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A Summary of Scholarly Research on the Efficacy of Distance Learning (DL) Relative to Traditional Classroom Learning

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**NAVAL
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MONTEREY, CALIFORNIA

**A SUMMARY OF SCHOLARLY RESEARCH ON THE EFFICACY
OF DISTANCE LEARNING (DL) RELATIVE TO TRADITIONAL
CLASSROOM LEARNING**

by

Peter D. Bertelsen, Lecturer

June 2020

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ABSTRACT

The efficacy of distance learning (DL) relative to traditional classroom learning has been studied extensively, and there has been considerable debate over whether the type of educational delivery format influences learning outcomes and whether the different types of DL should even be examined comparatively. A significant amount of academic research has assessed the relative quality of different types of DL in higher education with varying results. A review of a selection of meta-analyses of prior research and individual comparative studies indicates that the results are mixed: many applications of DL outperform their classroom counterparts, and many perform more poorly. Studies comparing the effectiveness of two versions of the same course, one DL and one face-to-face, with no other variability, have found no significant differences. Other studies have found that mixed-method or blended learning formats may result in better learning outcomes than DL or face-to-face instruction alone. And there are many best practices in DL and blended learning formats relevant to the DRMI teaching model.

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INTRODUCTION

Distance learning (DL) and online learning are understood to refer to learning which occurs at a distance from the locus of instruction, requiring the use of technological tools.

Traditional classroom learning (which is learner centric) and traditional classroom instruction (which is teacher or instructor centric) refer to the face-to-face learning and instruction which commonly include lectures, case studies, and peer discussion conducted in-person in a traditional classroom setting. **Blended learning** refers to a mixed method education in which participants learn through varying combinations of DL interactions and traditional face-to-face or in-classroom interactions.

Different technology applications are used to support **different models of DL**.

Asynchronous communication tools such as e-mail and threaded discussion boards allow learners to contribute at their convenience. Synchronous technologies such as webcasting, desktop audio/video technology, and chat rooms are used to approximate face-to-face teaching strategies such as delivering lectures and holding discussions with groups of students or one-on-one. Earlier DL programs tended to implement one model or the other. More recent applications tend to combine multiple forms of synchronous and asynchronous online interactions, and some with occasional face-to-face interactions as blended learning.

This report is based on a review of **22 scholarly research papers and empirical studies** comparing the effectiveness of traditional classroom learning, distance learning, and

blended learning that were published between 1994 and 2019. Some of these studies were meta-analyses of existing research and literature reviews dating to the 1990s, both quantitative and qualitative, while others were comparative experiments of a single course offered in different delivery formats. Some studies focused on specific courses in a particular discipline while others examined multiple courses in a wide range of disciplines. The education level analyzed was **generally undergraduate or postgraduate**, although a few of the meta-analytic studies did include **professional development courses**. The academic discipline or fields of study ranged from undergraduate-level statistics, finance and accounting to graduate-level business and management, ethics and medical courses.

Measuring the effectiveness of DL relative to traditional classroom learning is most often based on students' average final course grade, average exam scores, average assignment grades, quality of course projects, average participation grades, and students' perceived content knowledge. Many studies also measure other outcome dimensions such as student satisfaction with a course or with the educational process, student attitudes or preferences, and retention rates.

There is **quite a range within the broad category of DL**, which encompasses earlier technologies such as correspondence courses via videodiscs, educational television, and videoconferencing. Early studies of DL concluded that these technologies were not significantly different from regular classroom learning in terms of effectiveness. Some studies examined variations in online practices, such as different versions of DL or

blended learning with and without immediate feedback to the learner (synchronous or asynchronous). Later studies included computer-based and internet-based courses. Some studies contrasted purely online learning conditions with classes that combined online and face-to-face interactions. Others explored online learning with and without elements such as video, online quizzes, assigned student groups, or guidance for online activities.

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DISCUSSION

The question of **the relative efficacy of DL, blended learning, and traditional classroom learning is being revisited** in light of current online learning applications which take advantage of a wide range of internet resources, multimedia, internet-based applications, and new collaboration technologies. These forms of online learning are a far cry from the televised broadcasts and videoconferencing that characterized earlier generations of DL. And interest in hybrid or blended learning approaches is increasing.

