A Literature Review and Model of Online Teaching Effectiveness Integrating Concerns for Learning Achievement, Student Satisfaction, Faculty Satisfaction, and Institutional Results

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ABSRACT
Research about online teaching has grown extensively, and in most areas, the findings are relatively clear about many of the major opportunities and challenges, the contemporary status of online teaching issues, and overarching best practices regarding online teaching (Zawacki-Richter & Naidu, 2016). Integrating online teaching research effectiveness has been difficult because of (1) the substantially different perspectives related to learning achievement, student satisfaction, faculty satisfaction, and institutional results, (2) the rapid evolution of technology and online capacity, and (3) the rapid evolution of student, faculty, institutional, and accrediting body preferences and expectations of what constitutes quality online education. This article reviews the online teaching effectiveness literature with the purpose of providing a synthesis of the state-of-the-field in the higher education context. A model is provided to identify the major factors leading to effective quality online teaching and optimal learning potential.

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1. Introduction: Definitions, Opportunities, and Challenges

The literature on online education ballooned in traditional and specialized journals (Shattuck, 2015). Despite the enormous significance of the topic to practitioners, there tends to be substantial confusion related to the overall findings and how to incorporate the numerous specialized studies being published annually. While many reviews of the online literature have been conducted, they have largely failed to produce models that integrate institutional, faculty, and student issues with robust learning theory that appropriately integrates the instructionist, constructivist, and connective perspectives. The purpose of this article is to provide a contemporary literature review that can be summarized as a practical heuristic model for higher education faculty, administrators, and researchers interested in taking advantage of contemporary research insights.

2. Definitions

Definitions of what constitute face-to-face, technology-enhanced, hybrid, and online courses are consistent in principle, but there is no widely agreed-upon set of terms outside individual institutions and networks. A taxonomy of terms consistent with general usage is provided here. A traditional mode relies wholly on face-to-face instruction to meet instructor-facilitated or "seat time" requirements, with little use of technology other than slide programs like PowerPoint. All instruction is synchronous because of the requirement for simultaneous physical presence.

In a technology-assisted mode, while all instruction is still synchronous and physically present, the use of technology can be extensive. A learning management system can provide a place for lecture slides, course texts and auxiliary materials, announcements, computerized homework, out-of-class group-work and projects, assignment submission and feedback, and a detailed grade book, among other features. In the class, extensive use of the internet can bring topical and distant elements into the classroom.

In blended or hybrid classes, differing proportions of seat time are allocated to face-to-face classes and digitally mediated sessions. While the face-to-face sessions are synchronous, the online sessions may or may not be synchronous. When students are required to attend video-conference sessions, they, too, are synchronous. Frequently, a "flipped classroom" approach is for the online portion that relies more heavily on an asynchronous mode. Flipped classes provide fewer instructor-based lectures and more seat-time rehearsal of concepts and skills on a weekly basis. In the ideal, students are rehearsing material directly every week they are online and are getting feedback from the instructor and other students in well-organized activities in the form of quizzes, small or large group fora, individual submissions, etc. In some cases, the only portions of the course that are face-to-face are the exams in which proctoring may be more critical because of the ease of cheating in technically-based classes and in which rigorous performance demands exist, such as in engineering or pre-med courses.

Fully online classes do not ever meet physically. Some fully online classes have substantial synchronous elements for videoconferencing, synchronous timed exams, synchronous small group activities, etc. It is uncommon for them to be fully synchronous. Many online classes maximize student and faculty flexibility by being fully asynchronous. Students have windows of time to complete course requirements, frequently divided into weekly modules, with specific timelines established within the module as well. Table 1 summarizes the major features of the four possible teaching modalities.

Table 1: Four Modes of Teaching: From Fully Traditional to Fully Online

Mode	Role of technology in seat time	Type of "seat" time Synchronous or Asynchronous	Description of "seat" time
Traditional instruction	No technology or very little	All synchronous	All seat time is with the instructor being physically present; frequently relies on lecture, discussion, slides, white board, and handouts.
Technology-enhanced instruction	Some technology but it is auxiliary, not primary	All synchronous	While instruction stays in classroom, the instructor augments it with online announcements, online submission and grading, use of internet in the classroom, automated homework, etc.
Blended or hybrid instruction	Significant to substantial use of technology	May be fully synchronous or partially asynchronous	From 10 to 90 percent of the "classroom" instruction moves online. The online components may be synchronous (e.g., video-lectures) or asynchronous (e.g., video-taped lectures), or both.
Fully online instruction	Complete use of technology	May be full asynchronous or partially synchronous.	The instructor and students never meet physically and rely totally on the internet, video, digital text, and other virtual tools. Unlikely to be fully synchronous.

All modalities have their inherent strengths and weaknesses. However, the quality of implementation in a mode may be as important, if not more important, than differences in the modes used. This article reviews not only the literature on strengths and weaknesses related to learning achievement, student and faculty satisfaction, and institutional outcomes, but also what contributes to the quality of hybrid and online courses. Next we turn to the opportunities and challenges of partially or wholly online courses.

