GRADUATE-LEVEL ONLINE INSTRUCTION: CHANGES IN FACULTY PERCEPTIONS FROM 2002, 2007, AND 2016

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ABSTRACT

Faculty perceptions about interaction, instruction, and use of technology factors related to graduate-level online courses were explored using data from a brief, 10-item Online Graduate Distance Education survey administered to U.S. higher education faculty with online teaching experience in 2002 (N = 23), 2007 (N = 27), and 2016 (N = 22). Descriptive and ANOVA procedures were used to compare group differences. The 2016 faculty group had significantly lower importance ratings for interaction and instruction items compared to the 2002 and 2007 groups. The 2002 faculty group had significantly higher ratings for technology use factors compared to the 2007 group.

Keywords: faculty perceptions, graduate online distance learning, instruction

INTRODUCTION

Among U.S. higher education institutions, graduate-level online distance course (ODC) delivery has expanded educational access and opportunities for a wider student population (Scagnoli, Choo, & Tian, 2019; Stephens, Coryell, & Peno, 2017). Enrollment in ODCs has risen from 11.7% in 2003 to 31.7% in 2016 (Scagnoli et al., 2019). Among 19,481,014 higher education students in 2016, 5,200,274 (30.8%) undergraduate and 2,971,802 (36.8%) graduate students had enrolled in an ODC (National Center for Education Statistics, 2018).

Exploring over time any changes in faculty perceptions related to ODC delivery can provide information about the factors that can influence the application of instructional pedagogy and use of technology in the ODC learning environment. The purpose of this study was to explore changes in faculty perceptions between 2002 and 2016 relative to graduate-level ODC interaction, instructional, and technology use factors. The study was guided by three research questions:

- To what extent has the level of importance ascribed by faculty to interaction factors changed over time relative to graduate-level ODC delivery?
- To what extent has the level of importance ascribed by faculty to instructional factors changed over time relative to graduate-level ODC delivery?
- To what extent has the level of importance ascribed by faculty to technology use factors changed over time relative to graduate-level ODC delivery?

CONCEPTUAL FOUNDATION

Moore's (2013) Transactional Distance Theory (TDT) provided the conceptual foundation for exploring faculty perceptions about graduate-level ODC delivery. Moore described learning as a social process mediated through communication interactions within a bounded transactional learning space. Asynchronous interactions influence the level of psychological distance and disconnect experienced by course members that affects the learning process. Moore referred to this as a transactional gap that is widened or narrowed by the extent that interactions promote a sense of presence and connectedness within the learning space. Learning and knowledge construction is facilitated through technology mediated interaction that is promoted through course tasks and discourse (Limperos, Buckner, Kaufmann, & Frisby, 2015).

A core assumption of TDT is that students have the capacity for self-direction in terms of their learning intentions, motivations, and actions. The ODC design, structure, embedded technology, and instructional strategy use influence the level of autonomy and responsibility that students are given to manage and direct the level of interaction, independent decision making, task completion sequencing, and pace of learning (Kebritchi, Lipschuetz, & Santiague, 2017; Limperos et al., 2015; Moore, 2013). According to Moore, students enter the ODC classroom with varying levels of motivation, resourcefulness, and prior experience with the subject matter. The role of the instructor shifts from control and direction to facilitation and support of self-directed learning through instruction and the integration of materials, activities, and resources to create an experiential learning environment. The course design and embedded technology are coupled with access to both technical and course supports to ease movement within the ODC environment, resolve technical glitches, link course activities with resources, foster interaction, and facilitate self-management of course activities and assessments (Moore, 2013).

LITERATURE REVIEW

Faculty perceptions about graduate-level ODC delivery influences interactional, instructional, and technology use to create a course environment that decreases the transactional gap and promotes learning (Gregory & Martindale, 2017; Kebritchi et al., 2017). The literature review is delimited to factors explored in the study: (a) student-instructor interaction; (b) requiring student collaboration and course participation; (c) instructor feedback: (d) the use of varied instructional techniques; (e) providing clear course organization and expectations; (f) providing clear criteria for student assessment; (g) the use of technology to support completion of course tasks; (h) instructor competency using technology; and (i) the use of technology to enhance learning.

Interaction in the ODC Learning Space

Graduate level ODC delivery relies on technology-mediated communication and interaction to facilitate engagement and dialog with the course content, the instructor, and peers within the transactional learning space (Martin & Bolliger, 2018). Faculty use a variety of communication channels, tools, media formats, and subject content delivery systems to promote engagement, interaction, and connectedness that facilitate learning (Martin & Bolliger, 2018).

A critical form of interaction in graduate-level ODCs is detailed, personalized, and constructive faculty feedback that promotes student engagement, critical thinking, knowledge construction, and motivation to persevere within the ODC learning space (Kebritchi et al., 2017; Martin & Bolliger, 2018). The instructional process, observations of student interactions, and assessment of student work provide channels for meaningful faculty feedback (Fedynich, Bradley, & Bradley, 2015; Kebritchi et al., 2017). However, the utility of feedback diminishes over time in its ability to support self-directed learning, promote knowledge construction, and reduce transactional distance (Moore, 2013). ODC faculty have reported problems providing consistent, timely, and explanatory feedback and admit taking two or more days to respond to emails and up to two weeks to return students assignments (Kebritchi et al., 2016; Martin & Bolliger, 2018).

Use of Instructional Strategies in the ODC Learning Space

Faculty bring to the ODC environment diverse levels of experience, knowledge, skill, and pedagogy that influence the course curriculum, technology integration, and instructional strategy. Advancements in ODC technology have placed greater responsibility on faculty for course design, structure, and instructional processes (Gregory & Martindale, 2017). However, faculty struggle to stay abreast of information and telecommunications (ITT) advancements and translate course materials and instructional strategies from the traditional classroom to the asynchronistic, technology mediated ODL environment (Kebritchi et al., 2017; Limperos et al., 2015).

