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Strategies for Managing Large Online Classes

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Abstract: Online classroom instruction is an exciting technology and continues to draw the attention of students, instructors and administrators working or studying in educational settings. Large numbers of faculty are currently involved in teaching online or hybrid courses within their educational institutions. At the present time, “very large” online classes are usually defined as 150 students and above. Many instructors are now experimenting with making online learning options available to even larger audiences and online class sizes are increasing rapidly. This paper presents guidelines for managing large online courses. Among key elements important in meeting the needs of the distant learner through large online course design are: effective communication, use of teaching assistants and multiple sections, teaching techniques successful in large online sections and professional practice in the online classroom. This paper will discuss these elements and corresponding suggestions for the instructors of large to very large online courses.

Keywords: e-Learning, Teaching Challenges, Online Instruction

TEACHING A “LARGE to very large” online class is quite different than teaching the same course in a traditional classroom or teaching a hybrid course. In the past, class size has been defined by the physical space in a classroom. However the web-based classroom has no walls and has opened up an opportunity to offer large to very large classes anywhere, anytime and anyplace (Burruss, Billings, Brownrigg, Skiba, & Connors, 2009; Schneider, 1999). In general, online classes are considered very small if they have between three to nine students and small classes are defined as between 10 to 29 students. Medium classes are defined as between 30 to 59 students; 60 to 149 students are defined as large classes. Very large classes are defined as more than 150 students (Arbaugh & Benbunan-Finch, 2005; Bocchi, Eastman, & Swift, 2004; Leufer, 2007; Ryan, Hodson-Carlton, & Ali, 2001). There have been no significant findings between class size and the effectiveness of online courses. E-learning has progressed to the point where the quality of the interaction is more important than the actual size of the course (Arbaugh & Benbunan-Finch, 2005; Drago & Peltier, 2004; Nagel & Kotzé, 2010).

Much of the course design and structure should be unaffected by the number of students enrolled (Drago & Peltier, 2004). However, small mistakes do become amplified in a large online course and something that could be addressed in a few minutes in a traditional class becomes a time-consuming process of answering multiple emails and phone calls in an online course. Under the correct conditions, students can receive a quality experience in any size online class. As a result, it is important for individual instructors to prepare themselves to provide a quality learning experience for students in any size online course keeping in mind

the online environment is not as forgiving as the traditional classroom. Small mistakes in design or presentation in an online class can result in a very heavy workload for the instructor (Berry, 2009). Also, once mistakes are made in the online environment, it can be very difficult to completely recover from them (Berry, 2009; Dykeman & Davis, 2008).

What the authors of this paper have found to be important in the management of their own large to very large online courses include, but are not limited to, the following four areas: effective communication, teaching assistants and multiple sections, implementing teaching techniques successful in large online sections, and professional practice in the online classroom.

Effective Communication

Building a learning community in an online course is important in establishing comfort and trust between the instructor and students, and among the classmates. Large online classes can present a bit of a challenge simply because establishing a community with so many participants can be overwhelming. According to Bocchi et al. (2004), to help prevent isolation in a virtual classroom, students need to interact with faculty, other students, and course content. The focus shifts from a teacher-led approach to a student-led approach, and all participants learn from one another (Bocchi et al., 2004).

An initial challenge for students learning to socialize online may involve technology. Less experienced students may be less interactive, but participation can increase as students become more comfortable (Vrasidas & McIsaac, 1999). Vrasidas and McIsaac (1999) found that course structure and the feedback provided to the students also influenced interaction.

Instructor Communication

The instructor should begin building this sense of community with his or her own introduction. Many students may never physically meet the instructor, so making a personal connection “virtually” is important. This should include providing a photo, contact information, and may include a short biography (Berry, 2009; Keramidis, Ludlow, Collins, & Baird, 2007).