3. Opportunities

Online learning provides at least four important opportunities in the educational context, and at least two potential prospects (Dhanarajan, 2001; Wyatt, 2005; Young, 2006). First, online learning provides education at a distance. Traversing distance for students and faculty costs time and travel expense, and is sometimes a complete bar on attendance (Nguyen, 2015; Song, Singleton, Hill, & Koh, 2004). Second, online learning enhances convenience greatly and is most enhanced when conducted in an asynchronous mode so students can access learning modules to fit in with their schedules (Song, Singleton, Hill, & Koh, 2004). However, convenience is also enhanced in an online synchronous mode in that students and faculty can participate anywhere around the world (Boling, Hough, Krinsky, Saleem, & Stevens, 2012). Third, the need for brick-and-mortar space is reduced when teaching online (Miller & Ribble, 2010; Traynor-Nilsen, 2017).

Fourth, online learning enhances digital skills, such as student presentations, which are becoming increasingly important in our digital age (Hernandez-Lara & Serradell-Lopez, 2018). There is also evidence that training in online teaching improves face-to-face teaching, and allows the integration of online resources in face-to-face settings (Kearns, 2016; Joyes & Frize, 2005). Additionally, well designed online education *can* provide opportunities for enhanced rehearsal and individual feedback on a weekly basis (e.g., the so-called flipped classroom which holds students responsible for being active in learning every week) (Maycock, 2018; McGivney-Burelle, 2013). When well designed by the institution, it is possible for online education to reduce costs by lesser demand for physical infrastructure and greater use of shared digital resources (Kushnir & Berry, 2014; Young J. R., 2002), but in practice this has rarely been the case.

4. Challenges

The challenges of online education are equally important to consider and address (see Bawa, 2016; Horvitz et al., 2015; Mansbach & Austin, 2018). Five identified here will serve as elements to be addressed in a model of quality online education. When online education is poorly understood or when there are unrealistic expectations – frequently the case in higher education – a series of institutional support problems occur (Kushnir & Berry, 2014; Miller & Ribble, 2010). Online teaching requires new skills and teaching strategies, and without robust, high-quality training, it is likely faculty will suboptimize their teaching talents (Frazer, Sullivan, Weatherspoon, & Hussey, 2017; Williams & Casale, 2014). Institutions often provide too little technical support to faculty and students, inevitably keeping such resources centralized to reduce costs but making the support seem distant for instructors (Prinsloo, 2016; Chow & Croxton, 2017). Institutions are also often enticed to put more emphasis on marketing than on support in a drive to enhance the financial benefits of online teaching.

A second set of issues has to do with faculty concerns and motivation (Asarta & Schmidt, 2017; Mansbach & Austin, 2018; Wingo, Ivankova, & Moss, 2017). Because online teaching requires new skills and online courses take enormous upfront investments of time to "build," faculty are concerned about sufficient, timely training and the opportunity to devote adequate energy in advance of teaching a new course in the face of other obligations (Windes & Lesht, 2014; Wingo, Ivankova, & Moss, 2017). They therefore want reassign times for new preparations as well as for course re-designs. Faculty on average think that quality online teaching increases one's workload (Bollinger & Wasilik, 2009; Wingo, Ivankova, & Moss, 2017) because of the higher individualized student feedback expectations and believe compensation should be adjusted with a stipend system (Wingo, Ivankova, & Moss, 2017) or graduate student support. Students routinely evaluate online instructors more critically (Otter et al., 2013; Bangert, 2008), so there are promotion and tenure concerns as well.

A third concern regards the overall quality of instruction (Bernard et al., 2004*;* Marks, Sibley, & Arbaugh, 2005; Tallent-Runnels et al., 2006; Halverson et al., 2014). Will students get enough aural/visual input when they move to an online mode? Face-to-face classes tend to ensure large components of lectures, which have "rich" aural/visual configurations to complement readings (Paechter & Maier, 2010). Sometimes the aural/visual component is completely converted to text-based instructor lectures in online settings. More frequently today, the aural/visual component is presented via prerecorded podcasts or videos, and/or "live" videoconference sessions, generally shorter in time and sometimes dramatically less than in face-to-face classrooms, leading to concerns about insufficient media variety (Arbaugh, 2014). Ease of cheating in online classes is another worry (Jones, 2011; Wilkinson, 2009). Still another concern

is because the organizational aspect of online education is so critical without face-to-face interaction, even small issues, glitches, and oversights reduce the student's experience enormously (Frazer, Sullivan, Weatherspoon, & Hussey, 2017; Traynor-Nilsen, 2017). Without instructor training and diligence, weak online teaching organization can become a huge liability.

Related is the challenge of decreasing the impersonal nature of the digital online learning experience. Generally called social presence, this typically involves not only instructor-to-instructor presence, but also student-to-student presence (Short, Williams, & Christie, 1976; Kehrwald, 2008; Wei, Chen, & Kinshuk, 2012). While definitions of social presence vary extensively, common elements include the immediacy and personal quality of interactions, the trust and confidence built up by facilitators, and the quality of communications (Agosto, Copeland, & Zach, 2013; Tu & McIsaac, 2002). Whereas high social presence is relatively easy to attain in face-to-face settings, it is challenging online (Dennen, 2014; Phillip & Cain, 2015). While there are many techniques to reduce the impersonal feel of online teaching formats, they must be used extensively and consistently to ensure instructor-student and/or student-student social presence is roughly equivalent to a standard classroom.

A fifth consideration involves student readiness (Sieber, 2005). Instructors must be prepared for the online learning experience, but so, too, must students. Many, especially older, students have concerns about the online learning environment because they have not experienced it, or their initial experiences were poor (Artino, 2010; Rooij & Zirkle, 2016). Additionally, without the perception of a structured lecture schedule (even though weekly activities may actually be as structured), inexperienced students may be lured into unrealistic notions of what they can accomplish or will do in virtual contexts (Asarta & Schmidt, 2017; Rooij & Zirkle, 2016).

