

The Best Pedagogical Practices in Graduate Online Learning: A Systematic Review

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Abstract

After considerable growth over the last two decades in e-learning, graduate programs show a steady increase in the availability of online courses, trending ahead of baccalaureate and doctoral programs. Education leaders agree that e-learning is essential to key stakeholders including higher education institutions and the students they serve, yet there is limited research demonstrating what best practices graduate-level online programs should adopt. The aim of this narrative systematic review was to investigate the best pedagogical practices in graduate online learning. Multiple databases were used in the search with a date range from 1995-2017, corresponding with the period of substantial growth in this industry. After reviewing title abstracts, of 132 studies, forty-two were included and analyzed. After conducting our systematic review, we found the best pedagogical practices associated with achieving the most significant educational outcomes for online graduate students include positive academic attitude towards online education, and timely, consistent teacher-student communication.

Keywords

Graduate Programs, E-Learning, Teaching Methods, Graduate Education, Online Learning

1. Introduction

After considerable growth over the last two decades in online learning, graduate programs show a steady increase in the number of available online course offerings. Graduate students are attracted to online programs for many reasons. According to Allen and Seaman (2008), lower total costs, including commuting and relocation, are invaluable for many students. Because many course materials are often available online for free, the need for textbooks and their associated costs

are both lessened. Additionally, non-monetary burdens such as traffic and limited available time are all pearls of e-learning that may make traditional classroom settings pale in comparison.

As technology advances, so does the design, content and delivery of online education. Approximately 66% of universities' chief academic leaders agree that online learning is essential to the universities' long-term strategies (Allen & Seaman, 2014). However, there is limited research delving into what the best pedagogical practices should be for adoption by graduate-level online programs. Brick and mortar institutions worldwide offering conventional face-to-face instruction have long outlined their best teaching practices in graduate education. These best pedagogical and learning practices include providing resources for smooth functioning and optimal interactions between students and faculty; encouragement for faculty and students to form scholarly communities; diversity of race, gender and social class; fostering students to publish papers; intellectual forums for exchange of ideas; and adequate mentoring by practitioners in the field. Many of these practices are employed in universities' online programs, however, the unique facets of online education suggest that there should be other best practices that are more specific to e-learning settings. Yet, the evolution of best practices for the digital mode of delivery appears to be lagging behind. With the increased prevalence of graduate-level online programs, the use of the related best pedagogical practices and guidelines will inevitably aid educational institutions, as well as faculty and students within them. The identification, evaluation and adoption of e-learning best practices are of strategic importance to educators. As a result of this and the dearth of published work in this area, we sought to conduct a systematic review related to best pedagogical practices in graduate-level online learning. The overall aim of this review was to answer the following question: What are the best pedagogical practices in graduate-level online learning? The primary objectives were to:

- Prepare an answerable Population, Intervention, Comparison, Outcome, Time (PICOT¹) question and a well-formulated SR protocol,
- Examine and determine pedagogical practices that are most effective in promulgating timely degree completion for online graduate students, and
- Organize, evaluate, analyze, and synthesize the data for manuscript submission to a peer-reviewed journal for publication.

The PICOT question for this systematic review was “In graduate level online learning, which pedagogical practices are associated with achieving the best educational outcomes for graduate level online students?” Within the PICOT framework, the population is defined as graduate-level online students, the intervention is defined as pedagogical practices in online learning and the outcome is defined as best educational outcomes. The comparison and time are not applicable.

2. Study Characteristics

Throughout the researched literature, many of the studies' populations shared

similar characteristics, while other studies varied in their populations. There were multiple population variations in the studies we reviewed; the majority of the studies' populations were graduate-level online students. Some studies included both graduate-level online students and faculty; followed by both undergraduate and graduate students. Few studies had all three student populations: undergraduate, graduate and doctorate students. Other studies included the populations of only graduate level online faculty or doctorate students. Though some of these studies included undergraduate-level online students, we were able to use the data collected for only graduate-level online students and other professional-level students in our systematic review. This is outlined in the Evidence Table (**Appendix B**), which highlights the details of the included studies.

As with the population characteristics, there were also similarities and variations of setting, evidenced by the types of courses and programs used in the included studies. The majority of studies did not specify the type of course; those that did specify included, education, seminary, and Black studies courses. One setting was the College of Liberal Arts while other settings consisted of Master of Business Administration (MBA), Doctoral of Education Technology and Master of Arts in Teaching. Population characteristics are presented in greater detail in **Appendix B**.

3. Review of Literature

Several studies have examined teaching practices in online graduate learning in an effort to increase student retention, graduation rates and student engagement. A detailed outline of studies can be found in the Evidence Table (Appendix B). In our systematic review, we reviewed a total of twenty-four studies and each yielded different results as to what are the best pedagogical practices in graduate-level online learning. One study was conducted by [Evans \(2013\)](#), consisting of a survey, interviews, and grade comparisons of MBA students at a private middle states university to measure students' perception of learning effectiveness in face-to-face versus online MBA courses. Another study we reviewed was by [Groeling \(2004\)](#) that was conducted to find if technology impacts communication and student learning in face-to-face and online courses. [Groeling \(2004\)](#) further investigated student pre-existing motives, interaction, interpersonal communication competence and mediated communication competence to learn and find the impact of instructional technology on cognitive learning outcomes. [Groeling \(2004\)](#) found that there is a lack of interaction between instructors and students.

