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Comparing Learning Platform Impact on Low Vision Education for Occupational Therapists

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Comparing Learning Platform Impact on Low Vision Education for Occupational Therapists

Abstract

This pilot study examines the impact of face-to-face, remote, and hybrid learning platforms on satisfaction, confidence, and knowledge-application of occupational therapy practitioners during a synchronous low vision continuing education program. Fifteen participants were divided into three groups, each corresponding to one learning platform. They engaged in two 45-min learning sessions and completed pre, post, and follow-up surveys to measure the impact of the learning platform on the dependent variables of satisfaction, confidence, and knowledge application. No significant differences were found between learning platforms for the three variables, but improvements from pre to follow-up survey were found to be significant for confidence and knowledge application for all groups. These findings indicate that similar education provided to occupational therapy practitioners may result in improved confidence and knowledge application to clinical practice from the beginning to the end of the educational program, despite the learning platform. Flexibility with online learning options increased participation and adherence rates. Synchronous remote and hybrid learning platforms may be as effective as traditional face-to-face methods, specifically with increasing practitioner confidence and knowledge application. Remote options may reduce peer interactions but increase flexibility and convenience with scheduling for program scalability and accessibility.

Comments

The authors report that they have no conflicts of interest to disclose.

Keywords

continuing education, educational technology, active learning

Cover Page Footnote

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Credentials Display

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Technology is rapidly expanding and is continually sought out for convenience in all aspects of human life. Instructional methods must frequently evolve to integrate creative web-based learning options to satisfy tech-savvy generations of learners and to increase accessibility to education (Henriksen, Mishra, & Fisser, 2016). This transition from face-to-face to distance education approaches builds scalability to greater geographical areas and facilitates learner competence with recent and relevant equipment, devices, techniques, and trends (Cervero, Artino, Daley, & Durning, 2017). Various professions, including those in the health sciences, have broadened continuing education and staff training opportunities using distance learning platforms to overcome common convenience or cost-based barriers (Chang, 2016; Scott, Bauer, & Barrett, 2017). Comparisons of face-to-face learning and purely web-based platforms outside the field of occupational therapy exist, as does emerging support for mixed face-to-face and distance approaches known as hybrid courses (Chipps, Brysiewicz, & Mars, 2012; Cook et al., 2008). However, comparison studies in different professions cannot be generalized to all health sciences because of the broad variability among professions (Sinclair, Kable, Levett-Jones, & Booth, 2016).

Distance learning is used synonymously with the terms tele-education and e-learning and is defined as the use of technology to present information to learners remotely (Chang, 2016). Tutorials, internet conferencing, hybrid learning, and synchronous and asynchronous education are also considered distance learning (Cook et al., 2008). In the literature outside of occupational therapy, web-based education is suggested to be as effective as face-to-face learning for knowledge retention, which potentiates distance opportunities as a viable solution for increased accessibility and convenience for students; convenient accessibility to educational resources, despite the location of learners, is believed to be the most substantial benefit of distance learning (Tomlinson et al., 2013). A structured design of distance learning options broadens learner-focused program development opportunities, expands accessibility to geographically dispersed individuals, including those in rural areas, and allows greater flexibility in classes (Scott et al., 2017). The literature outside of occupational therapy also suggests that there is an insignificant difference between distance learning platforms with knowledge retention about health-based material and participant reports of high levels of satisfaction (Tomlinson et al., 2013). Few studies integrated measurement of learner confidence levels, and they were primarily based on differences in asynchronous versus synchronous platforms, yet they suggested participant confidence increased with active participation in a synchronous environment (Curran, Fleet, & Kirby, 2010). Despite positive knowledge-based outcomes, however, varying contexts between classes may lead to a perceived lack of camaraderie and reduced use for less tech-savvy persons, indicating a need to build programs to support learner needs (Chipps et al., 2012; Griffiths & Inman, 2017).