During the early days of ODC delivery, faculty frequently applied a teacher-centered instructivist pedagogy to curricular and instructional approaches (Esterhuizen, Blignaut, & Ellis, 2013). Instructivism is founded on the premise that the teacher, as the primary agent of learning, applies knowledge and instructional expertise to control the structure, order, and manner of content presentation (Esterhuizen et al., 2013). Instructors create a curriculum linked to specific learning outcomes and then engage students in completing a series of tasks with ongoing feedback and assessment to promote content mastery. The instructivist classroom is characterized by instructor-controlled pacing of the learning process, use of individual written assignments, test-based assessments, and limited opportunities for student interaction and collaboration (Broadbent & Poon, 2015; Esterhuizen et al., 2013). In the instructivist ODC environment, students often struggle to achieve learning outcomes due to limited opportunities for interaction, difficulty with the sequencing and pace of task completion, and technological issues that interrupt the learning process (Broadbent & Poon, 2015).

In an asynchronistic, technology-embedded ODC environment, instruction has shifted from a teacher-centered instructivist pedagogy toward a student-centered constructivist pedagogy that gives students greater autonomy to direct their learning (Gregory & Martindale, 2017; Kebritchi et al., 2016). From a constructivist pedagogy, students are treated as active learners who direct the construction of knowledge and meaning-making. The ODC structure and design incorporates a variety of multimedia formats that promote interaction, accommodate a diversity of learning styles, and use authentic problem-based activities that engage students with the subject content to promote use of higher-level cognitive skills and metacognitive strategies (Broadbent & Poon, 2015; Deschaine & Whale, 2017; Nursey-Bray & Palmer, 2019). An experiential learning space is created using audio or video files, PowerPoint presentations, simulations, games, animations, podcasts, embedded media links, and other resources to support student interaction, collaboration, and subject content mastery (Nursey-Bray & Palmer, 2019; Scagnoli et al., 2019).

In ODC delivery, course structure and organization provide the foundation for instructional and learning processes. The transactional gap in the ODC learning space is narrowed through a course structure with integrated features that promote interaction, subject content engagement, and use of authentic activities to promote learning (Moore, 2013). Compared to undergraduate ODCs, graduate-level ODCs require greater student responsibility for identifying learning needs, setting goals, and using course materials to achieve subject content mastery (Fedynich et al., 2015; Kebritchi et al., 2016). As self-directed learners, graduate students desire an unambiguous course structure with guidelines for navigating the ODC environment coupled with clearly stated expectations and assessments linked to course benchmarks and outcomes (Martin & Bolliger, 2018; Nursey-Bray & Palmer, 2019). However, the course content and activities in many ODCs are poorly linked to student assessments and required learning outcomes (Limperos et al., 2015). As a result, students have experienced an ODC structure and organization that caused confusion, frustration, and difficulty mastering the subject content because activities and assignments were ambiguous and misaligned with course learning outcomes (Limperos et al., 2015).

Use of Technology in the ODC Learning Space

Critical to ODC delivery is integrating technology to support the course structure, instructional strategies, and learning processes (Cochran & Benuto, 2016; Deschaine & Whale, 2017). Embedded technology influences the level of rigidity or flexibility students encounter in how they interact with others and their ability to manipulate course materials to fit their learning needs within the ODC transactional learning space (Cochran & Benuto, 2016; Moore, 2013).

Instructional quality and student timely completion of tasks is dependent on converting curricular materials into a digital format, ease of navigating the ODC course environment, reliability of the embedded technology, compatibility of the course technology with student computer systems and mobile devices, and accessibility of technical support (Kebritchi et al., 2016; Nursey-Bray & Palmer, 2019; Stephens et al., 2017). Providing real-time access to information, understanding time and place barriers influencing student communication and collaboration, and factoring in student unfamiliarity with course technology are important considerations when creating timelines for student completion of course tasks (Broadbent & Poon, 2015). The task for faculty is integrating technologies that have curricular applications aligned with instructional strategies and course learning goals that support self-directed learning and reduce the transaction gap in the learning space (Deschaine & Whale, 2017).

Student success in a graduate-level ODC is dependent on faculty competency using course embedded technology to support pedagogical and instructional practices (Esterhuizen et al., 2013; Holmes & Kozlowski, 2015). Core competency issues include the ability to integrate into the course design and instructional practices a wide range of synchronous and asynchronous technologies (Cochran & Benuto, 2016; Kebritchi et al., 2017). Initial and ongoing training promotes faculty competency in ODC-specific pedagogy, instruction, and technology use (Gregory & Martindale, 2017). While faculty receive more training in ODC-based technology use than during the early days of ODC delivery, many view the current training insufficient to keep pace with ITT and mobile technology changes and to develop ODC-specific pedagogy and instructional strategies (Cochran & Benuto, 2016; Esterhuizen et al., 2013).

Embedded course technology can enhance learning by promoting student interaction with the instructor, peers, and subject content (Moore, 2013). From a constructivist pedagogy, multimedia components (e.g., games, simulations, and videos) and interactive technology (e.g., avatars, wikis, FaceBook, and EduSpace) can create an experiential learning environment that promotes the construction of knowledge, provides students with autonomy in how they interact with course content, and increases the level of student control over the pace of their learning (Broadbent & Poon, 2015; Cochran & Benuto, 2016; Kebritchi et al., 2017).