A study completed by [Hamrick \(2004\)](#) at 17 different universities evaluated the perceptions of satisfaction and motivation in students' overall online class experiences using a Web-based survey instrument. A study by [Hegngi \(1997\)](#) examined and described the patterns of the first iteration of the Media Technology and Diversity course with a focused analysis of its online interaction. Both [Hamrick \(2004\)](#) and [Hegngi \(1997\)](#) discovered there is a lack of the interaction

between students and instructors, along with a lack of effectiveness regarding the course contents.

In addition, we reviewed a study by [Henckell \(2007\)](#) conducted at a midwestern institution in Missouri. The purpose of the study was to help institutions by providing information that assisted them in developing a distance education system, by creating a proper student evaluation instrument. [Henckell \(2007\)](#) found that there is a lack of student involvement in instructors' pedagogy practices. In another study, [Holland \(2006\)](#) observed online threaded discussion forums used for learning in higher education. [Holland \(2006\)](#) revealed that there is a lack of different ways to enhance students' ability to learn better. Researcher [Hwu \(2011\)](#) conducted a study using mixed methods to investigate concerns and professional development needs of instructors at the University Alaska Fairbanks (UAF) on the adoption of online learning. [Hwu \(2011\)](#) demonstrated that there is a lack of support for instructors in online learning. We reviewed a study by [Ice \(2006\)](#), which examined the lack of technical support and pedagogical guidance provided to faculty and student satisfaction in online courses. Another study by [Kahrhoff \(2005\)](#) investigated the relationship between the non-academic support needs of online graduate students and their developmental achievement. [Kahrhoff \(2005\)](#) discovered a lack of support services available to online students. [Kim \(2015\)](#) explored student motivation of online graduate students at a Korean university medical school, finding that when there was a deficiency in instructor-student interaction, the retention rates declined. After studying graduate students enrolled in a fully online instructional setting at a Canadian university, [Kovanovic, Gasevic, Joksimovic, Hatala and Adesome \(2015\)](#) emphasized that lower quality of the online activities and assignments resulted in poor cognitive development and lower cognitive presence. Similarly, [Kuna \(2012\)](#) found that the less frequent interaction graduate students had within online course management, the lower the performance. This observation was most apparent in threaded discussions.

[Levinson \(2012\)](#) studied graduate teacher candidates in an online environment to measure successful implementation of learned lessons and strategies. The findings suggested that the lack of support from instructors, described as receiving little to no feedback, prevented the candidates from using strategies learned from their online courses. After surveying 401 graduate students over two semesters, [Merena \(2006\)](#) demonstrated through student surveys that inadequate performance evaluation and feedback decreased student confidence in their learning achievements. A study reviewed by [Marchand and Gutierrez \(2012\)](#) explored what role the lack of emotional student support played in the graduate online environment. A study by [Mozzani-Miller, P. \(2006\)](#) examined the quality of learning through student engagement in two types of distance education classes in the same institution, which was evaluated using quantitative data from each class in the form of the four dependent variables: the length of the student responses, the number of sources cited, the number of interactions

elicited by the response to questions and the number of times sources outside the virtual library were cited (p. 123). Another study by [Pattison \(2017\)](#) investigated to what extent the social presence of online faculty influence and serve as a successful strategy to increase academic achievement, student satisfaction, and persistence in online courses, highlighting the need for strategies improve student grades, satisfaction, or persistence of student success. [Randle \(2013\)](#) analyzed interactions and outcomes associated with an online professional development course for science teachers and found that lack of explicit framing of learning tasks in an online environment appears to have a great deal of influence on learning outcomes. [Ruhlandt \(2010\)](#) examined the differences in retention, social presence, cognitive presence, and teaching presence in fully online and blended courses. [Ruhlandt \(2010\)](#) emphasized that students that adhered less to the aforementioned strategies were more negatively impacted and less successful. [Ruiz \(2007\)](#) analyzed student satisfaction in distance education students and conventional-campus-based students from the same graduate education program and found campus students to be less satisfied than their online education counterparts. Lastly, after revealing the prevalence of insufficient technical support and training, [Wang \(2007\)](#) highlighted specific needs for adequate socialization and technical support of students, particularly for first-year, online graduate students.

In summary, multiple studies throughout the review of literature highlighted that the interaction between students and instructors had the greatest perceptual impact on the students. When students received delayed feedback from instructors, it generated student perceptions of dissatisfaction and isolation, thus, making a timely student-instructor interaction a key factor in student learning. This systematic literature review included 24 studies dated from 1997 to 2017, with a data time gap from 1998 to 2004. The lack of quality studies on the best pedagogical practices in online learning during that period highlighted a need for additional, up to date and more extensive research. This systematic review delivers additional research and provides insight on the subject that has been understudied despite the considerable growth in online learning. Additionally, this systematic review outlines the practical significance of the findings for not only students, but for faculty and institutions of higher education, as demonstrated in [Table 1](#).

4. Methods

4.1. Eligibility Criteria

4.1.1. Types of Studies

Our primary studies did not include other systematic reviews in order to help avoid double counting studies included in both systematic reviews and to reduce the likelihood of forming inferences and conclusions biased by the results of reviews done by others. Although we did include mixed methods studies in this systematic review, qualitative studies were excluded, primarily because they rely more on less formal and subjective methods to collect data and, thus, heavily

depend on the skill of the researcher. Also, the results of qualitative studies can be easily influenced by personal bias (Occupytheory.org, 2014). Qualitative studies also tend to lack the rigidity that systematic reviews aim to achieve. In the scientific community, evidence-based practices are crucial and qualitative studies provide a summary or overview of a topic (SJSU, 2017). Therefore, we included mixed methods studies, viewing the qualitative part of the mixed study as a supplemental overview material, and only quantitative portions were included in the data tables.