A shift of focus from knowledge retention to learner satisfaction has emerged in more contemporary literature to underscore participant perceptions and preferences with technology-based education (Berndt, Murray, Kennedy, Stanley, & Gilbert-Hunt, 2017). Initial assessment of perceptions include preference for face-to-face and hybrid models and a rejection of web-based methods (Hartung, Hamer, Middleton, Haxby, & Fagnan, 2012), which illustrates the need not only to assess but also to design programs based on learner perceptions and preferences for best outcomes. This shift in education trends also requires instructors to plan for technological needs and problems, identify opportunities for active presence and participation during classes, and identify opportunities for both formal and informal learner feedback to increase student engagement (Bryan et al., 2018). There is a paucity of occupational

therapy literature supporting the use of web-based platforms for continuing education for occupational therapists, despite frequent use of remote platforms for delivery.

Occupational therapists work with people across the lifespan and in a variety of settings to resume meaningful activities in their lives through evidence-based interventions (AOTA State Affairs Group, 2017). The settings may include rural locations where therapists frequently work with minimal or no mentorship in a combination of hospitals, clinics, homes, schools, or settings that require specialty knowledge to treat certain populations. For example, over the course of one day an occupational therapist may work with children in a local school, a person with complicated orthopedic hand involvement in a hospital, and an older adult with dementia in his or her home. Additional support may be needed for these therapists to increase competence with such wide-ranging demands. Cost-based factors, such as dwindling continuing education budgets, travel requirements, and continual development of evidence-based methods (Nipp, Vogtle, & Warren, 2014) warrant the pursuit of additional evidence to support adult learning alternatives to traditional face-to-face education platforms. Nontraditional students often seek degrees or continuing education credits but frequently work in full-time positions and may have additional responsibilities at home that restrict devotion to face-to-face courses. Distance learning expands accessibility to programming for occupational therapists and students through reduction of barriers such as cost, geographical location, and possible time constraints (Nipp et al., 2014).

The purpose of this study is to explore the satisfaction, confidence, and knowledge application of occupational therapists following two sessions of education about low vision after acquired brain injury, delivered either face-to-face, remotely, or with a hybrid platform. These dependent variables were explored to inform larger-scale research efforts to support or refute current professional development practices using distance platforms.

Method

Study Design

Pilot studies use a small sample to assess measurement procedures, trial new methods, and adjust the effectiveness of a proposed study design in preparation for a larger-scale study (Leon, Davis, & Kraemer, 2011). The current pilot study used a three-group repeated measure design to compare the impact of learning platforms on the following dependent variables: learner satisfaction with interaction and technological components, confidence with concept application, and knowledge application to clinical practice. The participants were allocated into one of three groups by perceived convenience of proximity to each site. Each group used a different synchronous learning platform: (a) face-to-face group, (b) remote group, and (c) hybrid group. The face-to-face group participated in-person and in the same room as the instructor, the remote group participated together as a group and remote from the instructor in a synchronous platform, and the hybrid group participated in a combination of face-to-face and remote platforms. The three groups participated in two 45-min classes containing the same researcher-developed educational content on low vision after acquired brain injury. The face-to-face group participated in person for both sessions, the remote group participated via synchronous technology for both sessions, and the hybrid group participated in their first session in a face-to-face format and via a synchronous remote platform for the second session.

Four convenient clinical sites were selected where the instruction was either presented face-to-face or projected remotely via synchronous technology, depending on the group. The sites included one suburban area (face-to-face group), two rural areas (remote group), and one urban area (hybrid group) in

a large metroplex. To help control confounding variables, the participants could always see the instructor and presentation to establish synchronous presence, increase interaction, and allow for active troubleshooting of potential technological problems similar to the approach discussed by Bryan et al., 2018. The methodology was trialed with occupational therapy students and at an occupational therapy quarterly state organization meeting in both face-to-face and remote platforms prior to the start of the study. In addition, the design and outcomes were carefully monitored by both investigators before, during, and at the close of the study for any impact of extraneous variables.

