

Instructor and Student Perceptions of Course Experiences

In Online and Face-to-Face Classes

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Abstract

Student ratings were compared in courses offered either exclusively online ($n = 13,416$) or face to face ($n = 5,272$). Data from 105 institutions were accessed from archived files of the IDEA Student Ratings of Instruction system. Lecture was the primary approach to instruction in both face-to-face and online courses, although more common in hard than soft fields. Instructors in online classes required more writing and computer applications; those in face-to-face classrooms expected more oral communication and group work. Online instructors in soft-applied disciplines required slightly more critical thinking but much less creativity than those in face-to-face courses. Students in online classes reported greater instructor expectations that they share responsibility for learning. Overall, there were more similarities than differences between student ratings collected in face-to-face and online classes, with disciplinary differences controlled.

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PURPOSE OF THE STUDY

We examined differences between online and face-to-face college classes in instructor and student perceptions of course experiences, controlling for disciplinary differences.

Specifically, we compared student ratings across classroom settings to examine approaches to instruction, teaching styles, skill requirements, course circumstances, and teacher standards.

THEORETICAL FRAMEWORK

The percent of students taking college courses online has increased substantially to where now more than one in four students takes at least one Web-based course. The demand for online courses now exceeds that of face-to-face offerings, and 74% of public institutions view online learning as a critical component of their long-term enrollment strategies (Allen & Seaman, 2010). Nonetheless, skepticism about cyber learning remains, as more than two-thirds of instructors surveyed by the Babson Survey Research Group reported they believe students learn less in online courses than they do in the traditional classroom (Allen & Seaman, 2012). This is in spite of evidence to the contrary (e.g., Means, Toyama, Murphy, Bakia, & Jones, 2009; Wang & Newlin, 2000).

Disciplinary Differences in Teaching

Disciplines have contextual influences on teaching practices (see Neumann, 2001 for a review). Studies have reported disciplinary differences in terms of faculty members' use of time for teaching and preparation (Smeby, 1996), their commitment to teaching (Biglan, 1973a), types of instruction (i.e., lectures, seminars, laboratory work, and supervision), and teaching approaches (information transmission/teacher-focused and conceptual change/student-focused)

(Lindblom Ylänne, Trigwell, Nevgi, & Ashwin, 2006; Smeby, 1996). In this study, we adopted two dimensions from Biglan's (1973a, 1973b) typology of academic disciplines to categorize disciplines in terms of the existence of a single paradigm (hard vs. soft) and degree of application (pure-applied). Disciplines in our dataset were classified as hard pure, soft pure, hard applied, and soft applied. According to Neumann, Parry, and Becher (2002), hard-pure knowledge aims to develop universal, cumulative, and quantitative understanding of the physical world. Soft-pure knowledge focuses on holistic and qualitative interpretation of particulars. Hard-applied knowledge is concerned with mastery of the physical environment and yields products and techniques, whereas soft-applied knowledge focuses on applying soft-pure knowledge to create protocols and procedures.

Approaches to Instruction and Teaching Styles

Creating an online course requires more than just taking materials from a traditional course and posting them online. Instructors must think differently about the way they teach (Creasman, 2012; Dyrud, 2000; Fish & Wickersham, 2009). Because of differences between the online and traditional classroom environments, the primary approaches to instruction may differ. In the face-to-face classroom, most teachers continue to lecture (Svinicki & McKeachie, 2011). In the online environment they may draw upon alternative approaches that include multi-media (Milan & Bromage, 2011). Some argue that online teaching is not as effective if instructors use the same teaching methods and styles they apply in the traditional classroom (e.g., Beanie, Spooner, Jordan, Algozzine, & Spooner, 2002). We, therefore, examined possible differences in approaches to instruction and teaching styles.

Disciplines also have an influence on instructional approaches and teaching styles. Despite the inherent differences in subject matters, consistent patterns have emerged across

disciplines classified by the hard-soft and pure-applied dimensions. Lectures are a major type of instruction across hard and soft disciplines (Ballantyne, Bain, & Packer, 1999; Neumann et al., 2002). Soft disciplines tend to spend more time on seminars, whereas the hard fields tend to stress laboratory works and field trips (Biglan, 1973a; Smeby, 1996). Some teaching approaches, such as studio and clinic, are exclusively relevant for certain disciplines. Compared with their peers in soft disciplines, instructors from hard disciplines report more teacher-focused approaches, which focuses on transmitting facts and skills from the teacher to students. On the other hand, teachers from soft disciplines prefer student-focused approaches, with which teachers help students construct their own knowledge (Lindblom Ylänne et al., 2006). These studies have exclusively examined traditional courses, and it remains unknown whether such disciplinary differences would persist when teaching and learning migrate online.

To understand whether course format influences usage of instructional approaches and teaching styles, we proposed the following questions.

RQ1: Are there differences in approaches to instruction between online and face-to-face courses, after adjustment for disciplinary differences in teaching practices? If yes, what are they?

RQ2: Are there differences in teaching styles between online and face-to-face courses, after adjustment for disciplinary differences in teaching practices? If yes, what are they?