Communication in an online course from instructor to student includes overall class communication that provides instruction and mentoring, as well as individual communication. A variety of tools can be used, including email and the course management system, which may provide a bulletin board or discussion board forums, chat rooms, and/or a virtual classroom (Gibson, Tesone, & Blackwell, 2001). The course site will function as the main platform for classroom communication, but the instructor will also need to maintain individual communication through email or telephone. With a large class, individual communication can become overwhelming, but it is still necessary on some occasions. It is important that the instructor provide communication guidelines to students, including an expected response time to emails and phone calls. Gibson et al. (2001) recommends a 24-hour turnaround. When this is not possible, students should be made aware of the instructor’s absence. The instructor should also be clear if this same policy applies on weekends and during scheduled school breaks, which helps to establish trust between the instructor and students, providing comfort for the students in knowing when to expect an answer. Instructors should also be clear on the teacher’s and assistant’s role in online discussions. If students continue to lack

feedback on postings, it may discourage them from continued participation (Vrasidas & McIsaac, 1999).

Trust and community can continue to be established through personalized communication. In a very large online class, an instructor may choose to email smaller groups of students with a more personalized message. For example, Berry (2009) described a comparison of exam grades between students from the first exam to the second. After noting those students with improved scores, the instructor sent a message to those students with recognition of their achievement. This was received well by students, who remarked “I am so impressed that in such a large course you would take the time to recognize me for my performance” and “Thank you for taking the time to notice my efforts” (p. 178). The same principle could be applied to those students whose exam scores decreased by sending a note of concern and providing study tips (Berry, 2009). This kind of communication establishes an instructor-student relationship showing the student that he or she is more than just a number.

Communication may be provided asynchronously, synchronously, or through a combination of both. Most instructors are familiar with asynchronous communication, a common format used in online classes. A combination provides variety, allowing students to interact with the instructor, other students, and content in multiple ways. According to Gibson et al. (2001), students “love” the chat sessions that take place synchronously. These sessions can be used to review for an exam, discuss homework or look at case studies, for example. They should be planned for a limited amount of time, usually one to two hours. It is important to remember, however, that online students come from a variety of geographical areas, so a variety of times should be scheduled to accommodate as many students as possible. It is also important to note that infrequent chats can quickly divert from the agenda, so careful planning and organization is essential to stay on task for a limited amount of time (Gibson et al., 2001).

Student-student Communication

Student introductions are especially important in building community. Students should introduce themselves and be encouraged to share additional information, such as major areas of interest or hobbies. Student pictures are also nice to allow students to see each other, but they should not be a requirement. Introductions may be done synchronously in an initial virtual class session, or may be done through a discussion board. Online settings can actually be an advantage in student interaction, as some students may feel more comfortable sharing online (Drago & Peltier, 2004). Taking the time to reply to each student at least once can help build the bond between student and teacher (Palloff & Pratt, 1999). Student responses to each other can also help them form relationships for collaboration and identify similar interests for future group projects.

Vrasidas and McIsaac (1999), as well as Gibson et al. (2001), found that community-building activities were utilized more often if they are a requirement of the course. Thus, community-building activities should be required and graded. It is also important, however, that each activity has a purpose for the course. Activity without a purpose tends to be interpreted as busy work by students who will not want to participate (Vrasidas & McIsaac, 1999). Offering a variety of synchronous and asynchronous mediums allows different learning styles and technical skill levels to interact with course content and classmates in meaningful ways.

Cooperative learning is an active learning technique that utilizes a diverse student population, an advantage of online classes (Machemer, 2007). It can promote productivity, expose students to interdisciplinary teams, foster idea generation, and promote social interaction (Machemer, 2007). According to Machemer (2007), it can come with some resistance as students value cooperative learning less than other course activities, since it requires them to lose anonymity and possibly move from their comfort zone. Thus it may be necessary to offer an explanation of learning objectives and reinforcement in such activities.

Because monitoring and communicating with individual students in a large class can be cumbersome, group work is a way to make this more manageable. According to Leufer (2007), students see group work as a way to interact with classmates. It makes discussion and collaboration exercises more manageable when students are placed in appropriately sized groups. Most course management systems provide group pages, where students can post to boards, chat, and exchange files.