Participants

Study approval was granted by the internal review board of Texas Woman's University and the administrative board of Pate Rehabilitation. Participants were recruited using convenience sampling methods from three neuro-rehabilitation clinics and an inpatient rehabilitation clinic in a large metroplex in Texas, USA. Inclusion criteria included: (a) licensed occupational therapist in the state of Texas, (b) working part- or full-time, (c) 21 years of age or older, (d) fluent in the English language, and (e) access to Wi-Fi on a preferred device for survey completion. Ancillary support staff (e.g., technicians and aides), occupational therapy students, and occupational therapists practicing outside the metroplex were excluded from participation.

Class Design

The Active Learning theory informed the design of the educational sessions to facilitate active problem-solving and opportunities for interaction in the sessions for greater knowledge application to daily practice (Bonwell & Eison, 1991). Eye models and diagrams, simulation goggles, and occluded lenses were used at each site to increase interactive and hands-on learning to increase the depth of knowledge acquisition. These active learning materials were shipped to each site separately prior to the start of the study. Peer and instructor interactions were facilitated through opportunities for case study discussion and intermittent multiple-choice quizzes in the sessions to differentiate instruction. The topic of the education sessions was visual dysfunction after acquired brain injury and included information about the relevant anatomical description and presentation of common diagnoses, evidence-based assessment and treatment, and outside referrals. The first session focused on visual field deficits and members of the vision team, and the second session emphasized eye movement problems and psychosocial implications. The classes were designed to be identical among platforms with both education and opportunities for active learning, thus minimizing the differences between the sites.

Measure

A 25-question survey was developed by the research team that included conduct expert validation by a Certified Low Vision Therapist and an expert in survey methods. The survey was piloted with master of occupational therapy students in face-to-face and remote platforms and revised based on a thorough review of the literature and expert and student feedback prior to first administration. The confidence and satisfaction variables were measured on a 4-point Likert-scale to reduce central tendency bias. Confidence-based questions included rating levels of confidence with clinical skills, such as educating patients and families, interpreting assessment results, and selecting and justifying an outside referral source. Satisfaction questions included rating levels of satisfaction with technology used in the classes, access to resources, and peer interactions. Knowledge application was assessed through multiple-choice questions formatted to elicit clinical reasoning based on acquired knowledge. The knowledge application questions were primarily situation-based and required the occupational therapists to select the best answer. The repeated survey was administered at pre, post, and 3-week follow-up time

frames to record demographic information and measure the dependent variables of satisfaction, confidence, and knowledge application. The presurvey was administered 15-min prior to starting the education, the postsurvey was administered directly following the second educational session, and the follow-up survey was administered 3 weeks following the educational sessions. The surveys were provided to each participant electronically through an emailed PsychData link. The participants were allotted 15 min to complete the first two surveys and were provided 1 week to complete their final follow-up survey.

Data Analysis

The data were analyzed and compared with the pre, post, and follow-up survey (time) mean results. Demographic data and recruitment rates were compared using frequencies and percentages. Adherence rates were calculated by examining attendance in sessions and survey completion using descriptive statistics.

Dependent variables of satisfaction, confidence, and knowledge application were analyzed separately using descriptive statistics and with IBM SPSS v25 for 3 (group) x 3 (time) mixed ANOVA with repeated measures to describe the main effects of the independent variables of group, time, and the interaction of group and time. A power analysis was not performed because of assumed small sample associated with pilot studies. Therefore, the statistical results are exploratory and can be used to inform studies with larger samples and identify trends in the sample data.

Results

Participants

Fifteen participants were involved in the study and adhered to the full protocol. Of those approached to participate in the study, 18 of 53 (33.9%) potential recruits met the inclusion criteria and were enrolled. Fifteen of the 18 of the eligible recruits completed the study from the pre to follow-up surveys making the overall participation rate 83.3%; one participant dropped prior to starting because of the time commitment, and two participants fully participated in the courses but were lost at follow-up without a given reason. Final group analysis included four participants in the face-to-face group, six in the remote group, and five in the hybrid group. Despite the differences in group sizes, there was no impact on the homogeneity of variance assumption. The majority of the sample, 12 of the 15 (80%) participants, in this study reported 0-2.11 years of experience as occupational therapists (see Table 1). Most of the participants, 9 of the 15 (60%), were 26 to 30.11 years of age, and 13 of the 15 (86.7%) participants had a master's degree in occupational therapy (see Table 1). Prior to beginning the study, five participants (33.3%) requested and were granted a group change to accommodate their schedules, also resulting in uneven group allocation.