Several studies in this review attempted to aggregate the findings of a **wide range of earlier studies** on the effectiveness of DL. These meta-analyses seem to predate more recent experimental work in the field. Many of the summary investigations have judged that the research does not conclusively show a systematic difference in learning outcomes between DL and traditional classroom courses. Interestingly, when courses with **hybrid or blended learning methods** were previously classified as DL, results were more likely to favor the DL format.

In more recent experimental studies comparing blends of DL and face-to-face learning with traditional face-to-face courses, **blended learning has been more effective**. A meta-analytic comparison of blended learning and traditional classroom learning courses (Sitzmann et al. 2006) found that blended learning courses were:

- 13% more effective for conveying declarative knowledge (knowledge that refers to memory of the facts and principles taught)

- 20% more effective for procedural knowledge (knowledge that refers to information about how to perform a task).

This suggests that learning complex processes and analytical decision making may benefit from being delivered in a blended learning format.

A meta-analysis and literature review of studies that compared DL to classroom learning and measured student outcomes found, on average, students in DL conditions performed better than those in classroom settings, and that blended learning has been even more effective. However, the studies in this meta-analysis did not demonstrate that DL is superior as a *medium*. In many of the studies showing an advantage for DL, the online and classroom conditions differed in terms of time spent, curriculum, and pedagogy. It was the **combination of elements that produced the observed learning advantages** (Means et al. 2009).

A meta-analytic study (Sitzmann et al. 2006) comparing traditional classroom instruction with DL found that classroom instruction was more effective than DL for teaching declarative knowledge, but when the same instructional methods were used, there was no difference in learning outcomes. This suggests that **instructional methods rather than delivery media may be a bigger determinant of learning outcomes**.

A meta-analysis of empirical literature (Allen et al. 2010) compared student satisfaction with a DL course to a traditional classroom instruction course and indicated just a slight student preference for the traditional classroom over the DL setting. The consensus that

emerges is that **learning outcomes appear to be the same for DL as in traditional courses**, but students with prior training or experience using DL technologies are more satisfied than others with DL courses.

Empirical studies comparing the effectiveness of two versions of the same course, one taught DL and one taught face-to-face, with no other variability, have found no significant differences in test scores, assignments, participation grades or final grades (Johnson et al. 2000). A study comparing student achievement and satisfaction in an undergraduate statistics course taught in an online section and in a traditional classroom section found no significant difference in grades between the two formats (Summers et al. 2005). However, students in the online course were significantly less satisfied with the course on several dimensions.

Another experiment comparing an online section and a face-to-face section in an undergraduate economics course found no significant difference in test scores (Coates et al. 2004). An experiment comparing students' exam performance in three different delivery formats (face-to-face, online, and blended) of an undergraduate microeconomics course found scores in the face-to-face section significantly better than the online section on the most complex material, while there was no difference at all in learning the most basic concepts between the three formats (Brown et a. 2002). An empirical study comparing learning outcome data obtained from students enrolled in one of two versions of a graduate level instructional design course for human resource development professionals found no significant difference in several measures of learning outcomes,

but students in the traditional classroom version held slightly more positive perceptions about the instructor and overall course quality (Johnson et al. 2000).

There are numerous **comparative studies of business and management education** in DL, blended learning, and classroom-based formats, but few studies have compared both DL and blended learning settings simultaneously. The few studies that have compared blended learning with purely DL delivery in management education generally have shown favorable results for the blended learning format. An empirical study of traditional classroom, DL, and blended learning in undergraduate finance and economic courses found overall that blended learning courses had the highest average grade point averages and the highest course satisfaction scores (Wiechowski and Washburn 2014).