4.1.2. Types of Outcome Measures

We included outcome measures from studies discussing current and past pedagogical practices implemented in both graduate-level online and traditional graduate classroom-based settings to determine the best pedagogical practices for online graduate learning. We screened the data, which resulted in 132 full-text articles that were assessed for eligibility. After initial review, we analyzed 42 full-text articles with risk of bias assessed, and excluded 18 articles with reasons. Due to the rigorous selection process and strict systematic review guidelines, we selected and included 24 studies in this narrative systematic review. The research study selection process was documented in a Preferred Reporting Items for Systematic Reviews and Meta-Analysis, or PRISMA, flow diagram (Figure 1). We considered the outlined specific outcomes to determine the best pedagogical practices for online graduate learning:

- Student retention rates
- Competency with technology
- Teacher professional development
- Timely degree completion, student engagement
- Development of enhanced online educational approaches
- Enhancement of student satisfaction and motivation

4.1.3. Information Sources

The search included published journal articles with a date range from 1995-2017, higher education learning settings only, and primarily English results. We mainly used the Rutgers University Libraries, specifically the George F. Smith Library of Health Sciences. Through the Rutgers University Libraries, the databases used in the search included Ovid MEDLINE, Web of Science, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Educational Resources Information Center (ERIC), Pro Quest Dissertations & Theses Global and Scopus. Additional searches of grey literature resources such as reports, dissertations, theses, conference proceedings, studies outside of the United States, and studies conducted in other languages, given accurate and available translations, also occurred. We separated and categorized literature resources as grey or non-grey, and included grey literature in the data tables.

4.1.4. Search Strategy

The core of our search strategy consisted of identifying the major elements of

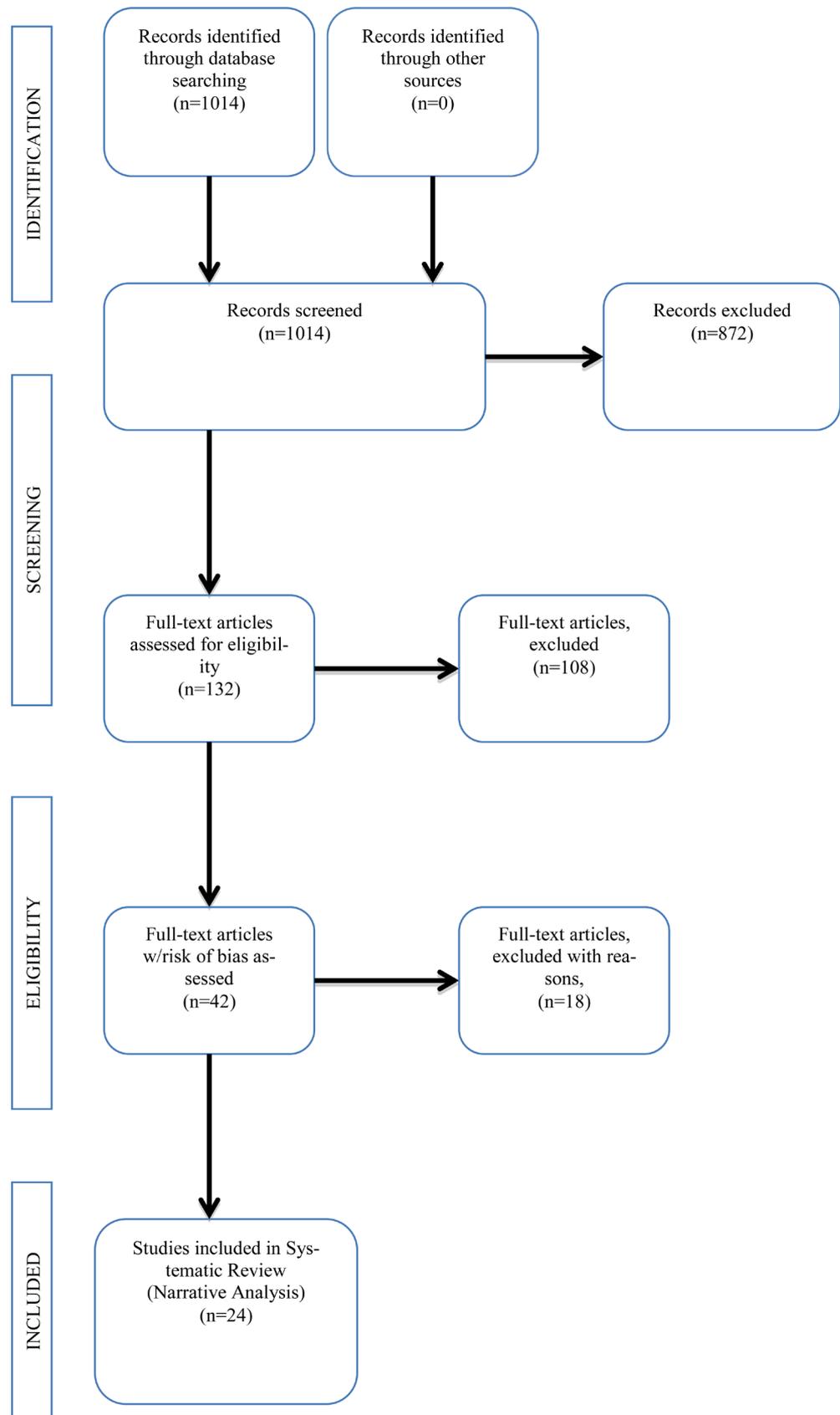


Figure 1. PRISMA Flow Diagram (summarizes the selection process).

our PICOT question and translating natural language terms to subject descriptors, or Medical Subject Headings (MeSH) terms. MeSH terms included graduate programs, e-learning, teaching methods, graduate education and online learning. We also searched different combinations of terms. We conducted a search of any potential unpublished studies, white papers and other grey literature relevant to this review.