Given these opportunities and challenges for online education in higher education settings, we next move to specific findings related to major areas of concern: institutional support, faculty motivation, online teaching standards, student readiness, and quality online delivery. A discussion of the major ways in which online education is evaluated—learning achievement, student perceptions, faculty perceptions, and institutional results—is reviewed, along with generalized research findings where they exist. The article concludes with a discussion of a comprehensive model of online learning that integrates the antecedent knowledge required to make good decisions, the five domains affecting instructional quality, and the four perspectives by which quality and results may be judged.

4.1. Institutional Support

A critical pillar of online learning quality is strong institutional support. Institutional support is based on ample resources, but also on the involvement and vision of institutional leaders.

Technical reliability of the learning management system (LMS) stems partially from the LMS provider such as Moodle, Canvas, Pearson, and Blackboard, and from the campus interface and support of the system. Both faculty and students expect high reliability, and any lapses are long remembered and foster long-lasting tech fears (Roby et al., 2013). Because online management systems are continually upgraded, browsers have constantly emerging issues, and the technical capabilities of recipient organizations are subject to frequent surges and occasional outages, reliability takes considerable institutional resources to manage. 24-hour technical specialists must be able to fix problems within minutes or hours, rather than days.

Technical assistance is direct and indirect support of both faculty and student users by technology experts and instructional designers. Direct support includes faculty access to experts for troubleshooting and a help desk with significant online teaching expertise for both students and

faculty (Seok, Kinsell, DaCosta, & Tung, 2010). Indirect support includes self-help videos, proactive communications about online management system issues, and frequent contact with the LMS provider to fix glitches (Lancellotti, Thomas, & Kohli, 2016). Good technical assistance is assumed and hardly noticed, but is highly exasperating when lacking (Lee, 2010). Dire is the institutional provision of *training on online teaching* (Meyer & Murrell, 2014; Moore-Adams, Jones, and Cohen, 2016). Most university faculty have limited training in teaching methodologies except as auxiliary activity in their doctoral studies, largely learning by what they perceive as successful practices of their own instructors rather than through a conscious plan of teaching skills development (Baran & Correia, 2014). This works well in face-to-face settings, but less well in online settings (Burke & Fedorek, 2017; Phillip & Cain, 2015). First, faculty may have not had extensive experience with online learning, or it may have been with old technologies or of poor quality (Porter & Graham, 2015). Second, since online teaching uses the "flipped classroom" more than face-to- face settings, it may require more less-obvious skills (Burke & Fedorek, 2017; Lancellotti, Thomas, & Kohli, 2016). Although training university faculty is key to producing consistent quality in online programs (Young & Duncan, 2014), it has many challenges. Faculty need training at different points in their careers and want to work on online courses at different times of the day or year. Getting a critical mass of faculty for training programs can be difficult unless training is mandated or incentivized. One-on-one training is efficient, but is resource-intensive in terms of personnel, and rarely is administered as comprehensively as in group training. Department-wide initiatives have higher success rates (Owens et al., 2018) which may reflect disciplinary differences (Arbaugh, 2013), and empowerment strategies are important for faculty creativity and motivation (Baran, Correia, & Thompson, 2011; Swan et al., 2014). Nonetheless, Brinkely-Etzkorn (2018) warns faculty development training may affect faculty perceptions and confidence more than student perceptions, and integrating pedagogy with technology is difficult.

Appropriate class size is viewed differently by all. Faculty want smaller classes, rarely exceeding 30 students, students are more sanguine about classes approaching fifty (Roby et al., 2013), and administrators are always eager for size maximization. Indeed, there are many successful examples of large, online classes. Because faculty consider online teaching as much or greater a workload than face-to-face classes, however, they tend to be highly sensitive to large numbers (Bolliger & Wasilik, 2009; Tomei, 2006; Windes & Lesht, 2014).

An indirect element of institutional support is *institutional leadership*. An obvious aspect of institutional leadership is making sure the extensive resources necessary are available as online programs are built and developed (Dhanarajan, 2001; Young & Duncan, 2014). Prinslow (2016, 139) makes note, however, of the frequent "low level of resources invested in distance education provisions." A second element is to ensure there are departmental or university conversations about quality, shared resources, collaborative teaching projects, and opportunities for excellence. Many administrators do not understand online education well, and many struggle to provide the technical and visionary support a growing educational system demands.

4.2. Faculty Motivation

Motivation to embrace online education includes increased flexibility for faculty and students, heightened student accessibility, and an expanded array of teaching tools, among others. However, these positive factors can be overwhelmed by negative aspects discussed earlier, so enhancing extrinsic faculty motivation to excel at online teaching is important (Lin & Ha, 2009). A compelling vision, incentives, recognition, and an appreciation of the challenges of teaching online are discussed here. Faculty are no different from others in organizations in that they want

to know that change is worthwhile and well planned. Therefore, a *compelling rationale for moving to an online mode as well as a compelling plan for doing so* are necessary (Roby et al., 2013). Reasons typically provided to faculty include those discussed above related to online education opportunities: reducing distance challenges of students and faculty, increasing convenience and flexibility, integrating digital skills in the curriculum, and the possibility of using additional teaching tools to enhance teaching. Just as important is making sure the actual plan addresses faculty concerns, discussed below.

