Jl. of Technology and Teacher Education (2006) 14(3), 531-541

The Impact of Online Teaching on Faculty Load: Computing the Ideal Class Size for Online Courses

LAWRENCE A. TOMEI
Robert Morris University
Pittsburg, PA USA
tomei@rmu.edu

This study examined the impact of substituting didactic instruction, face-to-face advisement, and conventional evaluation with distance-based delivery of content, electronic counseling, and online assessment. It analyzed the impact of distance learning demands on faculty teaching loads and computed the ideal class size for an online course. Specifically, *this article sought answers to the following questions.*

1. What are the teaching demands of an online course?
2. What is the impact of distance learning demands on faculty teaching loads? Does teaching at a distance require more or less of an instructor's time?
3. What is the ideal class size for an online course versus the traditional classroom?

The research reflected in this study found that online teaching demanded a minimum of 14% more time than traditional instruction, most of which was spent presenting instructional content. The weekly impact on teaching load also varied considerably between the two formats. Traditional teaching was more stable across the semester while online teaching fluctuated greatly during periods of advisement and assessment. Finally, the ideal class size was calculated for both instructional formats.

The role of the traditional classroom teacher evolved over the centuries to include a common set of skills and competencies agreed upon by most in the discipline (Budin, 1991). For example, the traditional classroom teacher must be certified for the appropriate grade level. In the United States, the appropriate foci comprise early childhood, elementary, middle, and secondary concentrations. Only 5% of schools have grade configurations outside these age-centered criteria (U.S. Department of Education, 2001). In addition, successful educators are expected to pursue a continuous program of professional development that begins soon after certification and lasts until retirement. Finally, the traditional classroom teacher is expected to devote considerable hours both in and outside the classroom—whatever is necessary to produce successful student learning outcomes (Kerr, 1989). Professional preparation, academic excellence, lifelong learning, and personal commitment are the hallmarks of the successful traditional teacher.

Since its arrival as a teaching strategy, many of these self-same characteristics have come to define successful distance educators as well (Cuban, 1986). In addition, new skills come into play as teachers assume the role of distance educator. Some of those additional skills include understanding the nature and psychology of distance education; identifying characteristics of successful distance learners; designing technology-based courseware; adapting teaching strategies to deliver instruction at a distance; evaluating student achievement in an online environment; and, recognizing the incremental demands of teaching (e.g., faculty load, online assessment, out of class interaction, etc.) under these new set of circumstances (American Association of University Professors [AAUP], 1968). Of all the peculiarities of teaching at a distance, none appears so crucial to successful student learning than teacher-student interaction.

RESEARCH

Teacher-student interaction plays perhaps *the* pivotal role in student attitudes about online learning and distance education. Research accepts that student attitudes, in turn, are significantly affected by the manner and degree of this interaction (Simmons, 1991; Ritchie & Newby, 1989).

Throughout a typical semester, distance learners interact with their instructors through synchronous and asynchronous communication media. Successful distance educators often require their students to e-mail short messages within the first weeks of a course in an effort to detect any misunderstanding of course expectations, learning assignments, or lesson objectives (McLellan, 1991). Later, online chat rooms provide a forum for students and teachers to share ideas in a near real-time learning environment.

Chat logs are easily captured by the technology for cooperative learning exercises. Both forums offer advantages and encounter limitations.

Asynchronous communication, most often in the form of electronic mail and threaded discussion groups, continues to represent the greatest use of technology in terms of quantity of teacher-student interaction (Simonson, 2000).

Synchronous communication often evidences itself as online chat sessions and claims a growing cadre of supporters with a penchant for improving the quality of teacher-student interaction. Surveys show there are over 9,300 Internet service providers in 120 countries, 30 million regular Internet users in the United States alone, and 70 million Internet users worldwide (National Center for Education Statistics, 2000). The use of synchronous learning environments continues to grow with nearly one million distance learners already online (Simonson, 2000). Research indicates that students perceive significant advantages for online learning over traditional methodologies including better use of limited time and better access to courses and class schedules (O'Malley & McCraw, 1999).