An empirical study comparing two groups of MBA students in an introductory financial and managerial accounting course, one group in a traditional in-classroom section and the other in a blended learning section, found similar final learning outcomes (Chen and Jones 2007). The same instructor taught both sections and administered the course in the same way, except for the method of delivery. A survey was conducted of both sections to assess students' overall satisfaction of the course and perception of course effectiveness. Overall perceptions of the course, instructor, and learning outcomes were positive for both groups. However, some interesting differences were noted: students in the in-classroom section were more satisfied with the clarity of instruction while students in the blended learning section felt more strongly that they gained an appreciation of the concepts. Blended learning students also indicated more strongly that

their analytical skills improved as a result of the course. In addition, students in the blended learning section indicated on average that they did not generally find online course delivery itself to be as effective as the traditional classroom setting. The results suggest that the two delivery methods were similar in terms of final learning outcomes but that both may be improved by incorporating aspects of the other.

The literature on **blended learning in management education** seems to lack research on comparative blends and determining the **“optimal” combination of classroom-based and DL activities**, and when they should occur. There is wide variance in the amount of face-to-face vs. DL activities in the blended learning course studies included in this review. Some blended learning courses seem to use DL to supplement classroom interaction and others seem to use classroom interaction as a supplement to the DL.

Studies that directly compared purely DL and blended learning conditions found no significant differences in student learning, but also noted that although conditions were labeled as “blended” or “purely DL” on the basis of their inclusion or exclusion of face-to-face interactions, conditions differed greatly in terms of content and quality of instruction (Means et al. 2009). This suggests that these differences in the nature of the learning conditions very likely contributed to the variation in outcomes, and that the relative efficacy of blended learning and purely DL learning approaches depends on the instructional elements of the two conditions.

Age, educational level, and experience seems to matter. There appears to be some evidence that suggests age or educational level affects what type works best. DL delivery may be more amenable to graduate education because these learners generally have greater practice in self-regulation and in acquiring learning strategies, and therefore can adjust to online environments relatively quickly (Arbaugh 2014). DL students tend to be older than classroom students generally. One study found that the extent to which DL students outperformed classroom students increased as the age of DL students increased, and the age of classroom students decreased (Sitzmann et al 2006).

The research has shown that as learners and instructors become more experienced with DL technologies and accustomed to the DL environment, both satisfaction and learning outcomes increase. With prior experience, graduate-level learners can recognize approaches to teaching presence through virtual environments more readily than can relatively novice learners (Arbaugh 2006). And blended learning courses may accelerate the process by which novice learners become more comfortable with DL. Participants' previous experience and comfort with DL technologies seems to be one of the best predictors of learning outcomes in a DL or blended learning format.

Blended learning may be more effective. Blended learning incorporates the benefits of both personal interaction and facilitated instruction in a classroom with self-directed study between instructional meetings using online technologies. Blended learning courses have been shown to yield **stronger learning motivation and higher course performance** relative to purely DL and purely classroom-based courses. A meta-analytic

study of blended learning found that blended learning was more effective than stand-alone face-to-face instruction or purely DL (Sitzmann et al 2006). Research regarding the effectiveness of general blended learning courses has shown that this delivery format leads to a multitude of positive outcomes including:

- fostering learning communities
- offering timely feedback and mentoring
- increasing learner control
- increasing confidence in working with online teams
- higher skill development
- better overall course performance

A meta-analytic review of studies examining the effectiveness of three delivery formats (face-to-face, DL and blended) in ethics education found that process-based, analytical content may be better delivered face-to-face, and instructional content may be better delivered online. And overall, blended courses were found to be the most effective (Todd et al 2017). It has been suggested that blended learning courses may hold users more accountable for knowing online content, increasing user learning and overall course effectiveness. Introducing DL elements or exercises into classroom-based courses was positively associated with course outcomes in studies of management education and blended learning courses have fared well in studies comparing them with both purely classroom and purely DL courses.

Best practices relevant to the DRMI model. Based on this review, there are many best practices and suggestions for effective teaching in DL and blended learning formats that are relevant to the DRMI model.