Change initiatives tend to be more successful when accompanied by incentives to compensate for hard work, uncertainty, and inconvenience. No matter how modest, *incentives* frequently are perceived as indicating a shared rather than imposed challenge for both faculty and administration. Recognition of the instructor's importance in the process and appreciation of their work in creation, experimentation, and redesign can be a simple, non-remuneration strategy. Because online teaching takes more up-front design time than standard face-to-face classes, reassign times are commonly awarded for initial design and redesign of courses. In lieu of, or in addition to, reassign times are auxiliary faculty stipends for the extra time and energy devoted to redesigning courses (Roby et al., 2013; Horvitz et al., 2015).

Beyond recognition, it is helpful if faculty are acknowledged for the challenges online teaching presents. Faculty sensitive to the quality of their student evaluations (i.e., instructors and junior faculty) can be at a disadvantage in comparison to face-to-face classes, where stronger social presence influences student perceptions (Windes & Lesht, 2014). Additionally, the stronger sense of self-teaching in the flipped classroom approach tends to depress "instructor contribution to learning" no matter how active an online instructor is (Lancellotti, Thomas, & Kohli, 2016; Maycock, 2018). Online courses are not at a sole student evaluation disadvantage *on average*: small classes tend to get better evaluations than larger ones, required classes score lower than electives, and rigorous classes are evaluated lower than easier courses with few or no poor grades. When evaluating student perceptions of teaching, faculty committees in the teaching and promotion process should account for the modest advantages or disadvantages when making judgments to avoid a substantial disincentive for some faculty to only teach certain types of courses, including online courses (for a range of views see Cohen, 1981; Marsh, 2007; and Uttl, White, & Gonzalez, 2017). For example, a large, required, rigorous online class will invariably have evaluations inferior to a small face-to-face elective in which nearly every student does very well.

Finally, strategies have to be carefully organized to suit the discipline and material. If faculty concerns about student violations of performance standards are not acknowledged by administration (such as possibly requiring an onsite testing component), faculty may be averse to teaching online. Similarly, in order for faculty to be more confident of academic honor codes being followed, training to reduce the possibility of cheating in the first place must occur (Wilkinson, 2009).

4.3. Guidelines for Course Quality and Administrative Support

Across all learning contexts, a similar set of learning principles have been identified in meta-analyses of the literature and practice (Chickering & Gameson, 1987; Van Wart, Cayer, & Cook, 1993; Graham et al., 2001; Ambrose et al., 2010). The emphasis on some principles and de-emphasis on others can be significant in different contexts such as with adults (Knowles, 1980). Comparing face-to-face and online teaching contexts, the content and purposes of particular courses are generally expected to be identical and learning principles to be roughly equivalent, but

the specific methods are understood to vary significantly in type (e.g., face-to-face versus videoconference) and design (e.g., long lecture followed by self-rehearsal, versus shorter lectures followed by rehearsal and instructor feedback). In sum, while the learning principles discussed below should be of equivalent importance in whatever modalities, the means by which they are achieved are adjusted by the teaching tools available, instructor competence in using those tools, and appropriate instructional designs.

4.3.1. Guidelines incorporating learning principles.

Knowing and practicing learning principles is one thing, but monitoring and assuring them is another, which is the role of guidelines—voluntary or mandated. Detailed guidelines for online instruction are built on principles and include Quality Matters (2018), the Community of Inquiry (n.d.), and the National Standards for Quality Online Teaching (NSQOT; 2011), among others.

Student goal setting. Setting goals focuses and enhances motivation (Young, 2006). First are the goals that bring students into the learning environment. Second are goals employed within the course itself, often called learning objectives. Without agreement on student and instructional goals, learning is likely to be mechanical and superficial. Student goal setting can be enhanced by instructors' taking the time to investigate individual learner's experiences and motivations, and then building the learning structure and assignments (e.g., projects or papers) around those experiences and particular needs (Jaggars & Xu, 2016).

Similarity of material to future work or other concrete skill needs. This principle is emphasized in training environments and educational programs focused on professional and skill development. Three progressive devices for incorporating similarity into educational course work are examples, models, and simulations. Examples help students understand select aspects of what is taught and can include everything from visual artifacts to verbal stories (Young, 2006). Case studies are a type of sophisticated example allowing students to become involved in figuring out solutions. A model is a visual or graphic technique that shows the learner a process. In modeling, students get to see a process in action or context through a demonstration, video, etc. (Lancellotti, Thomas, & Kohli, 2016). In simulations, students do more than observe correct behavior; they perform it through role-plays or machine guided experiences.

Underlying principles. The teaching of underlying principles is one of the oldest educational principles. It emphasizes the learner's need to understand broader applicability of concepts. Although teaching a specific application for a specific job is immediately useful, it does not equip the learner with a fundamental understanding to solve problems that arise or to adapt to new, related methodologies in the future. Principle-based learning lasts longer in terms of relevance, but has less specific short term utility. Technical-based learning is more direct, but may not be useful if the technique or context changes.

Organization of the material. Increasing the organization of the material seems a simple concept, but is surprisingly difficult to apply, especially in online contexts where elaborate course structures must be pre-planned (McGowan & Graham, 2009; Chang & Kang, 2016). What is apparent to the instructor is rarely as clear to the student. Because clear organizational structure enhances understanding and recall, it is important to make sure that material is outlined for learners (Young, 2006), is occasionally referenced during the learning, and is rehearsed repeatedly by students (Shaa, Li, & Pickett, 2006). There are innumerable ways to increase the organization of the material being taught. When readings are assigned to learners, questions designed to focus the reading beforehand are useful, clear definitions and labels are critical, figures and graphs help to visualize the concepts, and reviewing what has been taught tends to embed learning.