Graduate students enrolled in ODCs range from newcomers or digital immigrants with limited comfort and competency using ITT and mobile devices to digital natives with significant familiarity and skill using ITT across multiple platforms (Stephens et al., 2017). Digital native students express increased motivation for learning and higher content retention through ODC instruction compared to the traditional classroom environment (Holmes & Kozlowski, 2015). However, digital immigrants can become frustrated and overwhelmed when dealing with technology issues that disrupt instructional and learning processes (Nursey-Bray & Palmer, 2019). Faculty face the challenge of supporting interaction and learning through embedded technology that is usable by both digital immigrants and digital natives (Kebritchi et al., 2017).

METHODS

A descriptive survey method research design was used to explore faculty perceptions of graduate-level ODC delivery using the 10-item Online Graduate Distance Education (OGDE) survey. The study sample was derived from the population of faculty in the United States with experience teaching graduate-level ODCs. Convenience sampling was used to recruit faculty who volunteered to complete a survey about teaching ODCs.

In 2002 and 2016, participants who taught graduate and undergraduate ODCs completed a 32-item Quality Distance Education Survey (QDES) developed in 2002 (Perry & Steck, 2019). The 2002 data were collected for a dissertation study with the 2016 data specifically used as a comparison to the 2002 study. In 2007, a subset of questions from the QDES was administered to faculty who taught only graduate-level ODCs. The 2007 data were acquired from an unpublished set of data and added as an interim comparison group to the 2002 and 2016 samples to specifically examine faculty perceptions about teaching graduate-level ODCs. Surveys were completed by faculty in 2002 between May 17 and June 15, 2002 (N = 22) from twelve institutions across the United States; in 2007 between October 13 and November 29, 2007 (N = 27) from four institutions across the United States; and in 2016 between September 24 and October 25, 2016 (N = 23) from four institutions in the Pacific Northwest. The OGDE survey included demographic questions for age, sex, years teaching, institution type, number of ODL courses taught, and number of students in last ODL course. Unfortunately, demographic data were not collected from the 2007 faculty sample and therefore were not included in the present study. Finally, no repeated sampling was conducted over time as different faculty completed the survey in 2002, 2007, and 2016.

Instrumentation

Ten items from the longer 32-item Quality Distance Education Survey (QDES) developed in 2002 (Perry & Steck, 2019) were used to develop the short 10-item ODGE scale to explore faculty perceptions about interaction, instructional strategies use, and use of technology factors specific to teaching an ODC. Questions on the OGDE survey were presented in a Likert-type, single response, forced-choice format. The Likert format used in measuring beliefs and attitudes has been demonstrated to be generally capable of attaining high levels of reliability and validity (Norman, 2010). The ten scale items were used to derive an overall composite score on the importance of graduate-level ODC delivery (OGDE scale) and three subscales: (a) 4-item OGDE:INT interaction subscale (OGDE scale items 1, 2, 3, and 5) on the importance of instructor-student interaction, student collaboration, requiring active student participation in the course, and instructor feedback; (b) 3-item OGDE:INS instruction subscale (OGDE items 4, 6, 8) on the importance of using a variety of ODC instructional techniques, course organization and providing clear expectations for course outcomes, and providing clear criteria for assessing learning outcomes; and (c) 3-item OGDE:TCH technology subscale (OGDE items 7, 9, 10) on the importance of using technology to facilitate student timely completion of the course, instructor competency using ODC technology, and the use of technology to enhance student learning. Question responses were presented using a 6-point Likert-type set of anchors: 1 Not at all important, 2 Unimportant, 3 Slightly unimportant, 4 Slightly important, 5 Important, and 6 Very important. The survey required approximately five minutes to complete.

OGDE Validity and Reliability

The content validity of the OGDE was assessed using face validity based on a review of the literature, subjective impression of the study researchers, and comparison with items developed from two validated instruments: the Teacher's Attitudes Towards Computers Survey (Christensen, 1997, pp. 38–40) and the University of Phoenix Perceptions and Attitudes Exhibited by Distance Education Students and Faculty Survey (Goodwin, 1993, p. 115). The OGDE survey was revised based on content and format recommendations by a panel of three PhD-level experts in survey construction and distance education. A pilot study of the instrument was conducted for face and content validity.

Reliability of the OGDE instrument was established using the Cronbach alpha coefficient (see Table 1). The ten OGDE items were generally unrelated, with correlations ranging from .636 for INS-8 and INS-6 to -.005 for INT-5 and INS-8. ODGE scale statistics were M = 52.94 and SD = 6.329. The Cronbach alpha reliability coefficients of the ten individual items ranged from .756 for INS-6 to .780 for TCH-9. The Cronbach reliability coefficients for the 10-item OGDE scale was .779 and .701 for the 4-item OGDE:INT subscale, .699 for the 3-item OGDE:INS subscale, and .754 for the 3-item OGDE:TCH subscale.

Table 1. Cronbach Alpha Values for the OGDE Scale and Three Sub-scales

OGDE: Interaction subscale (OGDE:INT)	.701
INT-1: Student-instructor interaction	.760
INT-2: Collaboration among students	.758
INT-3: Active class participation required	.761
INT-5: Timely instructor feedback	.763
OGDE: Instruction subscale (OGDE:INS)	.699
INS-4: Uses a variety of instructional techniques	.765
INS-6: Course organization/Clear expectation	.756
INS-8: Clear criteria for student assessment	.757
OGDE: Use of Technology subscale (OGDE:TCH)	.754
TCH-7: Timely complete course using technology	.779
TCH-9: Instructor competency using technology	.780
TCH-10: Use of technology to enhance learning	.763
OGDE 10-iten Scale	.779

Based on recommendations by Nunnally and Bernstein (1994), reliabilities ranging from 0.50 to 0.60 were acceptable in the early stages of instrument development with the goal of achieving levels of .80 or higher. The Cronbach's index of internal consistency was .779 for the ten items in the OGDE scale that provided evidence of an acceptable level of scale reliability.