Academic Skills Emphasized in Traditional and Online Classes

Students in online courses report a greater amount of reading in their classes (Benton et al., 2010a). Because students are, in most cases, required to post comments online, instructors teaching online might put more emphasis on writing skills. Given the reliance on the Internet for communication, instructors might also place more emphasis on computer applications. In contrast, because the traditional classroom enables face-to-face communication, perhaps

instructors in that environment require more oral communication and group work. In the current study, we compared online and face-to-face classes on these and other academic skills.

The nature of knowledge in various disciplines also determines skills required of students (Jones, Zenios, & Griffiths, 2004; Neumann et al., 2002). Hard-pure disciplines often emphasize retention of facts, theories, logical reasoning, and quantitative skills. Soft-pure fields tend to value critical thinking, reading skills, and self-expression. Students in hard-applied disciplines are expected to be able to apply theories to professional practices. Soft and applied fields emphasize problem-solving skills as well as oral and writing communication.

RQ3: Are there differences in required academic skills between online and face-to-face courses, after adjustment for disciplinary differences in student requirements? If yes, what are they?

Impact of Course Circumstances on Learning

Multiple aspects of course circumstances, such as physical facilities, students' intellectual and psychological preparation for the course, instructor's control over the course, technical support, may affect students' learning to some extent. While we were unable to locate any literature on this topic in the context of online teaching, we speculate physical equipment and technical/instructional support would be of particular importance to online courses. Given their sole reliance on information technology infrastructure, online teaching should be facilitated by ample technical resources and intellectual support.

Various disciplines value certain course circumstance differently. There are disciplinary differences in requirements and uses of digital resources (Jones et al., 2004; Neumann et al., 2002). The nature of hard disciplines demands presentational equipment and techniques (Neumann et al., 2002; Trigwell & Prosser, 2004). Certain disciplines may be less mindful of

their students' intellectual readiness, if their teaching approaches are mainly teacher-focused as opposed to student-centered (Trigwell & Prosser, 2004).

RQ4: Are there differences in instructor's perceived impact of course circumstance on learning between online and face-to-face courses, after adjustment for disciplinary differences in such perceptions? If yes, what are they?

Student Responsibility for Learning and Instructor Achievement Standards

Distance learning--by virtue of computers, the Internet, mobile technology, digital tablets, blogs, and social networks—has become incredibly student-self-directed (Eighmy, Hall, & Lenoue, 2011). Students in online courses depend less on the instructor and more on their own ability to work autonomously. We, therefore, examined whether students in online and traditional courses would report comparable instructor expectations that students share in the responsibility for their own learning. In addition, because the majority of instructors believe students learn less in online courses than they do in the traditional classroom (Allen & Seaman, 2012), we compared student ratings of the instructor's achievement standards. In terms of disciplinary differences, hard disciplines may be less likely to communicate expectations that students take the initiative in the learning process as they tend to adopt teacher-focused instruction (Trigwell & Prosser, 2004). On the other hand, student-focused approaches have high expectations on students being active learners (Trigwell & Prosser, 2004).

RQ5: Are there differences in instructor's expectations for students' responsibility for learning between online and face-to-face courses, after adjustment for disciplinary differences in such expectations?

RQ6: Are there differences in instructor's achievement standards between online and face-to-face courses, after adjustment for disciplinary differences in achievement standards?

METHOD

Instrumentation

The IDEA Student Ratings of Instruction system has been available nationally since 1975 and is comprised of two forms: The Faculty Information Form and the Student Rating Form.

Faculty Information Form. Instructors complete the *Faculty Information Form* (FIF) for each course evaluated in the system. They begin by rating each of 12 learning objectives as 3 (*Essential*), 2 (*Important*), or 1 (*of Minor or No Importance*). They also report basic information about the course such as the class meeting time, the course number, the number of student enrolled, and a department discipline code. Instructors then have the option of responding to a set of contextual questions. They can select the primary and secondary instructional approaches to the course. Using a 3-point scale, instructors can also report the extent to which their classes require the following features: writing, oral communication, computer applications, group work, mathematical/quantitative work, critical thinking, creative/artistic/design endeavor, reading, and memorization. Instructors reported whether any of following several factors may have had a positive, negative, or neutral impact on students' learning: physical facilities and/or equipment, their previous experience in teaching this course, substantial changes in teaching, their desire to teaching this course, their control over course management decisions, students' level of preparation, enthusiasm, and effort to learn, as well as technical/instructional support. Instructors also report the primary type of student enrolled. Each campus determines the start and end dates for the survey completion. The online version is delivered to faculty via e-mail.

Student Rating Form. The *IDEA Student Rating of Instruction Form* is a 47-item instrument. Students indicate how frequently their instructor used each of 20 teaching methods, by responding 1 (*Hardly Ever*), 2 (*Occasionally*), 3 (*Sometimes*), 4 (*Frequently*), or 5 (*Almost*

Always). In Table 1, the 20 teaching methods are organized into five teaching styles based on factor analysis (Hoyt & Lee, 2002). Students also rate their progress on each of the same 12 learning objectives their instructor rated for importance. Additional questions concern course characteristics, student characteristics, overall impressions of the course and instructor, and other teaching methods and instructor standards.