Another method that is helpful in building student-to-student interaction and in providing students with useful feedback is the use of a peer review activity. Nagel and Kotzé (2009) describe a course activity that required two double-blind peer critiques. Students appreciated both receiving and making comments, and built relationships based on a common goal and shared interests. Through peer review, students are able to receive more feedback than just that of the teacher or assistant, and often sooner. According to Nagel and Kotzé (2009), students found the process beneficial and their feedback was positive.

Teaching Assistants and Multiple Sections

Instructors with experience utilizing teaching assistants (TAs) in the traditional classroom will find the role of the teaching assistant different in a large online course but it can be equally helpful to the instructor (Caulking & Kelly, 2006; Elison-Bowers, Henderson, Sand, & Osgood, 2010; Stephens, O'Connell, & Hail, 2008). In a large online course, a TA can perform many duties: holding virtual office hours, monitoring online discussions and chat sessions, identifying students who are in academic trouble, and generating rubrics and exam questions (Civikly-Powell & Wulff, 2002).

Another area where teaching assistants can be particularly helpful in a large online course is when multiple sections are created by the instructor. Multiple sections of an individual course is a creative strategy allowing students to obtain some of the benefits of the interaction found in a smaller course while actually participating in a much larger online course. Instructors of large online courses can utilize teaching assistants in virtual multiple sections in several ways. For example, the sections can be virtual, created for discussion board or chat sessions only. In a chat or discussion board section, the duties of the TA could include grading, discussion monitoring, or identifying students who need further assistance (Panagopoulos, 2007). Instructors can also divide a course into multiple sections for the purpose of course management. For example, in a 150 student course, an instructor could develop three virtual sections of 50 students each and assign individual TAs or graders to those sections for the entire semester or quarter. This team approach would provide more individualized support to students by encouraging them to build rapport with a TA (Civikly-Powell & Wulff, 2002; Deithloff, 2002).

An important component in utilizing teaching assistants in any size online course, but especially a very large online course, is TA orientation. The orientation of teaching assistants

for the online environment should include a student manual explaining instructor expectations and requirements, a confidentiality statement for TAs to sign and references to important institutional student policies that TAs will be expected to observe. The instructor should also conduct a training session for all teaching assistants prior to utilizing a TA in an online course (Elison-Bowers et al., 2010; Firmin, 2008). For example, there should be clear course policies provided to prepare the TA to respond to student complaints, strategies for setting appropriate boundaries with students in the class and for responding to incivility (Civikly-Powell & Wulff, 2002). This may include discussions with TAs regarding what to do when a student complains of unfair grading procedures by a teaching assistant and what to say to the student who complains the TA gave them incorrect information about a test or examination. TAs should also be provided with information about consequences of their own actions and the process by which those complaints will be handled. An example might be the student who makes a complaint to the instructor regarding harassment by a TA who proposed a higher grade for the student in exchange for intimacy (Heppner, 2007).

Teaching Techniques for Large Courses

Although there is some debate on quality issues in large classes, high quality content that is easily accessible to students should and can be delivered regardless of class size (Drago & Peltier, 2004). A few ways to manage a large class include detailed course design, taking a learner-centered approach, and taking advantage of technology.

Course Structure/Design

Time management is a key to success in an online course. Gibson et al. (2001) recommends “chunking” course work, breaking it into smaller units or modules so that students can manage course load more effectively. Setting clear expectations and deadlines is important and should be done early in the course (Berry, 2009; Hricko, 2002). Time frames are of particular importance in an online class as students may be participating from any location and often have a variety of obligations that limit their availability. This is amplified in a large online class. After surveying students, Berry (2009) found that offering exams for an extended time period on the weekends would meet most student needs, thus reducing the number of special individualized requests.

As with any course, the learning tasks should be carefully planned and executed based on the course objectives. These tasks should guide learning and be structured to result in a desired product. They should lead to content retention, address problem areas, require multiple levels of knowledge, and be engaging, challenging, reasonable, and respectful. They should also provide useful feedback, and be supported with adequate resources (Saulnier, Landry, Longenecker, & Wagner, 2008). Linking tasks to specific course objectives can help students understand the meaning behind activities.