4.1.5. Time Period

Research over the specified time period of 1995 to 2017 allowed us to capture the literature about the use of technology in higher education, both in its infancy and at its height (Rajasingham, 2011).

4.2. Study Records

4.2.1. Data Management

EndNote was used by the team of authors for bibliographic management.

4.2.2. Selection Process

Three review authors independently screened the titles and abstracts and applied inclusion and exclusion criteria according to the research article title. Articles were independently screened again to review the titles and/or abstracts for consensus. In order to ensure a widely accepted and systematic approach was used, we adhered to the PRISMA flow chart (Figure 1).

4.2.3. Data Collection Process

After the articles were screened, we conducted a full text review of the remaining included articles and independently evaluated each article to determine if it meets eligibility for inclusion. A thorough examination was performed of the study design and studies that explored the use of pedagogical practices in graduate-level online learning and included them in this review. The data in this review is comprised of the secondary data extracted from the eligible articles. Additionally, all authors of the systematic review were available to provide necessary additional information, clarification and further evaluation of included studies, as needed.

The review authors independently extracted the following information from the studies and documented it on the data extraction form, which was developed based on Cochrane Collaboration's Data collection form:

- 1) Study Characteristics: study aim, study design, study setting, inclusion criteria, and exclusion criteria;
- 2) Study Participants: this systematic review study did not include any participants;
- 3) Methods: methods for assessing bias and methods for extracting, combining and synthesizing data;
- 4) Interventions: characteristics of possible interventions were discussed;
- 5) Outcome Measures: description of main outcome measures;
- 6) Results: organization, evaluation, analysis, and synthesis of data collected.

4.2.4. Data Items

In order to collect all the relevant information about the best pedagogical practices in graduate-level online learning, we researched, combined, and analyzed the study data using narrative analysis.

4.2.5. Outcomes and Prioritization

The studies were grouped according to study design and prioritization was given to studies with higher quality of study.

4.2.6. Risk of Bias in Individual Studies

Aside from addressing risk of bias through researcher consensus during times of disagreement, we also used the Cochrane risk of bias criteria to address the risk. This criterion is widely used for judging the risk of bias, which includes: random sequence generation, allocation concealment, blinding of outcome assessment, incomplete outcome data, selective reporting, or other sources of bias. Risk of bias was rated as low, high, or unclear for each study being considered for inclusion. Studies with high or unclear ratings were excluded.

4.2.7. Addressing Missing Data

Missing data was not a reason for study exclusion from the review. If we were unsuccessful in obtaining missing data, such as in the case of Virginia Tech Conference, we assessed the risk of bias appropriately and coded the study as incomplete outcome data. We discussed the potential implications of the absence of the study from this systematic review.

4.2.8. Data Synthesis and Reporting

The data extracted from the studies was entered and grouped into a data extraction form as well as an evidence table (**Appendix B**) according to study design. Most importantly, we evaluated and reported the findings in the context of an ensemble of recommendations related to best pedagogical practices for online graduate learning. These recommendations were further supported by the outcome measures in the studies (**Appendix A**).

4.2.9. Confidence in Cumulative Evidence

We assessed the strength of the body of evidence according to the GRADE criteria where quality of studies varied between very low, low, moderate and high.

5. Findings

5.1. Description of Included papers

The initial database search strategy resulted in 1014 findings. We assessed full-text articles for eligibility and twenty-four papers were considered relevant for this systematic review (**Figure 1**). A full list of the included studies ($n = 24$) is found in **Appendix B**.

5.2. Methodology

The majority of studies were survey-based, followed by mixed-methods, followed

by two Quasi-experimental studies, one cross-sectional, one literature review, one instructional based, two correlational studies, one systematic research, and one casual comparative. The most frequently used measures were learning effectiveness and evaluation of online learning. This was followed by two studies that measured online student's satisfaction, two studies that measured student engagement in online learning, two studies that measured online instructors training and development and two studies that measured social presence in online learning. There was a study that measured online graduate students' development and support needs, another study that measured learning technology, an additional study that measured best graduate online course design and a study that measured best strategies to reduce dropout rates in online courses. The above information is referenced with greater detail in **Appendix B**.

5.3. Outcome Measures

Outcome measures included in this review were from studies in which researchers evaluated current and past pedagogical practices implemented in both graduate-level online and traditional classroom-based settings to determine the best pedagogical practices for online graduate learning. Specific outcomes, as outlined above in Section 4.1.2, were considered in order to determine the best pedagogical practices for online graduate learning. Numerous studies used certain tools to measure such outcomes, such as student enrollment trends and data to measure student retention rates, as well as student surveys and questionnaires to measure student engagement.

5.4. Best Pedagogical Practices Found

Based on the reviewed literature and relevant studies, the best pedagogical practices associated with achieving the greatest educational outcomes for graduate-level online students were having positive academic discipline and attitude towards online education, and clear, timely and consistent teacher-student communication. The importance of quality of the student-teacher communication was the most noted and apparent throughout the literature. Also, studies including [Henckell \(2007\)](#) and [Mozzani-Miller, P. \(2006\)](#) showed better educational outcomes in an online setting when instructors conducted a pre-course characteristic-type evaluation of the student, targeting demographics, computer competency, distance education experience and preferred method of learning. This allowed instructors to adapt their pedagogy to the students enrolled to identify and work with at-risk online learners, and at the same time, enhance student satisfaction and motivation. Post-course assessment of graduate-level online students included questions that covered course content, materials used, organizational aspects of course activities, technical aspects, and the performance of instructor and support staff to help identify possible future course improvements. [Mozzani-Miller, P. \(2006\)](#) also recommended to “use multiple means of quality of learning assessment developed specifically for distance education

courses, such as developing and employing pre-test and post-test questionnaires for online learning students to discover: pre-test—demographics, computer experience, distance education experience, preferred method of learning and post-test—student satisfaction, grades and gain scores” (p. 126). [Mozzani-Miller, P. \(2006\)](#) also reported statistical analysis revealed that by the end of the course all of the students achieved a significant gain in quality of learning. Pertaining to course activities, [Hegngi \(1997\)](#) and [Hamrick \(2004\)](#) found that posting all of the assignments all at once and allowing students to work on their own pace along with not having the burden of responding to every single student’s post in the class would be better teaching practices.