Data Analysis

It is common in the research literature to find ordinal-level Likert data analyzed using interval-level parametric statistical procedures. Based on the analysis of real and simulated data, Norman (2010) concluded that parametric tests are appropriate for use with Likert data and can provide robust and unbiased outcomes even when normality assumptions are violated. Therefore, data analysis included descriptive statistics and One-Way Analysis of Variance (ANOVA) statistical tests. To mitigate for unequal faculty group sample sizes and instances of unequal or unknown variances, the more conservative Brown-Forsythe F-test and Games-Howell post hoc test were used for multiple paired comparisons between means. An alpha level of .05 was used for all analyses.

STUDY DELIMITATIONS AND LIMITATIONS

The study focus was delimited to three areas of graduate-level ODC delivery: interaction, instructional techniques, and use of technology. Some methodological limitations need to be mentioned. First, while Cronbach alpha reliabilities of the OGDE scale and subscales were within acceptable ranges, additional validity studies would improve the ability of the survey to capture interaction, instruction, and technology use issues more accurately. Second, caution should be used interpreting the findings due to the small sample sizes of the faculty groups and use of a short 10-item survey. Third, study participation was voluntary and may have introduced bias into the results; responder and nonresponder perceptions may be different. Fourth, data were derived from self-reported answers on a forced-choice survey that limited or excluded factors relevant to graduate-level ODC delivery. A mixed method approach using the survey to collect data on a large population combined with in-depth interviews of a smaller stratified sample would capture more fully faculty experiences and perceptions. Finally, a larger stratified sampling of faculty teaching graduate-level ODC by demographic, teaching, and ODC delivery experience would provide more in-depth information and improve generalizability of the results. The information from the present study provides a starting point for further investigation.

RESULTS

Comparison of the 2002, 2007, and 2016 faculty group importance mean ratings on the OGDE scale was conducted using descriptive statistics and One-Way ANOVA tests to assess differences in perceptions about the importance of interaction (OGDE:INT subscale), instruction (OGDE:INS subscale), and use of technology (OGDE:TCH subscale) in graduate-level ODC delivery. Effect size, or the amount of mean score variance explained by faculty grouping, was interpreted based on Cohen's (1988) recommended values of 0.10 (small), 0.30 (medium), and 0.50 (large). All items were rated on a Likert scale from 1 Not at all important to 6 Very important. The higher the mean value, the greater the level of importance given to that factor.

OGDE:INT 4-Item Interaction Subscale Findings

The importance of interaction to graduate-level ODC delivery was assessed using the 4-item OGDE:INT subscale. Presented in Table 2 are the means, standard deviations, and One-Way ANOVA values for faculty groups on OGDE:INT item means and subscale mean score. The highest mean rating scores for the four interaction items were INT-5 "timely instructor feedback" (4.74 to 5.61, important to very important) and lowest for INT-2 "collaboration among students" (3.50 to 4.13, slightly unimportant to slightly important). The lowest interaction item mean ratings were given by the 2016 faculty group with scores from 3.50 (slightly unimportant to slightly important) to 4.05 (slightly important). Overall, the OGDE:INT subscale mean ratings scores ranged from 4.05 (slightly important) to 4.74 (slightly important to important) and 5.61 (important to very important) for the 2016, 2002, and 2007 faculty groups respectively.

One-Way ANOVA F-tests and effect size were calculated to examine faculty group differences on OGDE:INT item and subscale means scores. There were no significant group differences for the OGDE:INT subscale items for "student-instructor interaction" (OGDE:INT-1) and "collaboration among students" (ODGE:INT-2). Effect sizes for both OGDE:INT-1 and OGDE:INT-2 were negligible with 7% and 7.2%, respectively, of the variance in the scores attributed to faculty grouping. Faculty mean ratings for both OGDE:INT-1 "student-instructor interaction" and OGDE:INT-2 "collaboration among students" decreased over time between 2002 and 2016. Significant faculty group differences and medium and large effect sizes, respectively, were noted for OGDE:INT-3 "active class participation require" and OGDE:INT-5 "timely instructor feedback" with the variance of the scores attributed to faculty grouping ranging from 29.3% to 55.5%, respectively. Finally, a significant group difference with a medium effect size was noted for the OGDE:INT subscale mean score with 32.8% of the variance in the OGDE:INT subscale mean score attributed to faculty group differences.

Table 2. Mean, Standard Deviations, and One-Way ANOVAs for Faculty Groups on OGDE:INT Subscale Items and the OGDE:INT Subscale Mean Score

		2002 Faculty (N=23)		2007 Faculty (N=27)		2016 Faculty (N=22)			
Item		**M**	**SD**	**M**	**SD**	**M**	**SD**	F^a	$\eta 2$
INT-1	Student-instructor interaction	4.48	1.082	4.17	.877	3.86	.710	2.603	.070
INT-2	Collaboration among students	4.13	1.180	4.04	1.029	3.50	.673	2.677	.072
INT-3	Active class participation required	4.61	.722	5.22	1.350	3.64	.848	**14.293	.293
INT-5	Timely instructor feedback	4.74	.619	5.61	.507	4.05	.653	**43.020	.555
	OGDE Interaction Mean Scale Score	4.49	.676	4.76	.686	3.76	.404	*16.862	.328

Note: a df = 2; * $p < .05$; ** $p < .01$

Table 3. Post Hoc Analysis of Faculty Group Composite Scores for OGDE:INT Subscale Items and Total Subscale Mean Score (N=72)

Faculty Group 1	Faculty Group 2	M_D	SE_D	p
	OGDE:INT-3 "Active Class Participation Required" Mean Score			
2016 Faculty	2002 Faculty	-.972	.235	.001*
	2007 Faculty	-1.586	.317	.001*
	OGDE:INT-6 "Timely Instructor Feedback" Mean Score			
2007 Faculty	2002 Faculty	.868	.162	.001*
	2016 Faculty	1.562	.167	.001*
	OGDE:INT Subscale Mean Score			
2016 Faculty	2002 Faculty	-.728	.165	.001*
	2007 Faculty	-.998	.158	.001*

Note: Games-Howell test of mean differences for multiple comparisons used; * $p < .05$.