Table 1

Demographic Characteristics of Participants (N = 15)

Characteristic	N
Sex (female)	15
Age	
21-25.11 years	3
26-30.11 years	9
31-40.11 years	2
41-50 + years	1

Years of Experience	
0-2.11 years	10
3-5.11 years	3
6-10.11 years	2
Highest Education Attained	
Bachelor's degree	1
Master's degree	13
Doctorate degree	1

Learner Satisfaction

Satisfaction with peer and instructor interactions and technology use was assessed and compared between the three groups and over time. The participants rated their level of satisfaction using the following scale: (1) *low satisfaction*, (2) *somewhat low satisfaction*, (3) *somewhat high satisfaction*, and (4) *high satisfaction*. The results of the 3 (group) x 3 (time) ANOVA indicate that the effect of time was not significant, $F(2,24) = .469$, $p = .631$, nor was the effect of group, $F(2,12) = .381$, $p = .691$, nor was the effect of the interaction of group and time, $F(4,24) = .389$, $p = .841$. These findings suggest the levels of satisfaction did not change between groups despite different application and amounts of technology integrated throughout the study (see Table 2). The face-to-face group did not vary between times assessed ($p = 1.0$); the remote group varied ($d = .20$) between pre and postsurvey times; the hybrid group varied ($d = .12$) between pre and follow-up survey times, indicating a small effect size. Satisfaction remained consistent over time and there were insignificant differences between groups. All groups reported means between 3.00 and 3.36, indicating somewhat high levels of satisfaction with interaction and technology use throughout the study without variance between survey time frames.

Learner Confidence

Confidence with translating knowledge to clinical practice was rated by the participants using the following four-choice responses: (1) *low confidence*, (2) *somewhat low confidence*, (3) *somewhat high confidence*, and (4) *high confidence*. According to the results of the 3 (group) x 3 (time) ANOVA, significance was found for the main effect of time, $F(2, 24) = 22.89$, $p = .000$, which increased for the entire sample between pre-, post-, and follow-up survey administration times. The interaction of group and time was also significant, $F(2, 12) = 2.94$, $p = .041$, for confidence outcomes. Results indicated that the effect of group was not significant, $F(2, 12) = 1.64$, $p = .234$, for the levels of confidence measured indicating that the groups were equal from beginning to the end of the study and had no impact on the main effect of group on confidence outcomes. The remote group's confidence increased the most from a surveyed response ($d = 1.14$) from pre to postsurvey (see Table 2) but also entered the presurvey at the lowest level of confidence (M = 1.93) in comparison to face-to-face (M = 2.2) and hybrid (M = 2.64) groups. Remote and hybrid groups increased to the same levels of confidence at postsurvey time periods, which was greater than the face-to-face group, but significance was not established because of a small sample. During the follow-up assessment, 93% and 87% of the participants in the hybrid and remote groups, respectively, rated somewhat high or high levels of confidence with educating clients and families on vision dysfunction and identifying evidence-based treatment methods.

Knowledge Application

Knowledge application was measured through 10 multiple-choice, scenario-based questions. The performance means were analyzed and compared for significance with use of a 3 (group) x 3 (time)

ANOVA. The knowledge application variable was significant for the main effect of time, specifically between pre and postsurveys, $F(2, 24) = 19.68$, $p = .000$, but not between groups, $F(2,12,) = .898$, $p = .433$, indicating the groups remained the same from the beginning to end of the study. The interrelation between time and groups was also not significant, $F(2,24) = .446$, $p = .775$, for the knowledge application variable (see Table 2). Pre to follow-up knowledge differences for face-to-face ($d = 0.25$), remote ($d = 0.20$), and hybrid ($d = 0.17$) groups indicate a small effect size overall. Knowledge application rates varied between time points, including mean improvements of 25% for face-to-face, 20% for remote, and 17.3% for hybrid groups.