Increasing student retention in the online graduate setting was one of the major outcomes of this systematic review. Studies including [Groeling \(2004\)](#), [Hamrick \(2004\)](#), [Hegngi \(1997\)](#), and [Henckell \(2007\)](#) showed that student interaction with the instructor, clear and steady communication between faculty and online graduate students, as well as prompt and constructive instructor feedback, all factored into a student’s satisfaction, engagement and overall success in the online distance education environment. [Ruhlandt \(2010\)](#) also examined the importance of student retention, social presence, cognitive presence, and teaching presence in fully online and blended courses. Some of the strategies to reduce such differences included student orientation, readiness identification, technical support (24 hours a day) and personal contact with professors, other students, and university support personnel [Marchand and Gutierrez \(2012\)](#) noted the importance of emotional student support in the graduate online environment. The utility of value, or how valuable the tasks were in the students’ personal and professional goals, along with relevance of instruction and academic self-efficacy, interacted with both positive and negative emotions, ranging from hope to anxiety, respectively. The findings in [Hwu’s \(2011\)](#) and [Ice \(2006\)](#) study also suggested the importance of implementing additional administrative support, proper recognition of achievements and investing in continuous professional development for instructors teaching graduate level online courses. Multiple studies including [Evans \(2013\)](#), [Kahrhoff \(2005\)](#), [Pattison \(2017\)](#) and [Holland \(2006\)](#) also noted the importance of adequate student socialization, the use of student peer mentors, the use of allusions to the group or classroom, and supplemental online support for students. Student socialization could include students interacting with other students through online discussion portals, group messaging, or other ways of being able to communicate with peers. This was particularly important for first-year graduate students in order to improve their chances for retention and the overall success in online courses. According to research done with doctoral students of an education technology program at a Florida University, [Kumar \(2014\)](#) conceptualized that in order to decrease student anxiety and increase satisfaction during e-learning, instructors need to have consistent communication, structure and timelines to yield better satisfaction. [Maryannakis \(2009\)](#) studied graduate students over one academic term to de-

termine the best graduate online course design for a research methods course, finding that the structured “comprehensive objectivist” design was significantly more effective than its unstructured counterpart on graduate learners’ competence in research methods. Merena (2006) found that student interaction with the instructor, quality of the course materials, improved evaluation methods, delivery methods and discipline all factored into a student’s satisfaction and success in the online distance education environment. Similarly, Keeler’s (2006) quantitative approach to determine the relationship between types of interaction and student satisfaction in master’s level distant education showed learner-instructor interaction contributed the most to overall student satisfaction in distant education. Lastly, Ruiz (2007) analyzed overall student satisfaction in online education students and conventional-campus-based students from the same graduate education program and found that, distant education students were more satisfied than their counter-parts enrolled in the conventional campus-based programs.

6. Discussion

6.1. Practical Significance of the Findings on Students

As graduate-level online students, we know how essential it is for instructors to practice best pedagogy so that students can achieve the greatest educational outcomes. Understanding which pedagogical practices are best suited for graduate-level online students is essential for positive learning outcomes. There needs to be solid teaching practices so that even at-risk students can be successful in their courses. We discovered that the best pedagogical practice is for instructors to have good interaction with their learners, including good communication and relations. Groeling (2004) found that the interaction between instructors and students is the “mechanism for student learning” (p. 188). Having good interaction with students can help instructors know whether each student is learning to the best of their ability. Hegngi (1997) also emphasized that instructors need to improve on their interactions with students in order for them not feel isolated. If instructors do not interact with their students, then the latter will feel isolated and unmotivated, resulting in lower educational outcomes. Good interaction can help instructors improve in teaching and students in learning. **Table 1** outlines the significance and impact these findings have on students.

6.2. Practical Significance of the Findings on Faculty

Multiple studies showed better educational outcomes in online setting when instructors adapted their pedagogy to the students. Therefore, one of the practical implications of this systematic review for faculty would be helping students become successful online learners by adapting parts of the course based on a pre-course evaluation of the students’ distance education experience, preferred method of learning and computer competency. A short automated survey could be implemented and administered to students immediately after registration for the course allowing, enough time for faculty to review the results before begin-

ning of the semester. An emphasis should be placed on the faculty development and training. Multiple studies showed that instructors need more technical support, as discussed by Wang (2007), more administrative support, proper recognition of their achievements, professional development, and an enhanced role for centralized support for faculty engaged in online learning. University administrators should consider implementing 24-hour online support services available to the online students in order to improve their chances at succeeding in online courses. This way students can voice their concerns, ask additional questions or clear any misunderstandings associated with their online learning courses. **Table 1** summarizes the importance of these findings for faculty.