Games-Howell post hoc tests of mean differences for faculty groups on the OGDE:INT item means and subscale mean score are presented in Table 3. Post hoc comparisons showed the 2016 faculty group had a significantly lower mean score for OGDE:INT-3 "active class participation required" compared to the 2002 and the 2007 faculty groups. The 2007 faculty group had significantly higher mean scores for the OGDE:INT-5 "timely instructor feedback" and OGDE:INT subscale mean scores compared to the 2002 and the 2016 faculty groups.

OGDE:INS 3-Item Instruction Subscale Findings

The importance of instructional elements to graduate-level ODC delivery were assessed based on a 3-item OGDE:INS subscale. Presented in Table 4 are the means, standard deviations, and One-Way ANOVA values for faculty groups on OGDE:INS item means and subscale mean score. The mean rating scores were lowest for INS-4 "uses a variety of instructional techniques," ranging from 3.83 to 4.66 (slightly unimportant to slightly important) and highest for INS-6 "course organization/clear expectations," ranging from 4.41 to 5.43 (slightly important to important). The mean ratings for the three instruction items were highest for the 2007 faculty group with scores from 4.66 to 5.43 (slightly important to important) compared to the 2002 and 2016 faculty groups with mean scores from 3.83 to 4.78 (slightly unimportant to slightly important) and 4.00 to 4.41 (slightly important), respectively. Overall, the OGDE:INS subscale mean score ranged from 4.24 (slightly important), to 4.45 (slightly important), and 5.10 (important) for the 2016, 2002, and 2007 faculty groups, respectively.

One-Way ANOVA F-tests and effect sizes were calculated to examine faculty group differences on the OGDE:INS item and subscale mean scores. Significant group differences and small effect sizes were noted for all OGDE:INS subscale items, OGDE:INS-4 "uses a variety of instructional techniques," OGDE:INS-6 "course organizations/

clear expectations," and OGDE:INS-8 "clear criteria for student assessment" with 12.0%, 24.3%, and 20.8%, respectively, of the score variance attributed to faculty grouping. Finally, a significant group difference with a small to medium effect size was noted for the OGDE:INS subscale mean score with 27.2.8% of the variance in the OGDE:INS subscale mean score attributed to group differences.

Games-Howell post hoc tests of mean differences of faculty groups on the OGDE:INS item and subscale mean scores are presented in Table 5. Post hoc comparisons showed a significantly higher mean score for the 2007 compared to the 2002 faculty group for OGDE:INS-4 "uses a variety of instructional techniques" and a significantly higher mean score for OGDE:INS-6 "course organization/clear expectations" compared to the 2002 and 2016 faculty groups. The 2016 faculty group had significantly lower mean scores for OGDE:INS-8 "clear criterial for student assessment" and OGDE:INS subscale compared to the 2007 faculty group.

OGDE:TCH 3-Item Technology Use Subscale Findings

The importance of technology use to graduate-level ODC delivery was assessed using the 3-item OGDE:TCH subscale. Presented in Table 6 are the means, standard deviations, and One-Way ANOVA values for faculty groups on OGDE:TCH item means and subscale mean score. All faculty groups rated highest TCH-9 "instructor competency using technology" with mean ratings from 4.21 to 4.55 (slightly important). Importance ratings for the technology items were fairly consistent for the 2002 faculty group ranging from 4.30 to 4.39 (slightly important) with more variability for the 2016 faculty group ranging from 4.14 to 4.55 (slightly important) and the greatest variability

Table 4. Mean, Standard Deviations, and One-Way ANOVAs for Faculty Groups on OGDE:INS Subscale Items and the OGDE:INS Subscale Means Score

		2002 Faculty (N=23)		2007 Faculty (N=27)		2016 Faculty (N=22)			
Item		**M**	**SD**	**M**	**SD**	**M**	**SD**	F^a	$\eta 2$
INS-4	Uses a variety of instructional techniques	3.83	.948	4.66	1.102	4.00	.926	*4.718	.120
INS-6	Course organizations/ Clear expectations	4.78	.518	5.43	.964	4.41	.734	**11.070	.243
INS-8	Clear criteria for student assessment	4.74	.541	5.22	.925	4.32	.646	**9.057	.208
	OGDE Instruction Mean Scale Score	4.45	.410	5.10	.864	4.24	.426	**12.889	.272

Note: a df = 2; * p < .05; ** p < .01

Table 5. Post Hoc Analysis of Faculty Group Composite Scores for OGDE:INS Item and Total Subscale Mean Ratings (N=72)

Faculty Group 1	Faculty Group 2	M_D	SE_D	p
	OGDE:INS-4 "Uses a Variety of Instructional Techniques" Mean Score			
2002 Faculty	2007 Faculty	-.830	.295	.019*
	2016 Faculty	-.174	.295	.815
	OGDE:INS-6 "Course Organization/Clear Expectations" Mean Score			
2007 Faculty	2002 Faculty	.651	.213	.012*
	2016 Faculty	1.024	.243	.001*
	OGDE:INS-8 "Clear Criteria for Student Assessment" Mean Score			
2016 Faculty	2002 Faculty	-.421	.178	.058
	2007 Faculty	-.897	.225	.001*
	OGDE:INS Total Instruction Subscale Mean Score			
2016 Faculty	2002 Faculty	-.207	.125	.233
	2007 Faculty	-.859	.190	.001*

Note: Games-Howell test of mean differences for multiple comparisons used; * p < .05.

among the 2007 faculty group ranging from 3.47 to 4.21 (slightly unimportant to slightly important). While the 2007 and 2002 groups rated lowest item TCH-7 “timely complete course using technology” from 3.47 to 4.30 (slightly unimportant to slightly important), respectively, the 2016 faculty group rated lowest item TCH-10 “use of technology to enhance learning” (4.14, slightly important).