1. Lecturers should not expect to import wholesale their face-to-face lectures and teaching approaches into the DL environment without considerable thought and planning. **How participants learn** when in a room together is different from how they learn in a DL environment. Lecturers should not attempt to use the same teaching approaches and learning activities in both environments.
2. Holding a **DL environment orientation** at the beginning of the course, with clear guidance about the technology resources, IT support, as well as limitations of the platform can help manage participant expectations and improve overall participant experience. Providing step-by-step guides to course resources and expectations and developing an interactive course roadmap or an interactive syllabus with links can also be useful to foster online interactions between participants and content (learner-content interaction).
3. Creating a **sense of social presence** and an online learning community early in the course can help overcome the inherent social and psychological distance in DL and blended learning environments. It can also hold the two learning environments together. The use of welcome introductions, personal profiles or bios, and addressing students in an informal manner are useful techniques for establishing a social climate. Make time for the opportunity to develop collaborative online learning communities. Create an atmosphere where

participants get to know at least two other classmates. Team assignments and discussion boards can be useful.

4. **Enhance instructor-participant interaction** (learner-tutor interaction). Holding virtual office hours, moderating participant discussion forums (participating in and guiding discussions), instant messaging, chat functions, texting, and even one-on-one e-mailing can improve the quality of interactions, making instructors more available for prompt feedback. Immediacy behaviors and timely feedback may be used to reduce social and psychological distance.
5. **Enhance participant-participant interaction** (peer interaction). Peer interaction, the communication between two or more participants in order to collaborate, reflect, or exchange knowledge with or without the presence of an instructor, has been identified as a **fundamental contributor to online learning** (Samuels-Peretz 2014). Asynchronous discussion boards and threaded discussion forums can provide participants opportunities for deeper thinking, extending time for reflection, to compose thoughts, reactions, and offering the opportunity for more thoughtful, composed contributions to discussion. Studies have concluded that online group discussion facilitates peer connections and collaboration and encourages critical reflection. They can motivate participants to exchange and disseminate their ideas throughout the online learning community. Participants should also be encouraged to use other collaborative tools to exchange thoughts and experiences, thus creating strong peer interactions. Participants can take on the role of facilitators by organizing discussion topics, inspiring others to brainstorm, and reflecting on real-life situations. Instructors can take on the role

- of students, posting ideas, sharing resources, and helping create a conducive atmosphere.
6. **Interactivity and the development of learning communities** are critical in DL and blended learning courses, but the learning activities and communication strategies are different. While face-to-face courses can rely on in-depth discussions and debates for a sustained period of time during a classroom session, DL courses sometimes have a more difficult time engaging learners in “deep” conversations. DL instructors have to find an alternate path to arrive at the same outcome. DL instructors should employ as many, if not more, hands-on, authentic instructional approaches that foster active learning while enabling students to master content, than face-to-face instructors.
 7. **Small participant groups** as subsets of the entire class have been shown to help create cohesiveness and trust among group members, as well as creating positive participant interaction experiences. Engaging in small discussion groups can have a positive impact on learning by allowing participants to deepen their understanding of online material. And the use of small groups that have continuity through a course has been shown to increase social presence and the sense of community.
 8. **Change how classroom time is used to better tailor opportunities for participant learning.** Activities that require more team cohesion or learner control could be conducted online, whereas activities that require skills in active listening, oral communication, and more extemporaneous thinking may be better served by a classroom setting.

9. **The idea of a “flipped classroom”** where activities such as practice exercises, group-based problem solving, and discussion sessions occur during classroom-based meetings, and video lectures and individual quizzes and practice exercises take place outside of class via an online platform is an interesting idea that may be worth considering as we are looking at courses with the first 2 weeks of DL followed by 2 or more weeks of in-classroom.
10. **Game-based learning activities and simulations** can enhance all forms of online interaction and can also contribute to the promotion of dynamic teamwork, reflection, and feedback in collaborative and engaging environments.

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CONCLUSION

Based on this review of selected scholarly research, the relative effectiveness of face-to-face instruction in general compared to DL instruction is unclear: overall learning outcomes may be similar or there may be no significant differences between the two delivery formats. Blended learning, which capitalizes on the strengths of both DL and face-to-face instruction, using face-to-face and DL formats to deliver appropriate content more effectively, may result in better outcomes than either DL or face-to-face instruction alone. There are best practices which should be helpful to the DRMI as it prepares to enter a DL and blended learning environment.

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