6.3. Practical Significance of the Findings on Institutions of Higher Education (IHE)

Today's reality is: online learning is here to stay; it is neither a fad nor a trend (Betts, 2017: p. 2). Moreover, Betts (2017) explained how the ubiquity of technology has made taking online courses the new norm. Students who seek flexible course formats largely drive enrollment for online courses at IHE as well as degree programs that support career placement and that readily adjust to students' personal and professional schedules (Betts, 2017). Our review findings highlighted the importance for all IHE to adopt, evaluate and continuously develop web-based innovative curricula within their existing academic frameworks. This is particularly demonstrated in Allen and Seaman's (2014) study which discussed academic leaders' optimism about the continued growth of online learning and its significant impact on higher education students. Interestingly, smaller universities were most passionate about how the improvement of technology helps universities decrease the costs for development and delivery of online courses, when compared to face-to-face courses (Allen & Seaman, 2014). A vast amount of larger universities also agreed with the concept, yet it is important to note most are large, public universities, where costs per course are low, compared to smaller, private institutions. Merena (2006) emphasized the need for institutions of higher education to refine their institutional missions, goals and audience to gear them toward e-learning. It was also expressed that fostering students' engagement and acclimation early in on-line course studies was essential for graduate-level online learning. Universities must focus on implementing an ongoing quality

Table 1. Practical significance of the findings on faculty, students, and institutions.

Students	Faculty	Institutions
Better learning experience	More intuitive back-end interface	Better academic outcomes
Better educational outcomes	Improvement in pedagogy	Better financial outcomes
Success in courses	Identification of faculty needs	Increase in enrollment
Less unnecessary stress	Greater efficiency in course design	Less attrition
Positive academic attitude	Greater efficiency in modification and delivery	Opportunity to expand

review process of their online curricula development (Merena, 2006). The implications of these findings for institutions of higher education are highlighted in **Table 1**.

6.4. Limitations and Implications for Future Studies

Limitations of this narrative descriptive systematic review included:

- Given that e-learning is a relatively new topic, paired with rigid review guidelines, this systematic review was limited to 24 included literature sources.
- Our primary studies did not include other systematic reviews in order to help avoid double counting studies included in both systematic reviews and to reduce the likelihood of forming inferences and conclusions biased by the results of reviews done by others.
- We reported the findings in the context of an ensemble of recommendations related to best pedagogical practices for online graduate learning considering the heterogeneous nature of graduate courses/programs examined.
- Though majority of included studies evaluated graduate students, a few consisted of a mix of graduate and undergraduate students; for the purpose of this systematic review only study results from graduate students were considered. In addition, seven mixed method studies were included in this systematic review, but only quantitative results were considered.
- Only studies where researchers explored the use of pedagogical practices in graduate-level online learning were included in this systematic review.
- There was a lack of randomized controlled studies in this systematic review therefore higher quality studies are needed to make a better conclusion.
- This descriptive systematic review concludes with results based on only 24 included literature sources and their implications for graduate online learning community, along with recommendations for future research.

Online Learning Consortium (2016) stated “the number of students taking online courses grew to 5.8 million nationally, continuing a growth trend that has been consistent for 13 years.” It is projected that each year more and more graduate students will be enrolling in online courses. According to the most recent study done by Babson Survey Research Group, “the number of higher education students taking at least one distance education course in 2015 is up 3.9% over the previous year” (**Online Learning Consortium, 2016**). Despite this growth, “some faculty members have become less confident in these online programs” (**Online Learning Consortium, 2016**). This suggests that there is a greater need for more quantitative studies to be conducted on best pedagogical practices specifically in graduate-level online learning for institutions to have a better understanding on which pedagogical practices are most beneficial for student’s educational outcomes.

7. Conclusion

As graduate-level online students we chose a subject that has been understudied,

and therefore is important for online institutions, students and faculty to understand. After conducting our systematic review, we found that the best pedagogical practices associated with achieving the greatest educational outcomes for graduate-level online students were having positive academic discipline and attitude towards online education, and clear, timely and consistent teacher-student communication. We also discovered that the most effective pedagogical practice used by online instructors was student-teacher interaction and communication. It is important for online instructors to go the extra mile to establish effective communication with students in order to ensure the students understand the course content and learning to the best of their ability. Instructors can establish effective communication by reaching out to each student periodically to check on their progress in the course. The second best practice suggested was for online instructors to evaluate each student's distance education experience, preferred method of learning and computer competency in the beginning of the course. Instructors can do this by conducting a survey and incorporating the results into their pedagogical practices in online setting. This will help instructors develop better pedagogical practices in their online courses, which will help students achieve the best educational outcome and timely graduation.

8. Stakeholders

Worldwide we are in the Digital Age, where traditional industries have shifted to a period where our economies are based on information technology and computerization. In turn, this era demands expeditious processing of information, supply of resources and delivery of results. Most notably, education and healthcare are two key industries whose existence and advancement depend heavily on technology. Given the continuous growth of distant education on the graduate level, the identification and adoption of the best pedagogical practices in e-learning will benefit stakeholders who have major investments in online education. These stakeholders include faculty and students. Additionally, they include academic institutions in the health, education and technology industries, and the systematic review process offers searches that are replicable, highly trustworthy and reliable, proving quintessential for those sectors.

Conflict of Interest

The authors certify we had no commercial or financial involvements, funding or benefits from industry or elsewhere to conduct this systematic review.