Table 1

Teaching Method Subscale Styles on the IDEA Student Ratings Diagnostic Form

I. Stimulating Student Interest
4. Demonstrated the importance and significance of the subject matter
8. Stimulated students to intellectual effort beyond that required by most courses
13. Introduced stimulating ideas about the subject
15. Inspired students to set and achieve goals which really challenged them
II. Fostering Student Collaboration
5. Formed “teams” or “discussion groups” to facilitate learning
16. Asked students to share ideas and experiences with others whose backgrounds and viewpoints differ from their own
18. Asked students to help each other understand ideas or concepts
III. Establishing Rapport
1. Displayed a personal interest in students and their learning
2. Found ways to help students answer their own questions
7. Explained the reasons for criticisms of students’ academic performance
20. Encourage student-faculty interactions outside of class (office visits, phone calls, e-mail, etc.)
IV. Encouraging Student Involvement
9. Encouraged students to use multiple resources (e.g. data banks, library holdings, outside experts) to improve understanding
11. Related course material to real life situations
14. Involved students’ in “hands-on” projects such as research, case studies, or “real-life” activities
19. Gave projects, tests, or assignments that required original or creative thinking
V. Structuring Classroom Experience
3. Scheduled course work (class activities, test, and projects) in ways which encouraged students’ to stay up-to-date in their work
6. Made it clear how each topic fit into the course
10. Explained course material clearly and concisely
12. Gave tests, projects, etc. that covered the most important points of the course
17. Provided timely and frequent feedback on tests, reports, projects, etc. to help students improve

Samples of the faculty and student forms may be found at <http://www.theideacenter.org/services/student-ratings/sample-forms-student-ratings-instruction>. Four survey delivery methods are available online: survey links available through a Blackboard® Building Block, e-mail, the course website, or a combination of all three. Students are restricted to one submission.

Coding Disciplines as Hard-Soft and Pure-Applied

Respondents can indicate their discipline by filling out a four-digit number representing their department. A list of 327 discipline/sub-disciplines can be found at <http://theideacenter.org/DisciplineCodes>. One author created two dichotomous variables respectively for the hard-soft and pure-applied characteristics and rated each discipline as either hard or soft and either pure or applied. Disciplines that have been covered in existing literature (Ballantyne et al., 1999; Biglan, 1973b; 1973a; Neumann et al., 2002) were coded consistently with Biglan's (1973a; 1973b) scheme and others were rated by the research's judgment. A small number of disciplines were not coded due to their interdisciplinary characteristics. After the initial coding was completed, another author reviewed the result and discussed with the other code when disagreements arose. Necessary changes to the coding were made after the discussion. Both researchers agreed on classification of 95.4% of the disciplines, indicating high inter-rater reliability. Table 2 displays the frequency of classes by course format and the hard-soft, pure-applied dimensions.

Data Source

We accessed data collected online from nearly 300 institutions using the IDEA Student Ratings of Instruction System (SRS) from 2002 to 2008. Not all classes that use IDEA Online are considered "online courses"; we contacted users individually to ascertain whether their

courses were taught on campus (face-to-face), via the Internet (online), or in some combination. We included only classes identified exclusively as either face-to-face (i.e., traditional, $N = 5,272$) or online (i.e., no blended learning, $N = 13,416$). Among the 18,688 classes, there were 38 institutions represented in the face-to-face group and 67 in the online group. Table 3 presents the frequency and percentage of face-to-face and online classes, respectively, by the highest degree awarded. Table 4 presents the frequency and percentage of principal types of students enrolled across course formats.

Table 2

Frequency of Courses by Type of Course, Hard-Soft Dichotomy, and Pure-Applied Dichotomy

	Face-to-face Courses ($n = 3,338$)		Online Courses ($n = 10,415$)	
	Hard Discipline ($n = 1,088$)	Soft Discipline ($n = 2,250$)	Hard Discipline ($n = 2,584$)	Soft Discipline ($n = 7,831$)
Pure Discipline	266	881	658	2,128
Applied Discipline	822	1,369	1,926	5,703

Note. $N = 13,753$. 4,935 classes were excluded from this table because they could not be classified as hard-soft or pure-applied.

Table 3

Frequency and Percentage of Highest Degree Awarded by Type of Course

Highest Degree Awarded	Face-to-face Courses ($n = 5,272$)		Online Courses ($n = 13,416$)	
	n	%	n	%
Associate's	1,137	21.6	3,715	27.7
Baccalaureate	1,084	20.6	611	4.5
First professional degree	14	0.3	0	0.0
Master's	1,694	32.1	4,423	33.0
Beyond Master's but less than Doctorate	49	0.9	1,010	7.5
Doctorate	1,214	23.0	3,657	27.3
Not applicable	80	1.5	0	0.0

Note. $N = 18,688$.