Variety of stimuli and techniques. This principle engages learners' senses more fully, leading to more deeply embedded learning. When different sensory and cognitive channels are used in the learning process, learners have a greater opportunity to encode knowledge. For example, Mayer (2017) identified six techniques that substantially increase learning because of better use of multimedia variety, three that aid in processing multimedia better, and three that aid in sense-making. Because everyone has a somewhat different learning style in terms of favoring aural, visual, textual, and tactile inputs, using different sensory channels ensures all learning styles are being supported (Johnson & Cooke, 2016; Draus, Curran, & Trempus, 2014).

Actively involving the learner. A principle critical to most high-quality learning is actively involving the learner through a variety of techniques. Freeman et al. note that "students learn better if they are active, but most prefer being passive" (2007, 133). At the simplest level, even teaching strategies that encourage note-taking significantly increase learning (Maycock, 2018). For learning to be optimally effective, it must be anchored to old experiences, or new experiences must be created on which it can be anchored. Asking questions and engaging students in dialogue, doing exercises and practice exercises, and conducting role plays and simulations (where it overlaps with enhancing similarity of the material) are examples of active learner involvement. McGowan and Graham (2009) found this principle to be rated by faculty as the single most important in improving online teaching.

Giving feedback. This principle supplies learners with knowledge about the results of practice (Jaggars & Xu, 2016). Practice in this case includes exercises, tests, discussions, papers, simulations, and apprenticeships. Feedback on practice can take many forms. It can be verbal praise or suggestions for improvement. It can include test scores, written comments, or verbal reports. It can be subtle and occasional, or quantitative and blunt. Feedback is very important because it enables learners to extinguish errors while enhancing processing speed.

4.3.2. Standards related to administrative and institutional policies

Another approach to enhance teaching quality is by monitoring and requiring training, facilitated experience, or other proof of faculty competence. Because an institution provides training, and possibly incentivizes online teaching or even the training itself, does not mean faculty will necessarily avail themselves of it (Horvitz, Beach, Anderson, & Xia, 2015). A comprehensive study reported that "few universities have written policies, guidelines, or technical support for faculty members or students" (Tallent-Runnels et al., 2006), and while there is evidence that technical support has improved somewhat, at least on an ad hoc basis (Bates et al., 2017; Seaman, Allen, and Seaman, 2018), there is little evidence that policies and guidelines have improved (see, for example, Chow & Croxton, 2017).

Other administrative requirements for online courses can include student support, data security, and the accuracy of academic promises made by educational institutions. Student support refers to the technical assistance provided to students when they have problems logging into systems, when the learning management system works improperly, or when students have inadequate hardware or bandwidth to interact smoothly in the online system (Lee, 2010). Data security and student privacy is normally covered by institutional policies and legal compliance, but is covered in quality guidelines as well. The accuracy of academic promises related to online programs tends to be monitored primarily by accrediting or governing bodies.

4.4. Student Readiness

As suggested by higher attrition rates, students may or may not be fully ready to perform well in online environments, and weaker students (those with less experience, coming from disadvantaged backgrounds, or needing more external structure) tend to fare even worse in online classes without institutional and instructor interventions (Asarta & Schmidt, 2017; Xu & Jaggars, 2014). In examining the success of science and math students, Hachey, Wladis, and Conway (2015) showed grade point averages and prior online outcomes were predictors of future online course outcomes, but used in combination, at risk students were best identified by using both factors because regardless of grade point average, some students did better in online classes. A study by Shen et al. (2013) indicates student self-efficacy is multidimensional. Gender, number of online courses, and academic status were found to be predictors of self-efficacy. Furthermore, self-efficacy is a predictor of learning satisfaction, and both are predictors in future online enrollments (Artino, 2010; Kuo, Walker, Schroder, & Belland, 2013). Lim (2016, 317) suggests that institutions "offering self-paced courses should implement strategies to teach students self-regulating behaviors."

This raises the issue of screening and training students for online readiness. As indicated, students can be assessed for readiness by looking at their self-efficacy profile or various types of past performance. These indicators are very useful in the advising process. However, another approach is to train students about the technology used and learning environment created in online programs (Rooij & Zirkle, 2016). Such training often exists at the institutional level with self-help videos provided by a teaching resource center, but it is unclear how much, if any, real effect such videos have. More common is to build student readiness information and training into online courses themselves (Rooij & Zirkle, 2016). Syllabi can provide technical requirements, clear and detailed learning expectations, and learning tips (Rooij & Zirkle, 2016). Welcome-and-start-here videos can explain the basic technology and format of an online course (Lancellotti, Thomas, & Kohli, 2016). Learning management systems provide copious student evaluation data, allowing faculty to easily monitor student progress in reviewing material and performing activities. Faculty can easily send out individual, group, and class notices related to nonperformance, assistance, feedback, and reminders—either automatically or manually (Oncu & Cakir, 2011). Quality guidelines generally stress the importance of such practices in impactful teaching.

4.5. Course Delivery

Even with institutional support, faculty motivation, online teaching standards, and student readiness, courses will vary considerably in quality during delivery based on the quality of implementation and the social presence created. Training, incentives, and standards enhance the likelihood of, but do not guarantee, good course delivery. Course delivery is much affected by factors such as overall instructor competence (in any mode), time spent in preparation of the online class, and the actual time and energy put into the delivery of each course, etc. (Baran & Correia, 2014).