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Appendix A: Best Graduate Pedagogical Practices Summary Table

Researchers: Gleyzer, Javed, Pardino

Graduate learning online pedagogical practices	Included	Excluded	Primary outcome measures
Weekly online teacher-student discussions evoked learning flow and collaboration	✓		Student motivation
Students needed to be meta-cognitively capable, skillful and motivated in order to use online tools.	✓		Student engagement
Conduct pre and post learning quality assessment to discover: pre-test—Demographics, computer experience, distance education experience, preferred method of learning. Post-test—student satisfaction, grades and gain scores.	✓		Student engagement
Consistent communication, structure and timelines yielded better satisfaction.	✓		Student satisfaction
Distance education students were more satisfied than their conventional counter-parts. The interaction of program access, distance or conventional campus-based education, yielded higher satisfaction of distance education students.	✓		Student satisfaction
Continuous learner-instructor interaction	✓		Student satisfaction
Interaction between students and instructors had the greatest perceptual impact on the students. When students got delayed feedback from instructors it generated student perceptions of dissatisfaction and isolation. The best pedagogical practice from this study would be for instructors to post all of the assignments at once instead of staggering the assignments, allowing student to plan ahead	✓		Student satisfaction and motivation
Student interaction with the instructor, quality of the course materials, improved evaluation methods, delivery methods and disciplines all contributed to a student's satisfaction and success in the online distance education environment.	✓		Increased student retention and student satisfaction
Frequent interaction graduate students had with online course management	✓		Higher student performance
The task value in the students' personal and professional goals, along with relevance of instruction and academic self-efficacy, interacted with both positive and negative emotions, ranging from hope to anxiety, respectively.		✓	Role of student emotions in graduate online environment
Initial student orientation, readiness identification, technical support (24 hours a day) and personal contact with professors, other students, and university support personnel.	✓		Differences in retention, social presence, cognitive presence, and teaching presence in fully online and blended courses.
Instructors can strengthen learning effectiveness by "giving students more support, enhancing social skills, and improving the quality of instruction through better communication	✓		Student's perception of learning effectiveness
The only strategy that has the potential to significantly improve student grades, satisfaction and/or persistence in online courses may be the use of allusions to the group or classroom.	✓		Social presence of online faculty
Degree of support and learned teaching practices that can be later implied by graduate teacher candidates in an online environment	✓		Future teacher professional development
Online asynchronous discussions encourage reflection by learners.	✓		Online teacher/professional development
Adequate socialization and technical support of students, particularly for first-year, graduate students in online setting.	✓		Technical support/training in computer skill in online setting
Cognitive learning outcomes were not significantly different for online students from face-to-face students. The interaction or communication compromising the student/teacher relationship is the mechanism for student learning.		✓	Impact of technology on communication and student learning in face-to-face and online courses

Continued

Instructors should conduct a pre-course characteristic-type evaluation of the student, in order to adapt their pedagogy to the students enrolled. Post examination of graduate-level online students should “include questions that cover course content, materials used, organizational aspects of course activities, technical aspects, and performance of instructor and support staff” Instructors must encourage interaction/communication between instructor-student.	✓	Success of distant education courses.
Structured “comprehensive objectivist” design was significantly more effective than its unstructured counterpart on graduate learners’ competence	✓	Best graduate online course design for a research methods course
Instructors should allow positive affective communities, the use of student peer mentors, and the use of cognitive knowledge which offers graduate online students the chance to interact at higher cognitive levels	✓	Determine problems with online threaded discussions in higher education
Instructors need more administrative support, proper recognition of achievements online learning achievements, promotion of learner-centered methodology in the transition to online learning, and professional development that leads to a more collaborative community, an enhanced role for centralized support for staff engaged in online learning.	✓	Explore concerns and professional development needs of full-time faculty and instructors
Technical support and pedagogical guidance have very low impact of student satisfaction in online learning. When designing training and support programs, The focus should be more on personal and pedagogical characteristics of faculty.	✓	The relationship between levels of technical support and pedagogical guidance provided to faculty and Student satisfaction in online courses
University administrators should offer online support services available to the online students in order to improve their chances at succeeding in online courses. This way students can voice their concerns or clear any misunderstandings that may affect their chances of succeeding in online learning.	✓	The relationship between the non-academic support needs of online graduate students and their developmental achievement.

Best pedagogical practices in graduate online learning

Visible instructor engagement in online course activities

Conduct pre and post learning quality assessment to discover: pre-test—demographics, computer experience, distance education experience, preferred method of learning. Post-test—student satisfaction, grades and gain scores.

Adequate socialization and technical support of students, particularly for the first-year graduate students in online setting.

Initial student orientation, readiness identification, technical support (24 hours a day) and personal contact with professors, other students, and university support personnel.

Pedagogical practice from this study would be for instructors to post all of the assignments at once instead of staggering the assignments, allowing student to plan ahead

Instructors should conduct a pre-course characteristic-type evaluation of the student, in order to adapt their pedagogy to the students enrolled. Post examination of graduate-level online students should “include questions that cover course content, materials used, organizational aspects of course activities, technical aspects, and performance of instructor and support staff”

Instructors need more administrative support, proper recognition of achievements and continuous professional development.

Prompt and constructive instructor feedback. When students got delayed feedback from instructors it generated student perceptions of dissatisfaction and isolation

Timely, clear and consistent communication between faculty and online graduate students. University administrators should consider offering supplemental support services available to the online students in order to improve their chances at succeeding in online courses.

