learner characteristics, design features, and learning outcomes (Kintu et al., 2017). In order to be aware of the pedagogy, technology, options, outcomes, and other qualities for good blended learning design and implementation, research is needed. Kentnor (2015) offered that to improve the quality of education educators provide, they need to "investigate and understand the progression and advancements in educational technology and the variety of methods used to deliver knowledge" (p. 22). Informed with a span of research about blended learning, educators are more prepared to design and to implement their own courses in this new blend of blended learning.

References

- Abou Naaj, M., Nachouki, M., & Ankit, A. (2012). Evaluating student satisfaction with blended learning in a gender-segregated environment. *Journal of Information Technology Education, 11*, 185-200. doi:10.28945/1692
- Allen, I. E., & Seaman, J. (2016). *Online report card: Tracking online education in the United States*. <http://www.onlinelearningsurvey.com/reports/online-report-card.pdf>
- Andrews, A. M. (2020). *The right mix: A single case study into a blended learning program at Tobrikey Corporation* [Doctoral dissertation, Liberty University]. Scholars Crossing. <https://digitalcommons.liberty.edu/doctoral/2339>
- Aoki, K. (2012). Generations of distance education: Technologies, pedagogies, and organizations. *Procedia – Social and Behavioral Sciences, 55*, 1183–1187. doi:10.1016 /j.sbspro.2012.09.613
- Arbaugh, J. B. (2000). How classroom environment and student engagement affect learning in internet-based MBA courses. *Business Communication Quarterly, 63*(4), 9–26. doi:10.1177/108056990006300402
- Bergmann, H. F. (2001). “The silent university”: The society to encourage studies at home, 1873-1897. *The New England Quarterly, 74*(3), 447-477. doi:10.2307/3185427
- Bernard, R. M., Abrami, P. C., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., Walseth, P. A., Fiset, M., & Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research, 74*(3), 379-439. doi:10.3102/00346543074003379
- Capra, T. (2014). Online education from the perspective of community college students within the community of inquiry paradigm. *Community College Journal of Research and Practice, 38*(2-3), 108–121. doi:10.1080/10668926.2014.851949

- Cheng, G., & Chau, J. (2016). Exploring the relationships between learning styles, online participation, learning achievement and course satisfaction: An empirical study of a blended learning course. *British Journal of Educational Technology*, 47(2), 257-278. doi:10.1111/bjet.12243
- Christensen, C. M., Horn, M. B., & Johnson, C. W. (2011). *Disrupting class: How disruptive innovation will change the way the world learns: Vol. updated and expanded new ed.* McGraw-Hill Professional.
- Christensen, C. M., Horn, M. B., Caldera, L., Soares, L., Innosight Institute, & Center for American Progress. (2011). *Disrupting college: How disruptive innovation can deliver quality and affordability to postsecondary education.* <https://files.eric.ed.gov/fulltext/ED535182.pdf>
- Chyung, S. Y. (2001). Systematic and systemic approaches to reducing attrition rates in online higher education. *American Journal of Distance Education*, 15(3), 36-49.
doi:10.1080/08923640109527092
- Dell, C. A., Low, C., & Wilker, J. F. (2010). Comparing student achievement in online and face-to-face classes. *Journal of Online Learning and Teaching*, 6(1),
https://jolt.merlot.org/vol6no1/dell_0310.htm
- Demirer, V., & Sahin, I. (2013). Effect of blended learning environment on transfer of learning: An experimental study. *Journal of Computer Assisted Learning*, 29(6), 518-529.
doi:10.1111/jcal.12009
- Deschacht, N., & Goeman, K. (2015). The effect of blended learning on course persistence and performance of adult learners: A difference-in-differences analysis. *Computers & Education*, 87, 83–89. doi:10.1016/j.compedu.2015.03.020
- Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N. (2018). Blended learning: The new normal and emerging technologies. *International Journal of Educational Technology in Higher Education*, 15(1), 1-16. doi:10.1186/s41239-017-0087-5

- Eom, S. B., Wen, H. J., & Ashill, N. (2006). The determinants of students' perceived learning outcomes and satisfaction in university online education: An empirical investigation. *Decision Sciences Journal of Innovative Education*, 4(2), 215–235. doi:10.1111/j.1540-4609.2006.00114.x
- Ervin, J. L. (2019). *Undergraduate education students' experiences in online cooperative learning activities: An embedded single-case study* [Doctoral dissertation, Liberty University]. Scholars Crossing. <https://digitalcommons.liberty.edu/doctoral/2218>
- Freeman, W., & Tremblay, T. (2013). Design considerations for supporting the reluctant adoption of blended learning. *Journal of Online Learning and Teaching*, 9(1), 80–88. https://jolt.merlot.org/vol9no1/freeman_0313.pdf
- Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education*, 7(2), 95-105. doi:10.1016/j.iheduc.2004.02.001
- Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2-3), 87–105. doi:10.1016/S1096-7516(00)00016-6
- Graham, C. R., Allen, S., & Ure, D. (2005). Benefits and challenges of blended learning environments. In *Encyclopedia of Information Science and Technology* (Vol. 1, pp. 253–259). IGI Global.
- Kentnor, H. E. (2015). Distance education and the evolution of online learning in the United States. *Curriculum and Teaching Dialogue*, 17(1-2), 21-34. https://digitalcommons.du.edu/cgi/viewcontent.cgi?article=1026&context=law_facpub
- 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. <https://files.eric.ed.gov/fulltext/EJ1107126.pdf>

- Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended learning effectiveness: The relationship between student characteristics, design features and outcomes: *Revista de universidad y sociedad del conocimiento. International Journal of Educational Technology in Higher Education*, 14, 1-20. doi:10.1186/s41239-017-0043-4
- Kobie, N. (2020, April 23). Zoom fatigue is very real and I have it. *PC Pro*, 23. <https://search-proquest-com>.
- Koch, J. V., & McAdory, A. R. (2012). Still no significant difference? The impact of distance learning on student success in undergraduate managerial economics. *Journal of Economics and Finance Education*, 11(1), 27–38. [http://www.economics-finance.org/jefe/volume11-1/03.%20Koch%20Vol.%2011%20\(1\)%20Article.pdf](http://www.economics-finance.org/jefe/volume11-1/03.%20Koch%20Vol.%2011%20(1)%20Article.pdf)
- Maloney, S., Nicklen, P., Rivers, G., Foo, J., Ooi, Y. Y., Reeves, S., Walsh, K., & Ilic, D. (2015). A cost-effectiveness analysis of blended versus face-to-face delivery of evidence-based medicine to medical students. *Journal of Medical Internet Research*, 17(7). doi:10.2196/jmir.4346
- Miller, A., Topper, A. M., & Richardson, S. (2017). *Suggestions for improving IPEDS distance education data collection*. U.S. Department of Education: National Postsecondary Education Cooperative. https://nces.ed.gov/ipeds/pdf/NPEC/data/NPEC_Paper_IPEDS_Distance_Education_2017.pdf
- Owston, R., York, D., & Murtha, S. (2013). Student perceptions and achievement in a university blended learning strategic initiative. *The Internet and Higher Education*, 18, 38-46. doi:10.1016/j.iheduc.2012.12.003
- Picciano, A. G. (2019). Blending with purpose: The multimodal model. *Online Learning*, 13(1), 7-18. doi:10.24059/olj.v13i1.1673

- Poon, J. (2013). Blended learning: An institutional approach for enhancing students' learning experiences. *Journal of Online Learning and Teaching*, 9(2), 271–289.
https://jolt.merlot.org/vol9no2/poon_0613.pdf
- Press release: American Heart Association and Zoom team up to address mental wellbeing and concern over virtual fatigue. (2020, June 11). *Dow Jones Institutional News*. <https://search-proquest-com>.
- Reissmann, D. R., Sierwald, I., Berger, F., & Heydecke, G. (2015). A model of blended learning in a preclinical course in prosthetic dentistry. *Journal of Dental Education*, 79(2), 157-165.
doi:10.1002/j.0022-0337.2015.79.2.tb05870.x
- Simonson, M. (1999). Equivalency theory and distance education. *Techtrends*, 43(5), 5-8.
doi:10.1007/BF02818157
- Sitzmann, T., Kraiger, K., Stewart, D., & Wisher, R. (2006). The comparative effectiveness of web-based and classroom instruction: A meta-analysis. *Personnel Psychology*, 59(3), 623-664.
doi:10.1111/j.1744-6570.2006.00049.x
- Spanjers, I. A. E., Könings, K. D., Leppink, J., Verstegen, D. M. L., de Jong, N., Czabanowska, K., & van Merriënboer, J. J. G. (2015). The promised land of blended learning: Quizzes as a moderator. *Educational Research Review*, 15, 59-74. doi:10.1016/j.edurev.2015.05.001
- Swan, K. (2001). Virtual interactivity: Design factors affecting student satisfaction and perceived learning in asynchronous online courses. *Distance Education*, 22(2), 306–331.
doi:10.1080/0158791010220208
- Szeto, E., & Cheng, A. Y. (2016). Towards a framework of interactions in a blended synchronous learning environment: What effects are there on students' social presence experience? *Interactive Learning Environments*, 24(3), 487–503. doi:10.1080/10494820.2014.881391

- Taylor, J. C. (2001). Fifth generation distance education. *e-Journal of Instructional Science and Technology (e-JIST)*, 4(1), 1-14.
<https://ascilite.org/archived-journals/e-jist/docs/vol4no1/Taylor.pdf>
- Tseng, H., & Walsh, E. J., Jr. (2016). Blended versus traditional course delivery: Comparing students' motivation, learning outcomes, and preferences. *Quarterly Review of Distance Education*, 17(1), 43. <https://eric.ed.gov/?id=EJ1142995>
- United States Department of Education, National Center for Education Statistics. (2018). Institute of Educational Sciences, Fast Facts, Distance Learning.
<https://nces.ed.gov/fastfacts/display.asp?id=80>
- Virginia Community College System. (2020). *Inquiry: The Journal of Virginia Community Colleges*.
<https://commons.vccs.edu/inquiry/about.html>
- Wiederhold, B. K. (2020). Connecting through technology during the coronavirus disease 2019 pandemic: Avoiding “Zoom fatigue.” *Cyberpsychology, Behavior and Social Networking*, 23(7), 437-438. doi:10.1089/cyber.2020.29188.bkw
- Willging, P. A., & Johnson, S. D. (2009). Factors that influence students' decision to drop-out of online courses. *Journal of Asynchronous Learning Networks*, 13(3), 115–127.
<https://files.eric.ed.gov/fulltext/EJ862360.pdf>
- Yamagata-Lynch, L. C. (2014). Blending online asynchronous and synchronous learning. *The International Review of Research in Open and Distributed Learning*, 15(2), 1–24.
doi:10.19173/irrodl.v15i2.1778
- 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 (Columbus)*, 85(5), 633-659. doi:10.1353/jhe.2014.0028