A particularly important aspect of course delivery is the amount of social presence created by the instructor (Shaa, Li, & Pickett, 2006; Marks, Sibley, & Arbaugh, 2005). It is important to note that online students are significantly more anxious than their face-to-face peers, so interaction, trust, and sense of community are critical for student satisfaction and comfort (Marchland & Guitierrez, 2012). Practices that may influence social presence positively include rapid response to questions or issues, increasing communication frequency and quality, providing instructor background videos rather than dry curriculum vitae or summary biographies (Martin, Wang, & Sadaf, 2018), encouraging introductions in class or small group sessions, providing

videoconference office hours, ensuring technology glitches are addressed rapidly, posting grades quickly, providing customized feedback on assignments, using audio, video, and text responses, creating and carefully monitoring small groups to ensure quality discussions rather than superficial chat sessions, providing at least one "social" forum on a class discussion board, and providing alternate face-to-face venues on an optional basis as appropriate.

5. Types of Evaluation and Results

Evaluation and results fall into four categories: concrete learning achievement, student perceptions, faculty perceptions, and institutional outcomes.

Evaluation of learning achievement asks: how does mastery of the material vary according to the learning mode? That is, do online students learn less, as much as, or more than their face-to-face counterparts, all things being equal? Learning achievement is measured by comparable test scores, comparable grades, or some other comparable measure that is a concrete performance measure.

Evaluation of student perceptions asks: how do student perceive/feel about the online educational experience? Do they perceive that in their online classes they learn less, the same as, or more than face-to-face classes? How satisfied are students with the overall online learning experience? To what degree are students satisfied with faculty contributions to learning in online courses, and how does that affect student evaluations of faculty? How important is the convenience and flexibility offered in the online context, especially when compared to other perceptual factors?

Evaluation of faculty perceptions asks: how do faculty perceive/feel about the online teaching experience? Do they perceive that in online classes their students learn less, the same as, or more than face-to-face classes? How satisfied are faculty with the overall online teaching experience and issues such as workload, changed roles (e.g., instructor-focused to student-focused), student evaluations, etc.? How important is the convenience and flexibility offered in the online teaching context?

Evaluation of institutional results asks: how well does the institution accommodate and support online education? What are the greatest factors contributing to enrollment – such as student perceptions of convenience and online quality – as well as the factors limiting it – such as course availability and perceptions of online support for difficult topics? How do accrediting bodies examine and judge the quality of online teaching programs? What are the retention rates of students in online courses compared to face-to-face classes, and if they are lower, what steps can be taken?

6. Overarching Findings from the Literature
6.1. Learning achievement

In terms of learning achievement, there is "no significant difference" between face-to-face and fully online, but only when all things are essentially equal. As Table 2 indicates, a majority of meta-analyses indicate that online learning achievement does not provide demonstrable differences between face-to-face and online courses, or the difference is significant but small. Some studies found increased effectiveness for classroom-based instruction for complex, technical skill enhancement, but equivalence in teaching most skills (e.g., Dolan, Hancock, and Wareing, 2015). The no-significant-difference finding is normally based on the same tests being administered or on overall course grades. However, there are studies that indicate face-to-face learning achievement was higher than online, and vice versa. A significant, but not sole, reason for this stems from the fact that all things are not equal. It is likely many of the studies that

indicated inferior learning in learning achievement are picking up on the fact that teaching facilitation, institutional support, etc., was indeed inferior. It is equally likely the smaller number of studies indicating online teaching produces superior results is actually because of enhanced online teaching and the Hawthorne effect (i.e., awareness of the observed being observed).

Table 2: Meta-analyses Related to Learning Achievement and Student Satisfaction: Various Comparisons of Traditional (Face-to-face), Technology-assisted, Blended (Hybrid), and Fully Online Classes

Study Authors	Year	Findings
Lockee, Burton, and Lawrence	1999	No significant difference found overall in learning achievement between traditional and distance education but likely bias in research designs.
Allen, Bourhis, Burrell, and Mabry	2002	In terms of satisfaction, indicates a slight student preference (.031 effect size). However, when auxiliary factors are considered (e.g., interactivity), there is no significant difference in satisfaction.
Hsu	2003	Computer-aided instruction (CAI) provides a small to medium improvement over traditional instruction (0.43 effect size). Teacher-made CAI were significantly more effective. Drill-and-practice programs were most effective among techniques studied.
Bernard, et al.	2004	Overall, distance education and classroom instruction are relatively equal. However, classroom instruction is slightly stronger in synchronous settings, while distance education is slightly stronger in asynchronous settings. Based on an analysis of 688 studies.
Zhao, Lei, Yan, Lai, and Tan	2005	Aggregate data show no significant difference but emphasizes the differences across studies.
Sitzmann, Kraiger, Stewart, and Wisher	2006	Web-based instruction was 6 to 19% more effective than classroom instruction for declarative knowledge, equal in procedural knowledge, and satisfaction was equal.
Schenker	2007	The use of technology in the teaching of statistics resulted in modest learning achievement improvements (0.239 effect size). The effect size was larger for graduate students than undergraduates. However, online instruction was no more effective than traditional instruction.
Jaggars and Thomas	2010	Study points out that previous meta-analyses tend to use results based on students who complete fully online courses. However, it points out that online students are less likely to complete their courses. This is particularly problematic with low-income and academically underprepared students. Argues that such students need extra support.
Macon	2011	Undergraduate satisfaction higher with traditional statistics courses, but not so with graduate students.