Table 4

Frequency and Percentage of Principal Type of Student Enrolled by Course Format

Student Type	Face-to-face Courses				Online Courses			
	<i>n</i>	%	Response Rate		<i>n</i>	%	Response Rate	
			<i>M</i>	<i>SD</i>			<i>M</i>	<i>SD</i>
Lower Division, General Education	1,228	25.5	.54	.25	2,983	24.4	.40	.20
Lower Division, Specialized	1,073	22.3	.56	.25	1,924	15.7	.43	.21
Upper Division, General Education	244	5.1	.60	.23	752	6.1	.49	.20
Upper Division, Specialized	1,076	22.4	.62	.24	1,684	13.8	.54	.22
Graduate/Professional	734	15.3	.74	.26	3,199	26.1	.61	.22
Combination	453	9.4	.55	.24	1,698	13.9	.47	.22
Total	4,808	10.0	.60	.26	12,240	10.0	.50	.23
Missing	464	8.8	-	-	1,176	8.8	-	-

Note. $N = 18,688$. M = mean; SD = standard deviation.

RESULTS

Students in face-to-face classes had a somewhat higher mean response rate (58%) to IDEA Online than did those taking a class online (50%). These response rates are comparable or slightly higher than those reported in other studies (Johnson, 2002; Layne et al., 1999). Response rate was only weakly related to student responses for each item. No correlations exceeded $r = .21$, and the median r was $< .15$. Because of the large sample sizes involved in this study, many of the comparisons reported here showed a statistically significant difference even when the descriptive difference between course modalities was small. To lower the risk of Type I error due to the large sample sizes, we specified a more stringent alpha level of .001 in this study.

Following the approach of Means et al. (2009), we therefore considered effect size as the best measure of practical significance.

Approaches to Instruction and Teaching Styles

Instructors were asked to select one of nine primary approaches (e.g., lecture, discussion/recitation) to instruction that characterized the course. To answer RQ1, we conducted two three-way cross-tabulations to examine the differences in the primary instruction approach between face-to-face and online courses with disciplinary characteristics controlled. Table 5 presents frequencies and percentages of instructors who selected each approach as the primary approach, categorized by type of course and the hard-soft disciplinary characteristic. In classes of hard disciplines, lecture was the method most frequently identified as the primary approach by instructors in both face-to-face (62.3%) and online courses (38.9%). Skill/activity and discussion/recitation were the second (19.2%) and third (17.5%) most frequently selected approaches in online courses in hard disciplines. In contrast, no approaches except lecture were identified as a primary approach by more than 10% of instructors in face-to-face classes in hard disciplines.

A different pattern emerged in soft discipline courses. While lecture was still considered as the most frequent primary approach (37.3%) in face-to-face courses, it was used online (23.1%) as one of the three major approaches, along with discussion/recitation (23.2%) and skill/activity (23.5%). In face-to-face classes, discussion/recitation was less frequently identified (13.3%) and skill/activity exhibited no difference, as it was identified by 22% of instructors.

In summary, a greater percentage of instructors in face-to-face than in online classrooms identified lecture as their primary approach. Lecture dominated as the primary approach in all face-to-face courses and in online courses within hard disciplines. In online courses within soft disciplines, the primary approaches were more diversified and lecture was only one of them. A significant greater percentage of soft-discipline instructors in both face-to-face (14.3%) and

online courses (16.9%) reported multi-media as their primary approach compared to only 1.7% and 3.5% of their counterparts in hard disciplines. However, no significant differences were found in this approach between face-to-face and online courses in both disciplines.

Table 5

Frequency and Percentage of Primary Approaches to Instruction by Course Format and Hard-Soft Disciplines

Primary Approach	Hard Discipline (<i>n</i> = 3,658)				Soft Discipline (<i>n</i> = 9,304)			
	Face-to-Face Courses (<i>n</i> = 1,441)		Online Courses (<i>n</i> = 2,217)		Face-to-Face Courses (<i>n</i> = 2,747)		Online Courses (<i>n</i> = 6,557)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Lecture	898	62.3	1,069	38.9	836	37.7	1,516	23.1
Discussion/Recitation	90	6.2	480	17.5	295	13.3	1,522	23.2
Seminar	50	3.5	225	8.2	115	5.2	443	6.8
Skill/Activity	129	9.0	528	19.2	487	22.0	1,540	23.5
Laboratory	139	9.6	71	2.6	76	3.4	81	1.2
Field Experience	16	1.1	51	1.9	34	1.5	221	3.4
Studio	52	3.6	197	7.2	4	0.2	42	0.6
Multi-Media	25	1.7	97	3.5	318	14.3	1,106	16.9
Practicum/Clinic	42	2.9	29	1.1	52	2.3	86	1.3

Note. *N* = 12,962. Total of percentages is not 100 because of rounding.

Table 6 presents frequencies and percentages of instructors who selected each approach as primary, categorized by course format and pure-applied disciplinary characteristic. In pure-discipline courses, lecture was still the identified as the most frequent approach, although no practical differences existed between face-to-face and online courses (50% vs. 45.2%). Discussion/recitation was used more frequently in face-to-face contexts (21.9%) than online (8.8%). Skill/activity was more popular in online courses (18.9%) than traditional classrooms (10.2%).

The same comparative patterns between face-to-face and online courses in terms of the three above-described approaches as primary approach emerged in applied disciplines. The only

exception is that lecture was no longer the dominant approach and had a similar share of instructors with the other two approaches. Similar to the pattern we detected in hard and soft disciplines, a significant greater percentage of applied-discipline instructors in both face-to-face (16.2%) and online courses (16.3%) reported multi-media as their primary approach compared to only 2.0% and 3.4% of their counterparts in pure disciplines. No significant differences were found in this approach between face-to-face and online courses in both disciplines.