Table 2

Satisfaction, Confidence, and Knowledge Application: Time- and Group-Based Means

		Satisfaction	Confidence	Knowledge application
Group (Platform)	**Survey Time Frame**	**Mean (S.E.)**	**Mean (S.E.)**	**Mean (S.E.)**
1 (Face-to-face)	Presurvey	3.35 (.27)	2.20 (.27)	.50 (.08)
	Postsurvey	3.35 (.22)	2.55 (.21)	.73 (.06)
	Follow-up Survey	3.35 (.25)	2.65 (.23)	.75 (.08)
2 (Remote)	Presurvey	3.00 (.22)	1.93 (.22)	.47 (.06)
	Postsurvey	3.20 (.18)	3.07 (.17)	.60 (.05)
	Follow-up Survey	3.13 (.20)	2.93 (.19)	.67 (.07)
3 (Hybrid)	Presurvey	3.24 (.24)	2.64 (.24)	.44 (.07)
	Postsurvey	3.24 (.20)	3.12 (.19)	.61 (.06)
	Follow-up Survey	3.36 (.22)	3.08 (.21)	.61 (.07)

Discussion

The purpose of this pilot study was to determine the impact of learning platforms on occupational therapist satisfaction with technology and interactions, confidence with clinical application of knowledge learned, and knowledge application to clinical practice. The results of the study suggest that equal education over time, not learning platform, impacts both knowledge application and confidence in clinical practice. The groups remained equal from baseline to the end of the study for all variables assessed with no statistical variation, indicating the group did not impact the overall outcome. Satisfaction with technology used was not impacted by learning platform or equal education, but it may be beneficial in future studies to explore a qualitative design to identify themes of satisfaction or dissatisfaction with the groups. There were also no technological problems that arose during the study that could have impacted this outcome for the groups using distance programming.

A study by Nipp, Vogtle, and Warren (2014) found that web-based programs for low vision education for occupational therapists improved knowledge-based outcomes after education despite the difference of asynchronous education. Our study also supports the increase of knowledge after remote continuing education for both remote and hybrid platforms but with a synchronous approach. The combination of findings between the two studies support continued use of web-based and/or remote programs for professional development in both synchronous and asynchronous approaches.

The age of 12 of 15 (80%) of the participants was 30 years of age or younger and 10 of 15 (66.7%) of the participants had less than 3 years of experience as an occupational therapist. Individuals in this age group may have a more normalized view of using technology to supplement learning and

greater perceptions of usefulness during education (Park, 2009). Free continuing education credits as incentive for participation may have increased the overall rate of participation. Despite similar demographics, initial knowledge application and satisfaction scores between the three groups at all three time points, the remote group reported lower levels of confidence in comparison to the other two groups at the entry of the study. This may be attributed to a psychological perception of confidence with clinical practice more than a relationship between experience or knowledge, which may not be learning platform related.

Active learning opportunities integrating deep learning tasks and digital tools used to optimize educational approaches (Fullan & Langworthy, 2014), such as case studies, video examples, and hands-on materials encouraged greater learner engagement through differentiated instruction (Millen & Gable, 2016). The Active Learning Theory guides occupational therapists to achieve the highest levels of learning and deeper comprehension of material necessary for practice; these levels of learning are progressed through use of Bloom's Taxonomy (Forehand, 2010) and facilitate therapists to evaluate and assess visual dysfunction, create treatment plans, and clinically reason through numerous clinical situations (Khan, Egbue, Palkie, & Madden, 2017). Before the study started, four participants initially placed in a hybrid grouping requested a change to the remote group, two in the hybrid group requested remote learning for the second session together but separated from the designated site, and one requested a change from face-to-face to hybrid grouping for increased convenience, specifically with travel time. These seven participants could not have participated without the flexibility of remote learning platforms, thus supporting Chang (2016) that a benefit of synchronous web-based education is geographical scalability, accessibility without a commute, and convenience. This finding is also consistent with thematic reasons for distance learning options for professional development that currently exists (Bryan et al., 2018; Scott et al., 2017). Though remote participation may have reduced peer interaction, it increased accessibility and convenience with participation. Further, the hybrid sample may have had less interaction with their peers in the second session because of the transition from a face-to-face to remote platform, which was possibly the reason for slightly reduced satisfaction with peer interactions from the beginning to the end of the study.