It is not uncommon for higher education administrators in particular to view online, distance learning-based courses as the "mother lode" for sizeable tuition revenue increases. After all, to the uninitiated, the argument can be made that if a traditional classroom teacher can accommodate a class of 25 students with the demands of face-to-face instruction, scheduled office hours, and individualized assessment, why shouldn't an online instructor be capable of handling 50 students? Why not a 100? After all, goes the contention, online learning is assisted by computer, office hours are diffused 24x7 thanks to electronic mail, and instruction is available on-demand thanks to its digital format.

Adding insult to the debate, distance educators have had only their hunches and limited experience to defend against over-subscription to their online courses. They realized that their brand of learners expected near real-time responses any time of the day, every day of the week. Now with this study, distance educators have facts to confront those who see online teaching as a panacea for expanding revenues and increasing student enrollment.

THE QUESTIONS

This article seeks answers to the following questions. In an attempt to establish a reasonable baseline for an educator's teaching load:

1. What are the teaching demands of an online course? What is the impact of substituting didactic instruction, face-to-face advisement, and pen and paper evaluations with web-based content, electronic information and inquiry, and online assessment?
2. What is the impact of distance learning demands on faculty teaching loads? Communications involving asynchronous (e-mail) and synchronous (online chat) interaction impact available faculty time. Does teaching at a distance require more or less of an instructor's time?
3. What is the ideal class size for an online course? Given that the study examines instruction, advisement, and assessment, we should be able to compare apples with apples to arrive at the ideal online class size given available faculty and teacher-student interaction demands.

This study did not undertake to answer the question: What is the level of student achievement in a distance learning versus a traditional classroom format? It does not purport to offer findings pertaining to successful learning outcomes or the quality of instruction using either format.

METHODOLOGY

During a recent semester of GITED 511, Technology and Education, students in Duquesne University's Program in Instructional Technology had the option of completing their course requirements in either the traditional or online format. Traditional students attended evening classes one night a week for 15 weeks. Distance students proceeded sequentially through each of 15 sessions, communicating with the instructor through weekly e-mails, end-of-session posts, and periodic online chat sessions. The author was provided a unique opportunity to explore the similarities and differences among teacher-student communications comparing the impact on the instructor of both formats simultaneously during the same semester. During the semester, 11 students opted for the traditional format while, coincidentally, another 11 students chose to take the course online. The author had taught the course using the traditional format five times in previous semesters. The online format had been offered on three of those previous occasions. After registration, it was determined that only two of the 11 individuals taking the online format had experienced previous online learning.

Faculty contracts often take into account three common elements. Teaching is paramount. Research fosters continuous professional development. Service to the school or community constitutes the third element. The

majority of a full-time faculty load, then, is rightly parsed to instructional content delivery, student advisement, and student evaluation.

Most educators are familiar with the 40-40-20 formula for allocating faculty time: 40% devoted to teaching, 40% to research, and 20% to service (AAUP, 1968). However, many professional educational associations suggest "something like 80% teaching, 5% research, and 15% service" (Mancing, 1991). For this study, an even more conservative 85: 5: 10 ratio was used and, when applied to the available 600 hours per semester, gave faculty 510 hours for instructional delivery, 30 hours of scholarship, and 60 hours of service. Contractually, if a faculty member is expected to offer three courses each semester, the target for each course, then, would be 170 hours (510 instructional hours divided by 3 courses). These available hours are used to draw our final conclusions and compute ideal class sizes.

FINDINGS

Traditional Format

In its traditional course presentation, the impact on teaching load (Table 1) found:

- Classroom Content Hours consisted of 15 sessions conducted one night a week. Another three hours per week were required and consisted of student readings, exercises, and projects that were not part of this study.
- Counsel and Advisement Hours were provided prior to evening classes; large variances were typical of the beginning and end of the semester. Typical of graduate-level programs, Counsel and Advisement were provided in the form of scheduled office hours from 4:00pm until the start of class at 5:30pm. Most students arrived for class directly from their full-time positions and were unavailable for sessions unless scheduled immediately prior to class.
- Student Assessment Hours varied by number of students enrolled and consisted of two major projects requiring considerable instructor attention for evaluation purposes.