Table 6

Frequency and Percentage of Primary Approaches to Instruction by Course Format and Pure-Applied Disciplines

Approach	Pure Discipline (<i>n</i> = 3,996)				Applied Discipline (<i>n</i> = 8,966)			
	Face-to-Face Courses (<i>n</i> = 1,533)		Online Courses (<i>n</i> = 2,463)		Face-to-Face Courses (<i>n</i> = 2,655)		Online Courses (<i>n</i> = 6,311)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Lecture	766	50.0	1,201	45.2	681	27.6	1,671	26.5
Discussion/Recitation	336	21.9	234	8.8	722	29.3	1,095	17.4
Seminar	162	10.6	113	4.3	163	6.6	395	6.3
Skill/Activity	156	10.2	501	18.9	408	16.6	1,619	25.7
Laboratory	53	3.5	157	5.9	24	1.0	133	2.1
Field Experience	19	1.2	48	1.8	45	1.8	210	3.3
Studio	4	0.3	245	9.2	7	0.3	39	0.6
Multi-Media	31	2.0	91	3.4	398	16.2	1,026	16.3
Practicum/Clinic	6	0.4	65	2.4	15	0.6	123	1.9

Note. *N* = 12,962. Total of percentages is not 100 because of rounding.

Five a-priori teaching styles are perceived to underlie the 20 teaching methods (Hoyt & Lee, 2002) (see Table 1). Hoyt and Lee (2002) reported high internal consistency reliability coefficients for all five scales, which ranged from .84 to .94. To examine whether the practice of various teaching styles differs across course format and disciplines, we conducted a three-way multivariate analysis of variance (MANOVA) with course format (online and face-to-face), hard-soft disciplinary dichotomy, and pure-applied disciplinary dichotomy as independent variables,

and the five teaching styles as dependent variables. The analysis results are displayed in Table 7. Results revealed a significant multivariate effects for all three main effects ($p < .001$ for course format, hard-soft discipline, and pure-applied discipline, respectively), all three two-way interaction effects ($p < .001$), but not for the three-way interaction ($p = .022$). Nevertheless, partial η^2 for each test was extremely small with the greatest value was not more than .03, which indicates the practical significance of the results is trivial.

Table 8 displays the trivial differences found for each individual subscale upon further inspection). The average Cohen's d was 0.14, indicating a very small effect size (Cohen, 1992). In both formats, students indicated that, on average, instructors implemented the styles "frequently." Differences between online and face-to-face courses were most evident in hard-pure and soft-pure disciplines. Face-to-face instructors in those disciplines employed the following teaching styles slightly more than their online counterparts: stimulating interest, fostering collaboration and establishing rapport. The greatest mean difference was not more than .20 on the five-point scale.

Table 7

Multivariate Analysis of Variance for Teaching Styles

Source	F^a	p	η^2
Course Format (CF)	44.83	<.001	.016
Hard/Soft Discipline (HS)	54.53	<.001	.019
Pure/Applied Discipline (PA)	94.28	<.001	.033
CF \times HS	4.82	<.001	.002
CF \times PA	5.22	<.001	.002
HS \times PA	51.42	<.001	.018
CF \times HS \times PA	2.63	.022	.001

Note. Multivariate F ratios were generated from Wilks's statistic.

^aMultivariate $df = 7, 13745$.

Table 8

Means and Standard Deviations for Teaching Styles by Course Format, Hard-Soft Disciplines, and Pure-Applied Disciplines

Teaching Style	Hard Discipline										Soft Discipline									
	Pure Discipline					Applied Discipline					Pure Discipline					Applied Discipline				
	F2F		Online		<i>d</i>	F2F		Online		<i>d</i>	F2F		Online		<i>d</i>	F2F		Online		<i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Stimulating interest	4.09	.57	3.92	.67	.27	4.05	.64	4.10	.65	.08	4.14	.53	4.03	.62	.19	4.14	.65	4.07	.64	.11
Fostering collaboration	3.56	.70	3.41	.87	.19	3.78	.77	3.85	.85	.09	3.95	.66	3.79	.82	.21	3.85	.76	3.86	.84	.01
Establishing rapport	4.11	.55	3.95	.68	.26	4.07	.64	4.09	.65	.03	4.17	.53	3.97	.65	.34	4.14	.64	4.03	.66	.17
Encouraging involvement	3.86	.63	3.78	.72	.12	4.07	.63	4.16	.62	.14	4.09	.50	4.04	.61	.09	4.14	.63	4.14	.64	.00
Structuring classroom	4.25	.52	4.15	.59	.18	4.13	.63	4.21	.61	.13	4.21	.53	4.15	.58	.11	4.21	.61	4.20	.59	.02

Note. $N = 12,962$. F2F = Face-to-face courses. M = mean; SD = standard deviation. d = Cohen's d .