Additional Comments

Appendix B: Evidence Table

1	2	3	4	5	6	7	8	9	10	11	12
Intervention	Study Design	Population	Outcomes	Author, Year	N	Statistically Significant	Quality of Study (GRADE)	Magnitude of Benefit	Absolute Risk Reduction	Comments	Risk of Bias
Online learning vs. face-to-face learning	Cross-sectional design; quantitative and qualitative	Graduate-level online students/ MBA students	Online courses offer students more flexibility than face-to-face.	Evans, 2013	225-survey, 10 interviews	yes	moderate	medium	n/a	no randomized study, lack of blinding	Low
Online learning vs. face-to-face learning	Quasi-experimental post-test	Graduate-level online students	does technology improve teaching and learning	Groeling, 2004	180 students	yes	low	small	n/a	no randomized study, lack of blinding, lack of description of withdrawals and dropouts	Low
Online learning	Survey-based	graduate and undergraduate online students	Are online students satisfied with online classes, yes	Hamrick, 2004	360 students	yes	high	small	n/a	lack of blinding, lack of description of withdrawals and dropouts	Low
Online learning and teaching	Instructional design	graduate and undergraduate students	effect of new technologies used in teaching and learning	Hegngi, 1997	10	n/a	low	small	n/a	no randomized study, lack of blinding	Low
Distance education	Survey-based	graduate and undergraduate online students	which of the 15 steps procedure are important for the success of distance education courses	Henckell, 2007	430	yes	high	medium	n/a	lack of blinding	Low
Student engagement in online discussions	One-way repeated measures analysis of variance; survey-based	undergrad, grad and doctorate students	to determine problems with online threaded discussions in higher education	Holland, 2006	11 from actual study	yes	moderate	small	n/a	no randomized study, lack of blinding, lack of description of withdrawals and dropouts	Low
Online learning faculty training	Mixed methods study (quantitative and qualitative); survey-based	graduate level online faculty	to determine the needs of faculty members in order to be successful	Hwu, 2011	93	yes	moderate	medium	n/a	no randomized study, lack of blinding	Low
Technical support and pedagogical guidance in online learning	Quantitative methods	graduate level online faculty and students	factors that influence faculty satisfaction, technical support and pedagogical guidance and student satisfaction	Ice, 2006	15 instructors, 519 students	yes	moderate	medium	n/a	no randomized study, lack of blinding, lack of description of withdrawals and dropouts	Low
Online graduate students support needs	Survey based	graduate level online students	to determine whether adult distant learners need more or less support than other distant students.	Kahrhoff, 2005	42	yes	moderate	medium	n/a	no randomized study, lack of blinding, lack of description of withdrawals and dropouts	Low

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Learning Technology (CoI) (e-learning)	Literature Review	graduate students	Develop educational approaches that enhance educational experiences	Kovanovic V, et al., 2015	81	yes (mixed method)	low	large	n/a	none	Low
Online learning for doctoral degrees	Systematic research	Doctoral students	Decreased student anxiety and increased satisfaction	Kumar, S., 2014	Varied over study	yes	low	large	n/a	none	Low
Online learning	Quantitative	graduate level online students	Student satisfaction via surveys	Keeler, 2006	Varied over study	yes	high	large	n/a	factored in age, course grade and gender for further analyses	Low
Online learning	Exploratory study; sequential explanatory (QUAN->qual) mixed method design	graduate level online students	Student motivation	Kim, 2015	77	yes (mixed method)	moderate	medium	n/a	qualitative results were incorporated in study's conclusions.	Low
Which online tools were perceived by students to be most useful	Mixed quantitative and qualitative	graduate level online students	Student interaction patterns and academic performance	Kuna, A. S., 2012	76	no	low	medium	n/a	qualitative results were incorporated in study's conclusions.	Low
Online learning	mixed method study; observational	graduate level online students /teacher candidates	Varying degrees of confidence, freedom and fidelity to implement the learned lessons/ strategies from the online course.	Levinson, C.C., 2012	4	yes (mixed method)	low	small	n/a	qualitative results were incorporated in study's conclusions.	Low
Best graduate online course design	Quantitative, causal comparative, quasi-experimental	graduate level online students	level of knowledge of students	Maryannakis, 2009	varied over study	yes	low	small	n/a	none	Low
Best strategies to reduce dropout rates in online courses	Quantitative	graduate level online students	Student satisfaction and success rates	Merena, 2006	401	yes	moderate	medium	n/a	none	Low
Online instruction; asynchronous course	Article—correlational in nature; student questionnaires at three points during a single semester	graduate level online students	General models of cognitive, motivational and affective processes may be applicable to computer-related settings.	Marchand & Gutierrez, 2012	291	no	moderate	medium	n/a	none	Low
Student engagement.	Mixed method	graduate level students and instructors	The quality of learning (student engagement) did not differ significantly between the client class and the web class.	Mozzani-Miller, 2006	61	yes	low	Small	n/a	none	Low

Continued

Role of social presence in online education	Quantitative correlational study	graduate level online students	social presence and student performance and educational outcomes	Pattison, A. B., 2017	600 students, 20 faculty	no	low	small	n/a	none	Low
Online professional teacher development	Mixed-methods study	graduate level online students	The explicit framing of learning tasks in an online environment appears to have a great deal of influence on learning outcomes.	Randle, David, 2013	varied over study	yes	low	Small	n/a	none	Low
Social presence, cognitive presence, and teaching presence	Casual comparative design	graduate level students and instructors	The findings indicate that the mode of delivery is not the sole determining factor for better educational outcomes	Ruhlandt, Ronell R., 2010	287	yes	low	Small	n/a	mix of undergraduate and graduate students	Low
Student satisfaction with graduate online course	quantitative method study.	graduate level online students	distance education students and conventional-campus-based students from the same graduate education program were highly satisfied with their experiences.	Ruiz, D. M., 2007	163	yes	low	medium	n/a	none	Low
Online learning	mixed (qualitative and quantitative)	graduate level students and instructors	Technical support/training in computer skill	Wang, 2007	81 students, 15 instructors	yes	low	medium	n/a	mix of graduate and undergraduate students.	Low