Sosa, Berger, Saw, and Mary	2011	In teaching statistics, computer-assisted instruction provided a meaningful advantage. The effect was greater with graduate students.
McCutcheon, Lohan, Traynor, and Martin	2015	Evidence suggests online learning in nursing education for teaching clinical skills is no less effective than traditional means.
Nguyen	2015	In studying meta-analyses, argues that the over-all effectiveness of online learning is well established, and recommends researchers focus on factors impacting effectiveness of online learning.
Liu, Peng, Zhang, Hu, Li, and Yan	2016	Blended learning superior to nonblended learning in health professions.
River, Currie, Crawford, Betihavas, and Randall	2016	There is only limited evidence that blended learning strategies, coupled with team-based learning, improved student outcomes or student preference in nursing education.
Sinclair, Kable, Levett-Jones, and Booth	2016	In health care professional behavior, e-learning was at least as effective as traditional learning approaches.
Peng and Yang	2017	Internet-based training in public health training was modestly more effective than face-to-face.
Voutilainen, Saaranen, and Sormunen	2017	In nursing education, an e-learning method resulted in a five point advantage over a conventional method.
Wandera	2017	Fully online and blended instruction were found to be more effect (effect size: 0.397).
Sharifi, AbuSaeedi, Jafarigohar, and Zandi	2018	Web-based computer, computer-assisted English language learning is moderately more effective than traditional instruction without it (0.50 effect size).

However, there is also evidence that hybrid models of instruction tend to be considered slightly superior in terms of both learning achievement and student satisfaction, but they have challenges as well (Halverson et al., 2014; Arbaugh, 2014; Price, Arthur, & Pauli, 2016;). It should be noted that: (1) the superiority or effect size is generally not large, and (2) there are studies that do not support this finding, or have contradictory findings. See Table 2 for an overview.

6.2. Student perceptions
Students tend to like online classes for flexibility when they have a clear structure, for the ability to manage one's own learning, and for opportunities to apply and exercise one's knowledge (Wyatt, 2005; Paechter & Maier, 2010). In terms of various student measures of overall satisfaction and experience, instructor contribution to learning, etc., students often rate online instruction and online instructors lower (see Table 2 for some meta-analyses in this area). Students' sense of classroom social presence is less than what faculty perceive and thus the experiential element is perceived as inferior. Having students move to activities faster, while reducing the aural/visual component, makes them feel they are teaching themselves more, even if they get more individualized feedback during rehearsal in the online mode (Oncu & Cakir, 2011). Organization is much more challenging in an online environment, but highly important to students, so they are

very critical of what they perceive as any confusion or unclear structuring (Jung, 2011; Wilkenson, 2009). Overall, to get the same level of student evaluations one gets in face-to-face classes, online instructors must be teaching more conscientiously (Martin, Wang, & Sadaf, 2018) and interacting as frequently as possible (Jaggars & Xu, 2016).

6.3. Faculty perceptions

Faculty who teach online can often feel positive about it (Bollinger, Inan, & Wasilik, 2014; Orr, Williams, & Pennington, 2009; Windes & Lesht, 2014) and feel they can learn how to effectively adapt to it (McGowan & Graham, 2009). However, faculty with negative initial experiences tend to resist further online teaching, making support and training critical so that they "do not give up on teaching online before they gain this self-efficacy" (Horvitz et al. 2015, 314). Furthermore, faculty in general are more critical of online teaching than face-to-face for some similar and some different reasons than students (Mansbach & Austin, 2018; Orr, Williams, & Pennington, 2009). Like students, faculty feel lesser social presence, as they sometimes feel moved from the role of professor (e.g., sage-on-a-stage) to that of learning facilitator. Like students, they often miss the richness of face-to-face student presence and reactions. In addition, they also feel students are more passive, expect more, and the workload (Orr, William, & Pennington, 2009) is higher (Freeman, 2007; Bollinger & Wasilik, 2009; Bollinger, Inan, & Wasilik, 2014), but the appreciation they experience is less. They also frequently feel the organizational and logistical challenges are substantial, and they neither want to make the changes, nor is there sufficient support to do so (Baran & Correia, 2014). Junior faculty sometimes fear the consequences of online teaching evaluations for promotion and tenure (Bangert, 2008). Finally, many faculty members are unconvinced the learning achievement is equivalent.

6.4. Institutional results

While online class enrollments continue to climb (Bates et al., 2017; Seaman, Allen, & Seaman, 2018), retention rates continue to be lower (Ni, 2013), institutional expectations tend to be exaggerated, and the resources required tend to be greater than anticipated (Bawa, 2016). Overall enrollments in online education are increasing around the world, although at different rates (Boling, Hough, Krinsky, Saleem, & Stevens, 2012). One factor propelling enrollment is the strong drive by students for convenience and flexibility as they try to integrate educational goals in intensive schedules (Naylor, Wilson-Gentry, & Wooldridge, 2016). As students get more online opportunities, become more comfortable with online formats (Hernandez-Lara & Serradell-Lopez, 2018), and perceive the overall quality increasing because of training and technology improvements, they are taking more and more advantage of online modalities. Some faculty have been more inclined to provide increased hybrid and online opportunities because of interest in meeting student preferences (Young, 2002), following enrollment trends, or simply peer and administrative expectations. Nonetheless, student readiness, loose enrollment models, and weak instructor awareness of best practices seems to continue to provide a small but significant performance gap between face-to-face retention and online retention (Brown et al., 2009).