Table 1
GITED 511, Technology and Education, Traditional Format

Session Number	Classroom Content Hours Per Week	Counsel and Advisement Hours Per Week	Student Assessment Hours Per Week	Total Contact
1	2.75	3.75		6.50
2	2.75	3.50		6.25
3	2.75	2.50		5.25
4	2.75	1.50	***22.00***	26.25
5	2.75	1.50		4.25
6	2.75	1.50		4.25
7	2.75	1.50		4.25
8	2.75	1.50		4.25
9	2.75	1.50		4.25
10	2.75	1.50	***33.00***	37.25
11	2.75	1.50		4.25
12	2.75	1.50		4.25
13	2.75	3.50		6.25
14	2.75	3.50		6.25
15	2.75	4.50	***5.50***	12.75
Teaching Load	**41.25**	**34.75**	***60.50***	**136.50**

Impact of the traditional format on teaching load. Some 136 hours of face-to-face interaction were found to be the norm for the 11 traditional students. The three-credit graduate course imposed a minimum of 40 instructional hours (.30 of total contact hours). Another 35 hours (.26) were expended in out of class advisement. Finally, 60 hours (.44) of assessment were needed to evaluate student-prepared projects. Faculty teach a full-time load comprising three courses and accounting for some 400 hours of instruction per semester.

Distance Learning Format

Distance learners submitted weekly e-mails to the instructor to validate their progress. As they completed each session, students posted a synopsis of the readings and assignments in a threaded discussion group. Finally, students submitted two projects and an electronic portfolio to the instructor as e-mail attachments.

As noted earlier, distance learning replaces web-based, digitized content materials with didactic teaching; electronic mail for face-to-face student advisement; and, student posts and online chats to augment traditional assessment. In each table, the term "instances" refers to the number of specific student inputs. Also, "words per week" refers to written instructor responses. An effective typing speed was estimated at 40 wpm using www.angelfire.com/ak/nutechbiz/typingtest.html. Tables reveal significant variations in teaching load between the traditional and online formats.

Impact of the distance learning format on teaching load (Table 2). The impact of the distance learning format on the teaching load of GITED 511, Technology and Education, is shown in Table 2.

- Instructional Content Hours consisted of a posted synopsis of the readings and online instruction to the discussion group. Each post required an average of 14 minutes of instructor review to formulate a response. Online chat sessions were conducted three times during the semester averaging 110 minutes each; a written critique was sent to each student by e-mail. For delivery of instructional content, the impact on teaching load was *59.18 hours* compared to *41.25 hours* of traditional instruction.
- Student Counsel and Advisement Hours took the form of e-mail replacing traditional face-to-face interaction with online administrative as well as academic guidance. Each e-mail required a minimum of nine minutes to review to formulate a response; many were much more protracted. For online counsel and advisement, the impact on teaching load was *40.43 hours* compared to *34.75 hours* for traditional students.
- Student Assessment Hours focused on two technology-based evaluations: several online quizzes and an electronic portfolio. Since the formative evaluations were hosted, managed, and scored online, for online student assessment the impact on teaching load was *56.22 hours* compared to *60.50 hours* of traditional assessment.

Table 2

GITED 511, Technology and Education, Distance Learning Format

Session	Instructional Content Hours		Student Counsel and Advisement Hours		Student Assessment Hours		Totals
	Instances	Instructor Response (Words)	Instances	Instructor Response (Words)	Instances	Instructor Response (Words)	Words Per Session
1	1	0	8	1272			1272
2	1	0	14	3030			3030
3	0	0	10	166			166
4	9	64	12	527	5	948	1539
5	12	246	14	494	1	1457	2197
6	16	578	8	1088	2	3633	5299
7	20	782	20	774	1	1155	2711
8	21	406	11	99			505
8	Chat	650					650
9	25	87	8	517			604
10	18	0	10	454			454
11	17	0	16	570	9	7091	7661
12	16	104	20	626			730
13	20	504	8	644			1148
13	Chat	806					806
14	23	636	20	7652			8288
15	24	968	13	1856	8	5951	8775
15	Chat	1306					1306
Totals	223	7137	192	19,769	26	20,235	47141
Teaching Load	56.22 hours	2.96 hours	32.34 hours	8.09 hours	47.79 hours	8.43 hours	155.83 hours

IMPLICATIONS

Variations in teaching load between the traditional and online formats are depicted in Table 3. Both formats represented a less-than-maximum teaching load of 170 hours. However, traditional students required 136.5 hours of faculty interaction while the online format demanded 155.83 hours, an increase of some 19 hours (14.2%).