Academic Skills

Instructors indicated to what extent each of nine academic skills was required in the course. To answer RQ3, we conducted four-way cross-tabulations to examine the differences in each required academic skill between face-to-face and online courses with disciplinary characteristics controlled. Table 9 presents each skill and the percent of instructors responding *Much required*, *Some required*, and *None (or little) required*. Across all four categories of disciplines, a greater percentage of online instructors reported that “much” writing was required compared to traditional instructors (24% vs. 11.8% in hard-pure disciplines; 37.4% vs. 20.6% in hard-applied disciplines; 72.9% vs. 52% in soft-pure disciplines; 45.3% vs. 22.9% in soft-applied disciplines). Similar trends were found in computer applications. Consistent patterns concerning oral communication were present across hard-soft and pure-applied disciplines: More online instructors required no oral communication, and more face-to-face instructors required some or much. In general, a greater percentage of face-to-face instructors required group work, although the differences across course format were more evident in hard-pure and soft-pure disciplines. In terms of math/quantitative skills, soft disciplines, whether pure or applied, exhibited no differences between face-to-face and online courses, which both required little. On the contrary, more online instructors in hard disciplines required no such skills than their peers teaching face-to-face classes (14.9% vs. 26.4% in hard-pure disciplines and 41% vs. 62.9% in hard-applied disciplines). The extent to which critical thinking and creativity were perceived to be required skills by face-to-face and online instructors was quite similar in hard-pure, hard-applied, and soft-pure disciplines. In soft-applied disciplines, a slightly greater percentage of online instructors (46.7%) considered critical thinking “much required” than their face-to-face

counterparts (37%). In contrast, 73.6% of online teachers in soft-applied disciplines required no creativity compared to only 46.8% of their face-to-face peers.

Table 9

Frequency and Percentage of Required Academic Skills by Course Format, Hard-Soft Disciplines, and Pure-Applied Disciplines

	Hard Discipline								Soft Discipline							
	Pure Discipline				Applied Discipline				Pure Discipline				Applied Discipline			
	F2F		Online		F2F		Online		F2F		Online		F2F		Online	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Writing</i>																
None	154	37.0	249	30.7	336	31.2	447	22.5	54	4.5	99	3.7	469	27.6	729	11.6
Some	213	51.2	367	45.2	518	48.1	794	40.0	519	43.5	627	23.4	844	49.6	2,706	43.1
Much	49	11.8	196	24.1	222	20.6	743	37.4	621	52.0	1,951	72.9	389	22.9	2,849	45.3
<i>Oral Communication</i>																
None	224	54.0	653	80.9	428	40.0	1301	65.9	211	17.7	2,105	79.4	501	29.4	4,443	71.1
Some	169	40.7	132	16.4	458	42.8	534	27.0	587	49.3	351	13.2	856	50.3	1,335	21.4
Much	22	5.3	22	2.7	185	17.3	140	7.1	393	33.0	196	7.4	346	20.3	468	7.5
<i>Computer applications</i>																
None	156	37.5	117	14.4	249	23.3	138	6.9	679	57.7	383	14.3	601	35.5	936	14.9
Some	194	46.6	302	37.2	404	37.8	538	27.0	376	32.0	1,073	40.2	522	30.9	2,180	34.8
Much	66	15.9	392	48.3	415	38.9	1313	66.0	121	10.3	1,214	45.5	569	33.6	3,150	50.3
<i>Group work</i>																
None	179	43.2	587	73.1	491	45.9	1110	56.2	422	35.6	1,646	61.9	843	49.6	3,848	61.4
Some	176	42.5	187	23.3	371	34.7	665	33.7	580	49.0	828	31.2	551	32.4	1,840	29.4
Much	59	14.3	29	3.6	208	19.4	200	10.1	182	15.4	184	6.9	305	18.0	578	9.2
<i>Mathematics</i>																
None	62	14.9	214	26.4	438	41.0	1243	62.9	1,089	92.7	2,489	94.1	1,121	66.4	4,312	69.1
Some	120	28.9	169	20.9	381	35.7	542	27.4	61	5.2	118	4.5	401	23.8	1,315	21.1
Much	233	56.1	427	52.7	248	23.2	191	9.7	25	2.1	38	1.4	166	9.8	617	9.9
<i>Critical Thinking</i>																
None	49	11.8	59	7.2	126	11.8	183	9.2	97	8.2	152	5.7	233	13.7	484	7.7
Some	161	38.8	365	44.8	491	45.9	856	43.2	459	38.6	992	37.1	841	49.3	2863	45.6
Much	205	49.4	390	47.9	452	42.3	944	47.6	634	53.3	1527	57.2	632	37.0	2931	46.7
<i>Creativity</i>																
None	358	86.5	708	88.2	719	67.8	1362	69.2	784	66.7	1911	72.4	795	46.8	4581	73.6
Some	50	12.1	84	10.5	234	22.1	525	26.7	322	27.4	607	23.0	369	21.7	1339	21.5
Much	6	1.4	11	1.4	107	10.1	81	4.1	70	6.0	123	4.7	535	31.5	308	4.9

Note. $N = 12,962$. None = none (or little) required. Some = some required. Much = much required. F2F = face-to-face courses.

Course Circumstances

Instructors indicated to what extent each of nine course circumstances had a positive, negative, or neither positive nor negative impact on student learning. To answer RQ4, we conducted four-way cross-tabulations to examine the differences in the influence of each circumstance between face-to-face and online courses with disciplinary characteristics controlled. Table 10 presents frequency and percentage of instructors selecting each option. Across all four categories of disciplines, a greater percentage of instructors in traditional courses believed physical facilities and equipment had a positive impact on learning than did those teaching online. On the other hand, a greater percentage of online instructors believed technical/instructional support had a positive impact on student learning.