These findings support that use of the Active Learning Theory to design web-based courses may increase the sense of community, which is suggested to be an essential component of course satisfaction and success (Khan et al., 2017; Myers, Jeffery, Nimmagadda, Werthman, & Jordan, 2015), even if only through web-based discussion boards and interactive learning opportunities (Chang, 2016). The participants who were recruited via email were also more likely not to provide a response to participate than those recruited with face-to-face interaction. Research is robust and continues to grow on the importance of using adult learning theories, including Active Learning Theory in online course environments. Bryan et al. (2018) and Khan, Egbue, Palkie, and Madden (2017) explored the use of embedding such theories in distance learning with use of discussions, peer engagement, and collaborative assignments. The use of such approaches will be both beneficial and necessary for occupational therapists using distance learning methods to maximize learner outcomes.

Limitations

The sample was small and was not adequately powered to draw generalizable conclusions to the profession of occupational therapy. The groups were not randomized, which reduced similarities on all confounds. The participants (n = 5) who requested group changes prior to the study to accommodate their schedules may have self-selected their group preference because of learning style, possibly

improving their overall outcome and resulting in uneven groups. This finding may warrant further research into the frequency in which learners presently self-select their learning platforms based on their preferred learning style. Because of the need to provide both hybrid and face-to-face sessions, the presenter repeated the module presentations in the study, therefore increasing topic clarity to the latter group through repeated practice with the presentation. However, significant attempts were made to keep education the same among groups by rehearsing and trialing the methodology in advance, limiting the number of presentations, and providing answers to participant questions after the study concluded. Although confidentiality was maintained throughout the study, some of the participants were familiar with the primary investigator, which may have impacted reports of satisfaction. The majority of the participants work in neurospecialty settings, which may have contributed to the rapid improvements with knowledge application because of greater familiarity with the subject matter.

Future Research

Qualitative analysis of satisfaction with learning platforms and technology will be important for future research to build therapist-centered interfaces and educational methods. Providing choices for learners between participation in four platforms, including face-to-face, hybrid, synchronous-remote, and asynchronous-remote designs, may reveal greater participant preferences between learning platforms. It is expected that education will become more technology-based, so it is important that educators continually explore and research the most effective and evidence-based platforms and interfaces to maximize learning. It will be beneficial to explore distance learning with a larger, randomized, and more diverse sample with different topics of occupational therapy education to determine the overall use and impact of distance programming on occupational therapist confidence and competence in various framework domains.

Implications for Practice

This study suggests that opportunities for continuing education credits via distance or mixed platforms may improve accessibility and convenience for therapists, thus increasing overall participation rates. Education provided in the same manner may result in similar outcomes despite the platform used. Active use of adult learning theories will strengthen the education despite the learning platform and can be integrated with any combination of distance-learning platforms.

Conclusion

The role of technology in education continues to expand. Distance learning programs become more desirable with predicted accessibility reductions for continuing education based on strict budgets and productivity demands, expansion of the profession to more rural locations, and increasing prevalence of potentially debilitating diagnoses, such as low vision (Nipp et al., 2014). This study supports the continued use of face-to-face, remote, or hybrid platforms for continuing education to increase scalability and occupational therapist confidence and knowledge application to clinical practice. Contemporary addition of distance learning for many classroom courses, continuing education units, and web-based/remote programs continue to gain popularity because of cost-based and accessibility benefits. Therefore, in the future, it will be vital to design programs based on learner feedback to optimize knowledge translation to their current practice.

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