Instructional content online required 43.5% more time than the traditional format. Advisement required an additional 16.3% more hours for online students. Only traditional assessment called for a lesser percentage (7.6% less) than online evaluations. Overall, approximately 14% more hours were required to teach the same number of students online at a distance than in the traditional classroom.

Table 3
Traditional versus Online Teaching Load

Traditional Format		Elements	Online Format		% Variance
Percent	Hours		Percent	Hours	
30.0	41.25	Instructional Content	38.0	59.18	+ 43.5
26.0	34.75	Counsel and Advisement	26.0	40.43	+ 16.3
44.0	60.50	Student Assessment	36.0	56.22	- 07.6
	136.50 hours			155.83 hours	+ 14.2

Computing the ideal traditional and online class size (Table 4). In the traditional classroom, only student assessment varies with enrollment; instructional content and counseling and advisement remain constant. Therefore, the calculation of ideal class size for a traditional classroom involves computing the number of students an instructor can counsel in 170 available semester hours. *The ideal class size for the traditional format was calculated at 17 students*.

All three teaching components (instructional content, counsel and advisement, and student assessment) are affected by each new online student. Therefore, *the resulting calculation of ideal class size for the online format was 12 students*.

Table 4
Calculation of Ideal Class Size

TRADITIONAL CLASS SIZE			
	Based on 136.50 hours	**Based on 170.00 hours**	**Calculations**
Instructional Content	**41.25**	**41.25**	**Therefore,**
Counsel and Advisement	**34.75**	**34.75**	**11 students : 60.50**
Student Assessment	**60.50x**	**94.00**	**hours :: x students : 94.00 hours**
			x = 17 students
ONLINE CLASS SIZE			
	Based on 153.83 hours	**Based on 170.00 hours**	**Calculations**
Instructional Content	**59.18x**	**64.56**	**Therefore,**
Counsel and Advisement	**40.43x**	**44.10**	**11 students : 60.50**
Student Assessment	**56.22x**	**61.34**	**hours :: x students : 94.00 hours**
			x = 12 students

CONCLUSIONS

This article sought to establish a baseline teaching load for faculty involved in online instruction. It found that online teaching demanded a minimum of 14% more time than traditional instruction, most of which was spent presenting instructional content. The weekly impact on teaching load varied considerably between the two formats. Traditional teaching was more stable across the semester while online teaching fluctuated greatly during periods of advisement and assessment. Finally, the ideal class size was calculated for each instructional format. *The ideal traditional class size was 17 students while the ideal online class size was 12 students.*

For the first time, research has shown that distance education demands more of an instructor's available time than the more traditional classroom delivery method. Online teaching should not be expected to generate larger revenues by means of larger class sizes at the expense of effective instructional or faculty over-subscription. Follow-on research is required to evaluate the effectiveness of the two teaching strategies on student learning.

References

American Association of University Professors (1968). Statement on faculty workload. *AAUP Journal, 54,* 256-257.

Budin, H. R. (1991). Technology and the teacher's role. *Computers in the Schools, 8*(1/2/3), 15-25.

Cuban, L. (1986). *Teachers and machines: The classroom use of technology since 1920*. New York: Teachers College Press.

Kerr, S. T. (1989). Technology, teachers, and the search for school reform. *Educational Technology Research and Development, 37*(4), 5-17.

Mancing, H. (1991). Teaching, research, service: The concept of faculty workload. *ADFL Bulletin, 22*(3).

McLellan, H. (1991). Teachers and classroom management in a computer learning environment. *International Journal of Instructional Media, 18*(1), 19-27.

O'Malley, J. & McCraw, H. (1999). *Students perceptions of distance learning, online learning and the traditional classroom*. Retrieved February 4, 2006, from http://www.westga.edu/~distance/omalley24.html.

Ritchie, H. & Newby, T. J. (1989). Classroom lecture/discussion vs. live instruction: A comparison of effects on student performance, attitude, and interaction. *The American Journal of Distance Education, 3*(3).

Simmons, I.V. (1991). *Survey of students' attitudes toward the IHETS delivery system*. (ERIC Document Reproduction Service No. ED330311)

Simonson, M. (Ed.). (2000). *Teaching and learning at a distance: Foundations of distance education* (pp. 3-18). Upper Saddle River, NJ: Prentice Hall.

U.S. Department of Education, National Center for Education Statistics (1999-2000). *Common core of data (CCD), Public elementary/secondary school universe survey*.