Instructor Standards

Students responded to two items that assessed the instructor's course standards, "The instructor expected students to take their share of responsibility for learning" (Item 45) and "The instructor had high achievement standards in this class" (Item 46). To answer RQ5 and RQ6, we conducted a three-way multivariate analysis of variance (MANOVA) with course format (online and face-to-face), hard-soft disciplinary dichotomy, and pure-applied disciplinary dichotomy as independent variables, and two instructor standard items as dependent variables. The MANOVA result for students' responsibility expected by instructors was significant for the main effect of course format, Wilks' $\lambda = .986$, $F(7, 13,745) = 94.7$, $p < .001$, $\eta^2 = .014$. Univariate follow-ups revealed students in online classes ($M = 4.51$, $SD = .40$) reported that instructors expected them to take a greater share of responsibility for learning ($d = -.26$) than did those in face-to-face classes ($M = 4.40$, $SD = .43$), $F(1,13745) = 130.64$, $p < .001$, $\eta_p^2 = .009$.

Table 10

Frequency and Percentage of Impact of Course Circumstances by Course Format, Hard-Soft Disciplines, and Pure-Applied Disciplines

	Hard Discipline								Soft Discipline							
	Pure Discipline				Pure Discipline				Pure Discipline				Applied Discipline			
	F2F		Online		F2F		Online		F2F		Online		F2F		Online	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Physical facilities</i>																
P	185	44.7	216	27.2	509	47.3	588	29.8	474	40.2	731	27.6	707	41.6	1,671	26.7
I	158	38.2	280	35.2	366	34.0	658	33.4	481	40.8	939	35.4	653	38.4	1,967	31.4
N	49	11.8	59	7.4	114	10.6	170	8.6	154	13.1	230	8.7	214	12.6	555	8.9
CJ	22	5.3	240	30.2	86	8.0	557	28.2	71	6.0	751	28.3	126	7.4	2,066	33.0
<i>Teaching Experience</i>																
P	339	81.9	643	80.8	790	73.6	1,547	78.2	906	76.3	2,099	79.0	1,352	79.4	4,604	73.7
I	43	10.4	84	10.6	162	15.1	193	9.8	142	12.0	337	12.7	175	10.3	771	12.3
N	6	1.4	9	1.1	9	0.8	35	1.8	32	2.7	50	1.9	27	1.6	108	1.7
CJ	26	6.3	60	7.5	113	10.5	203	10.3	107	9.0	172	6.5	149	8.7	760	12.2
<i>Changes in Teaching</i>																
P	115	27.8	270	34.0	295	27.5	579	29.5	319	27.0	764	28.8	475	28.0	1,897	30.4
I	202	48.9	348	43.9	543	50.7	893	45.4	589	49.9	1,349	50.9	865	51.0	2,731	43.7
N	26	6.3	32	4.0	47	4.4	127	6.5	65	5.5	181	6.8	83	4.9	400	6.4
CJ	70	16.9	143	18.0	186	17.4	367	18.7	207	17.5	357	13.5	274	16.1	1,217	19.5
<i>Desire to Teach</i>																
P	343	82.9	652	82.0	854	79.6	1,662	84.2	992	83.6	2,117	79.6	1,440	84.7	4,842	77.4
I	67	16.2	105	13.2	181	16.9	254	12.9	164	13.8	424	15.9	214	12.6	842	13.5
N	2	0.5	8	1.0	8	0.7	11	0.6	11	0.9	27	1.0	15	0.9	59	0.9
CJ	2	0.5	30	3.8	30	2.8	47	2.4	19	1.6	93	3.5	32	1.9	514	8.2
<i>Control over Course</i>																
P	308	74.4	593	74.6	709	66.0	1,431	72.6	846	71.4	1,931	72.9	1,214	71.4	4,341	69.4
I	90	21.7	162	20.4	282	26.3	394	20.0	262	22.1	542	20.5	403	23.7	1,200	19.2
N	8	1.9	4	0.5	21	2.0	45	2.3	31	2.6	72	2.7	35	2.1	148	2.4
CJ	8	1.9	36	4.5	62	5.8	101	5.1	46	3.9	105	4.0	48	2.8	567	9.1
<i>Students' preparation</i>																
P	122	29.5	210	26.3	410	38.2	843	42.7	294	24.8	667	25.1	569	33.5	2,223	35.6