One-Way ANOVA F-tests and effect sizes were calculated to examine faculty group differences on the OGDE:TCH item and subscale mean scores on technology use factors. There were no significant faculty group differences for OGDE:TCH subscale items “instructor competency using technology” (OGDE:TCH-9) and “use of technology to enhance learning” (ODGE:TCH-10). Effect sizes for both OGDE:TCH-9 and OGDE:TCH-10 were negligible with about 5.27% and 7.7%, respectively, of the variance in the scores attributed to faculty grouping. Significant faculty group differences and a very small effect size was noted for ODGE:TCH-7 “timely complete course using technology” with only 10.2% of the score variance attributed to faculty grouping. Finally, a significant faculty group difference with a very small effect size was noted for the OGDE:TCH subscale mean score with only 11% of the variance in the OGDE:TCH subscale mean score attributed to differences in faculty grouping.

Games-Howell post hoc tests of mean differences of faculty groups for OGDE:TCH-7 item and subscale mean score are presented in Table 7. Post hoc comparisons showed the 2002 faculty group had significantly higher mean scores for OGDE:TCH-7 “timely complete course using technology” and OGDE:TCH subscale mean score compared to the 2007 faculty group.

OGDE 10-item Scale

Some patterns were noted among the ten OGDE survey items (see Table 8). First, items OGDE:INS-6 “course organization/clear expectations” and OGDE:INS-8 “clear criteria for student assessment” were rated among the highest for all faculty groups while OGDE:INT-2 “collaboration among students” was rated among the lowest. Faculty from the 2002 and 2007 groups rated higher interaction item OGDE:INT-3 “active class participation required” compared to the 2016 faculty group. Conversely, the 2016 faculty group rated much higher OGDE:TCH-7 “timely complete course using technology” and OGDE:TCH-10 “instructor competency using technology” than did the 2002 and 2007 faculty groups. In fact, the

Table 6. Mean, Standard Deviations, and One-Way ANOVAs for Faculty Groups on OGDE:TCH Scale

		2002 Faculty (N=23)		2007 Faculty (N=27)		2016 Faculty (N=22)			
Item		**M**	**SD**	**M**	**SD**	**M**	**SD**	***F*[a]**	***η2***
TCH-7	Timely complete course using technology	4.30	.822	3.47	1.650	4.23	.685	*3.924	.102
TCH-9	Instructor competency using technology	4.39	.656	4.21	.783	4.55	.739	1.890	.052
TCH-10	Use of technology to enhance learning	4.35	.714	3.82	.931	4.14	.640	2.860	.077
	OGDE Technology Use Mean Scale Score	4.35	.555	3.81	.985	4.30	.447	*4.286	.110

Note: a df = 2; * p < .05; ** p < .01

Table 7. Post Hoc Analysis of Faculty Group Composite Scores for OGDE:TCH Item and Total Subscale Mean Ratings (N=72)

Faculty Group 1	**Faculty Group 2**	M_D	SE_D	*p*
	OGDE:TCH-7 “Timely Complete Course Using Technology” Mean Score			
2002 Faculty	2007 Faculty	.838	.334	.038*
	2016 Faculty	.077	.351	.974
	OGDE:TCH Total Use of Technology Subscale Mean Score			
2002 Faculty	2007 Faculty	.537	.222	.050*
	2016 Faculty	.045	.150	.952

Note: Games-Howell test of mean differences for multiple comparisons used; * p < .05.

2016 faculty rated all technology items higher in importance compared to the 2002 and 2007 faculty.

Using the composite OGDE scale mean score, a One-Way ANOVA F-test and effect size were calculated to examine faculty group differences on the compositive OGDE survey mean score. A significant group difference and small effect size was noted for the ODGE scale with 15.0% of the variance in the OGDE composite mean score attributed to faculty grouping.

Games-Howell post hoc test of mean differences of faculty groups for the OGDE scale mean score is presented in Table 9. Post hoc comparisons showed that the 2016 faculty group had a significantly lower mean score for the OGDE scale compared to the 2002 and 2007 groups.

DISCUSSION

Significant ITT advancements and the blending of technology into daily life have contributed to graduate-level ODCs becoming a regular part of higher education (Cochran & Benuto, 2016). Faculty are integral to student achievement of ODC learning outcomes through their roles as subject expert, course designer, learning facilitator, and technologist (Holmes & Kozlowski, 2015). The purpose of the study was to explore changes in faculty perceptions about teaching graduate-level ODCs. Due to the nature of utilizing a short 10-item forced-choice survey, study implications are limited. However, the findings provide information and a richer picture about changes in faculty perceptions over time that can influence attitudes and behaviors related to teaching in the graduate-level ODC transactional learning environment.