7. A Comprehensive Model of Factors Related to Online Teaching Effectiveness

The literature identifies five overall factors affecting the quality and success of online instruction. Three elements are related to the institutional support, faculty motivation, and guidelines for online instruction. A fourth factor is related to student readiness, and a fifth factor is the quality of delivery, including the social presence created in online courses. When institutions

and faculty are aware of online and hybrid best practices which function as antecedent conditions, they are more likely to design and deliver systems and courses to meet high-quality objectives. The evaluation and results related to online teaching and learning are multifaceted depending on the emphasis or balance that is to be achieved. Results can be divided among concrete learning achievement, students' perceptions, faculty perceptions, and institutional results. Figure 1 below identifies the general causal model.

Figure 1:   Five Overlapping Elements Affecting the Quality and Success of Online Instruction
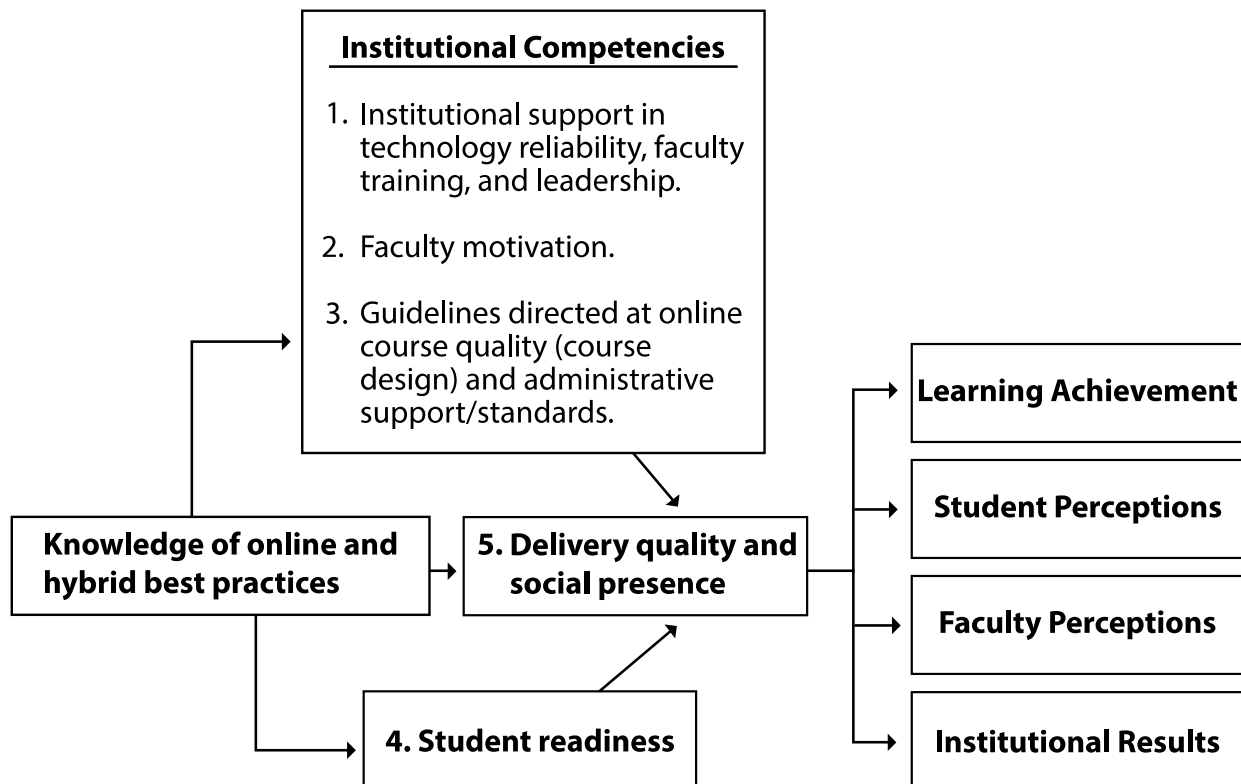
8. Conclusion

Fifty years ago, education was largely a choice between traditional classroom-based or low-quality correspondence courses. While correspondence courses served their limited purposes, the challenges were great and so the utilization was low. Today, we are in a world in which there are four viable options depending on circumstances, preferences, and the technology skills of those involved. While traditional courses still dominate the global higher education environment, every year there is steady advancement of the newer three modes. Technology in the form of bandwidth, much improved LMS systems, and lowered expense continues to evolve and improve, inexorably affecting circumstances. The presence of digital communication and functionality has changed how we live and interact nearly every hour of our waking day, thus affecting our expectations and preferences related to digital options, including in education.

This article has taken a contemporary look at the opportunities and challenges of online teaching in the higher education setting. While the inherent strengths and weaknesses at specific points in time have been reviewed, the major focus has been how to optimize utilization of online education. The discussion reviewed the field of knowledge about what best practices work, what constitutes institutional competencies, what constitutes student readiness of online education, and what constitutes the practices that affect quality social presence and quality delivery. Institutions, departments, and instructors cannot expect to provide top quality education without paying attention to the many critical differences that exist between traditional and nontraditional modes of education. This article has two purposes. First, it provides an up-to-date and integrated review of the current literature which has been expanding in depth and quality. Second, it provides a simple heuristic model of what are often confusing concepts. Given the maturation of the literature and practice, what we don't know may be less important than the challenge of living up to the great deal we do know.

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