I	139	33.6	292	36.6	443	41.2	694	35.2	566	47.8	1,152	43.4	734	43.2	2,127	34.0	
N	136	32.9	195	24.4	141	13.1	226	11.5	240	20.3	526	19.8	287	16.9	803	12.9	
CJ	17	4.1	101	12.7	80	7.4	209	10.6	84	7.1	309	11.6	111	6.5	1,096	17.5	
<i>Students' enthusiasm</i>																	
P	191	46.5	356	44.6	612	58.1	1,213	61.8	635	53.6	1,289	48.5	988	58.0	3,269	52.3	
I	134	32.6	235	29.4	295	28.0	461	23.5	322	27.2	764	28.8	476	28.0	1,486	23.8	
N	75	18.2	116	14.5	74	7.0	126	6.4	155	13.1	302	11.4	156	9.2	462	7.4	
CJ	11	2.7	92	11.5	72	6.8	162	8.3	72	6.1	302	11.4	83	4.9	1,033	16.5	
<i>Students' effort</i>																	
P	207	50.4	435	54.5	649	60.7	1,360	68.8	679	57.3	1,473	55.7	1,095	64.4	3,773	60.4	
I	115	28.0	179	22.4	294	27.5	393	19.9	314	26.5	644	24.3	384	22.6	1,208	19.3	
N	77	18.7	106	13.3	67	6.3	104	5.3	129	10.9	291	11.0	156	9.2	393	6.3	
CJ	12	2.9	78	9.8	59	5.5	119	6.0	63	5.3	238	9.0	65	3.8	876	14.0	
<i>Technical support</i>																	
P	122	29.5	428	53.7	400	37.5	981	49.7	343	29.1	1,332	50.4	584	34.6	2,988	47.9	
I	220	53.1	249	31.2	492	46.2	712	36.1	620	52.7	876	33.1	809	47.9	1,876	30.1	
N	31	7.5	35	4.4	76	7.1	102	5.2	90	7.6	173	6.5	117	6.9	428	6.9	
CJ	41	9.9	85	10.7	98	9.2	180	9.1	124	10.5	263	9.9	179	10.6	947	15.2	

Note. N = 12,962. P = Had a positive impact on learning. I = Neither a positive nor a negative impact.

N = Had a negative impact on learning. CJ = Can't Judge. F2F = face-to-face courses.

SIGNIFICANCE OF THE STUDY

Our results revealed a few common-sense differences in primary approaches to instruction, required academic skills, and students' share of responsibility for learning. However, in most cases we found either no differences or trivial differences in course circumstances, teaching styles, and instructor achievement standards.

As one might expect, instructors in the traditional classroom are more likely to identify lecture as their primary approach to instruction. This hardly comes as a surprise because lecturing remains the most widely used teaching method in universities throughout the world (Svinicki & McKeachie, 2011). With disciplinary differences taken into account, we observed some interesting patterns. Differences in the practice of lecture are mainly attributed to hard-soft disciplinary differences, as no differences were detected when we examined online and traditional instructors in pure and applied disciplines respectively.

Instructors in online classes require more writing and computer applications, most likely because online classes rely on keyboarding as a means of communication and the Internet as the mode of course delivery. In contrast, traditional instructors expect more out of students in the way of oral communication and group work, skills perhaps most effectively demonstrated in face-to-face settings. Disciplines also play a role in the extent to which certain skills are perceived to be required. In hard disciplines, mathematics skills are required less frequently in online courses than in traditional class settings. While course format does not differentiate requirements for critical thinking and creativity in hard disciplines and soft pure disciplines, some differences exist between course formats in soft-applied disciplines. Online instructors in soft-applied disciplines tend to require slightly more critical thinking but much less creativity when compared with their face-to-face counterparts. We speculate such differences result from

the greater variety of subject matters in soft-applied disciplines, given the much greater number of classes falling into this disciplinary category in our dataset. However, further analyses are required to confirm it.

A greater percentage of traditional than online instructors rated facilities and/or equipment positively. On the other hand, online instructors felt more positive than did traditional instructors about the impact technical/instructional support had on their classes. We did not find significant disciplinary differences in these perceptions. This promising finding suggests that many of those who teach online are getting the support they need, regardless of the inherent differences in available resources across disciplines.

A final difference is that students in online classes report greater instructor expectations that they take share of the responsibility for learning. Perhaps this perception came from the self-directed, autonomous nature of the online learning environment (Eighmy et al, 2001). With the development of Massive open online courses (MOOCs) (e.g., Siemens, 2008), students will most likely continue to be held more accountable for their portion of the learning process.

In all other respects, there were more similarities than differences between student ratings collected in face-to-face and online classes, with disciplinary differences controlled. Instructors applied the various teaching styles with essentially the same frequency. Moreover, instructors in traditional and online formats reported comparable desires to teach the course, control over course management decisions, adequacy of student background and preparation, student enthusiasm for the course, and student effort to learn. Finally, students reported only trivial differences in the level of achievement standards instructors had for the course. Overall, the current findings indicate that students report similar levels of learning and instructors employ teaching methods with similar frequency in face-to-face and online courses.

We acknowledge several limitations. Our data were limited to classes that used the IDEA Student Ratings of Instruction, and the generalizability of our results is consequently limited. Moreover, we excluded other indicants of teaching effectiveness and student learning (i.e., course exams, student products, self-ratings, ratings by peers, alumni, etc.). Third, many of the classes in our database were excluded because it was impossible to identify the class as exclusively either online or face-to-face or to classify the courses into hard/soft and pure/applied disciplines. Fourth, although we found no meaningful differences in the five IDEA teaching styles, other approaches to teaching should be investigated. Furthermore, qualitative approaches should be employed to reveal the unique approaches instructors take to apply teaching styles online.

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