Changes Over Time in Faculty Perception about ODL Interaction Factors

Interaction is central to student engagement, motivation, and learning in the graduate-level

Table 8. Mean, Standard Deviations, and One-Way ANOVAs for Faculty Groups on OGDE Scale Items and the Mean OGDE Scale Score

		2002 Faculty (N=23)		2007 Faculty (N=27)		2016 Faculty (N=22)			
Item		**M**	**SD**	**M**	**SD**	**M**	**SD**	F^a	$\eta 2$
1	Student-instructor interaction	4.48	1.082	4.17	.877	3.86	.710	2.603	.070
2	Collaboration among students	4.13	1.180	4.04	1.029	3.50	.673	2.677	.072
3	Active class participation required	4.61	.722	5.22	1.350	3.64	.848	14.293**	.293
5	Timely instructor feedback	4.74	.619	5.61	.507	4.05	.653	43.020**	.555
4	Uses a variety of instructional techniques	3.83	.948	4.66	1.102	4.00	.926	4.718*	.120
6	Course organizations/ Clear expectations	4.78	.518	5.43	.964	4.41	.734	11.070**	.243
8	Clear criteria for student assessment	4.74	.541	5.22	.925	4.32	.646	9.057**	.208
7	Timely complete course using technology	4.30	.822	3.47	1.650	4.23	.685	3.924*	.102
9	Instructor competency using technology	4.39	.656	4.21	.783	4.55	.739	1.890	.052
10	Use of technology to enhance learning	4.35	.714	3.82	.931	4.14	.640	2.860	.077
	OGDE Mean Scale Score	4.44	.451	4.58	.699	4.07	.246	6.093**	.150

Note: a df = 2; * p < .05; ** p < .01

Table 9. Post Hoc Analysis of Faculty Group by OGDE Total Scale Mean Score (N=72)

Faculty Group 1	Faculty Group 2	M_D	SE_D	p
2016 Faculty	2002 Faculty	-.3666	.1076	.005*
	2007 Faculty	-.5092	.1444	.003*

Note: Games-Howell test of mean differences for multiple comparisons used; * p < .05.

ODC transactional learning space (Moore, 2013). The declining level of importance given to interaction factors between 2002 and 2016 may be indicative of communication channels not being available or used widely in the past. The level of perceived importance may have diminished because faculty can engage in anywhere, anytime interactions through mobile devices and non–text-based applications such as webcasting, interactive audio/video streaming, and web-conferencing (Fedynich et al., 2015; Kebritchi et al., 2017; Martin & Bolliger, 2018).

The level of importance given to required student participation and peer collaboration on activities and projects decreased between 2002 and 2016. This finding may be attributed to the relative novelty of the technology innovations being used in ODCs in 2002 and 2007. By 2016, mobile technology such as smartphones and tablets had become ubiquitous and removed location and time barriers to ODC access. The lowered level of importance also may reflect faculty reconciling student dislike for required collaborative activities and the belief among educators that student collaboration promotes learning and cognitive development through dialogue, problem-solving, and applying teamwork-based skills (Fedynich et al., 2015).

Changes Over Time in Faculty Perceptions about ODL Instruction Factors

With increased addition of ODCs, there has been a shift toward a student-centered constructivist pedagogy supported through the integration of technology compatible instructional strategies and assessments that promote self-directed learning (Broadbent & Poon, 2015; Esterhuizen et al., 2013). Based on Moore's (2013) TDT, a student-centered constructivist pedagogy promotes better student self-directed learning and interaction that can increase a sense of connectedness and reduce the transactional gap within the learning space. The challenge for faculty in the constructivist based ODC is to create an enriched and engaging transactional learning space that incorporates synchronous and asynchronous multimedia activities with clear connections between the course content and required learning outcomes (Fedynich et al., 2015; Moore, 2013). In 2002, faculty often used technology for course preparation; by 2016, there was greater intentional use of technology tools to "teach" rather than just "prepare to teach."

Among the ten factors explored, a low level of importance was given to the use of a variety of instructional strategies. First, the faculty role has shifted toward focusing less on instructional strategies and giving greater attention to effective integration of technology within a clearly defined and organized course structure and curriculum to facilitate and support student self-directed learning (Broadbent & Poon, 2015; Cochran & Benuto, 2016; Kebritchi et al., 2017). In the ODC environment, faculty were moving toward a facilitator role that guides students through planned assignments and tasks to fit more with a constructivist pedagogy that uses technology-mediated lessons to promote student interaction, engagement, and mastery of the course subject content (Scagnoli et al., 2019; Stephens et al., 2017). Also, the low level of importance given to instructional techniques may reflect an increased faculty competency using ODC-based technology along with more digital natives entering the higher education teaching profession with ITT use skills who are comfortable navigating in a technology-mediated environment.

Finally, in line with prior research, providing clear course organization and criteria for student assessment was rated highest by faculty. In 2002, the market for graduate-level ODCs was predominantly among older, working, nontraditional students who generally had a higher capacity for self-directed learning compared to the younger traditional student population (Fedynich et al., 2015; Kebritchi et al., 2017). By 2016, greater numbers of younger students were enrolled in graduate-level ODCs that required more direction and motivation from the course instructor (Cochran & Benuto, 2016; Kebritchi et al., 2017). Decreased importance given to instructional factors may signal faculty movement away from a teacher-centered instructivist pedagogy that relied predominantly on lectures and test-based assessments toward student-centered constructivist approaches that focused on performance-based assessments such as writing projects, portfolios, and collaborative activities that are considered more effective in facilitating student use of critical thinking and problem-solving skills (Esterhuizen et al., 2013).

Changes Over Time in Faculty Perceptions about Technology Use Factors

Students enter graduate-level ODCs with differing levels of preparedness and ability to engage in self-directed learning (Kebritchi et al., 2017). Quality ODCs embed technology that support a diverse student population from digital immigrants to digital natives (Stephens et al., 2017). Between 2002 and 2016, advancements in ITT have improved technology reliability and functionality to support a variety of multimedia applications used in the ODC environment. Faculty importance given to the use of technology in ODC delivery rose between 2002 and 2016, especially in terms of students using technology to complete course requirements. The ubiquitous use of social media, mobile devices, and on-demand applications by digital natives entering higher education may explain technology use factors shifting in perceived importance over time due to the prominent role of technology in the lives of students coupled with advancements in ODC-based technology to support instructional and learning processes.

Central to graduate-level ODC delivery is faculty competency in applying a digital-based pedagogy, supporting student navigation within the ODC environment, and using embedded technology to promote self-directed learning and student success in completing course tasks and mastering subject content (Stephens et al., 2017). However, with frequent advancements in ITT, faculty struggle to maintain competency using the ODC technology and managing Web 2.0 user-generated content, usability, and interoperability factors (Cochran & Benuto, 2016).

Teaching an ODC requires faculty to move beyond a basic familiarity with course ITT and develop pedagogical knowledge and skills specific to the course level, content, and learning goals while paying specific attention to curricular factors that promote student interaction, metacognitive strategy skill development, and subject mastery (Esterhuizen et al., 2013). The sophistication of ODC technology requires faculty consult with ITT services and instructional designers to embed technology into the course structure and help troubleshoot technology issues (Cochran & Benuto, 2016). This may explain the increased level of importance given by faculty over time as they recognized both the need to keep abreast of technology as well as form collaborative relationships with technology and instructional experts when developing and delivering ODCs.

Finally, while it is not the instructor's responsibility to troubleshoot technical issues, digitize curricular materials, or know how best to convert, stream, and throttle bandwidth when delivering lecture videos, many ODC faculty are confronted with these tasks (Esterhuizen et al., 2013; Gregory & Martindale, 2017). Creating quality ODCs can be a pedagogical challenge for faculty who often must develop ODC-specific teaching strategies while keeping abreast of advancements in ITT and mobile technology (Nursey-Bray & Palmer, 2019). Unfortunately, faculty development often is focused on use of technology and less on ODC-based pedagogy and instructional strategies (Holmes & Kozlowski, 2015). This can create barriers to faculty keeping pace with the advancements in ODC technology, building knowledge and skill applying digital-based pedagogies, and exploring innovative and effective teaching strategies that facilitate student-centered instruction to support learning in a virtual environment (Kebritchi et al., 2017; Stephens et al., 2017). Providing ongoing professional development and mentoring opportunities can promote competency and confidence among faculty in the effective integration of content and technology into ODC delivery that moves beyond simple information and skill with mechanistic operating procedures (Esterhuizen et al., 2013; Gregory & Martindale, 2017).

Summary and Interpretation of Global OGDE Scale Scores

Overall, the decrease in importance given to ODGE factors between 2002 and 2007 may be indicative of the "normalization" of ODC delivery and a reconciling of idealized and realistic experiences with the challenges of providing desired levels of instructional quality under the increased demands of larger class sizes, teaching multiple ODCs, and keeping pace with advancements in ITT. By 2016, nearly all higher education institutions had implemented graduate-level ODCs with improved ITT and ODC support systems for instructors and students. In line with the literature, in the early years of ODC delivery technology was less reliable, students required higher levels of support, and faculty had less instructional experience and were more sensitive to the transactional gap created by time and location separation on the learning process (Moore, 2013). With ITT advancements, improvements in technology reliability, and increased numbers of digital natives entering higher education, interaction, instruction, and technology use factors have taken on less importance compared to other yet unknown factors.

CONCLUSION

Ultimately, responsibility rests largely with graduate-level ODL faculty to create a technology-mediated learning environment that provides students with an engaging, motiving, and successful learning experience. Based on the study findings, integration of course technology and faculty competency using that technology have taken on greater importance compared to interactional and instructional factors. This may be indicative of instructors working to improve technology integration within the ODC course structure and transactional space to support self-directed learning and the achievement of learning outcomes.

A constructivist pedagogy supported through technology integrated instructional strategies can promote self-directed learning and narrow the level of transactional distance in a media rich ODL learning space with materials delivered via multimodal formats such as dynamic presentations, laboratory tutorials, and simulations (Cochran & Benuto, 2013; Kebritchi et al., 2017; Limperos et al., 2015; Moore, 2013). Technological advancements, no doubt, will enable faculty to tailor instruction more effectively to student learning needs and narrow the transactional gap within the learning space (Deschaine & Whale, 2017). The results of this study provide evidence that over time faculty perceptions about student interaction, use of ODC-specific instructional strategies, and technology integration remain important factors to effective graduate-level ODC delivery as its use continues to expand within higher education.

RECOMMENDATIONS FOR FURTHER STUDY

Through this study, several factors were identified to consider in future research examining graduate-level ODC delivery. First, comparing faculty perceptions and actual instructional strategies and technology integration behaviors was not investigated. This would provide a richer picture of how perceptions influence behaviors to facilitate interaction, apply instructional strategies, and integrate technology to support student self-directed learning. Second, the significantly lower importance ratings among the 2016 compared to the 2002 and 2007 faculty groups on several factors warrants further investigation to understand more fully environmental, instructional, and cognitive factors that contribute to these divergent perceptions. Finally, faculty have reported that ODCs take more time and preparation compared to face-to-face course delivery. These factors were not addressed in this study but warrant further research.

Replicating this study to include both faculty and graduate students would provide a richer picture about graduate-level ODC delivery by elucidating faculty perceptions and misconceptions of what students actually believe and how they behave in the ODC environment. It also would provide information about how differences in faculty and student perceptions affect graduate-level ODC pedagogy, instructional strategy use, and technology integration to support ODC student learning. Finally, a larger more stratified sample would improve clarity and provide the ability to explore the direction or magnitude of change and shed light on possible reasons for different perceptions about graduate-level ODC instruction between various faculty groups.

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