The interactive activities in the course require clear guidelines for acceptable participation (Palloff & Pratt, 1999). At a minimum, expectations for course participation should be clear as to how often the student should be logging into the course site and what should be done during those sessions (Palloff & Pratt, 1999). Instructors may include an example of an activity, such as an initial posting in a discussion forum. Rubrics are a useful way to outline expectations, and can also be a valuable grading tool. The rubrics should clearly state what

constitutes appropriate work or participation, and provide students with an idea of their potential grade based on performance. Table 1 is an example of one author’s online discussion rubric.

Table 1: *Example Online Discussion Rubric*

Example: Online Discussion Rubric

Online discussions will be graded according to the following criteria: **S=Substantive; T=Timely; O=On Topic; P=Professional**. When you have finished posting make sure you are ready to **STOP**.

Criteria	3 Points	2 Points	0-1 Points
S	Posts include related information and perspective.	Posts include some related material and perspective.	Posts do not include related material or perspective. (Ex. state agreement with other postings)
T	3 or more posts, distributed in discussion; 1 to 2 paragraphs in length.	2 or more posts distributed in discussion, 1 to 2 paragraphs in length.	1 or more posts, not distributed and/or not 1 to 2 paragraphs in length.
O	Demonstrates understanding of topic/ answers the discussion questions/ relates comments to the topic.	Posts usually demonstrate understanding of topic/ answers the question.	Posts are not on topic, do not answer the question and do not demonstrate understanding.
P	Views are presented in a considerate and respectful manner.	Posts are presented in a considerate and respectful manner.	Posts are not presented in a considerate and respectful manner

Learner-centered Approach

Online learning requires teachers to shift from a teacher-centered approach to learning, to a student-centered approach (Berry, 2009; Machemer, 2007). In essence, the instructor places him or herself in the role of the student (Gibson et al., 2001). Students are required to become active participants, engaging in and interacting with course content, and the instructor becomes more of a mentor and guide (Gibson et al., 2001; Machemer, 2007). As a facilitator, the instructor is guiding, monitoring, providing feedback, and addressing problems as needed (Gibson et al., 2001). Machemer (2007) found that students valued both a traditional lecture format and active learning activities as they were linked to course objectives.

Berry (2009) addresses one necessary change in a class originally taught face-to-face that was converted to an online course. Regular course notes proved to be ineffective in addressing difficult material, as this was elaborated on in a physical lecture setting. Instead, Berry made “Study Buddy Notes (SBNs)” that guided students through difficult content and advised them on what to focus on and how to study. The majority of the class used these notes and indicated that they gave them confidence in mastering course material.

Technology

In managing large online courses, the instructor should take advantage of technology available (Gibson et al., 2001). While teaching a large writing class, Nagel and Kotzé (2009) found a lecturer who developed a template to check documents for common spelling and grammar errors and writing mistakes, beyond what word processing software might find. This was available to students for checking assignments before submission, providing early feedback, and was utilized by the instructor and teaching assistant in the grading process. Students were also able to use this template to perform peer reviews of classmates' work. Most students found this useful, and it lessened the burden on the teacher to provide this initial check (Nagel & Kotzé, 2009).

Bongey, Cizado, and Kainbach (2005) recommend providing student self-tests. These are ungraded assessments that guide the student through content and provide immediate feedback (Bongey et al., 2005). This prepares students to answer questions on content, provides some guidance on the format of the exam, and promotes critical thinking about course material.

Online courses always warrant special considerations when it comes to testing (Gibson et al., 2001). Multiple-choice formats work well for grading purposes, and course management systems allow for relatively easy randomization of questions, preventing some sharing and comparing of exams (Berry, 2009; Palloff & Pratt, 1999). Presenting questions one at a time can also help prevent students from printing the exam during a test and strict time limits discourage extensive use of textbooks and other resources (Berry, 2009; Keramidis et al., 2007). Technical problems are amplified in a large class. Berry (2009) found that 10-15 percent of students experience a problem during each exam which, in a large class, can be up to 15-20 students. This is often an issue that a teaching assistant cannot resolve, and typically results with panicked contact from students. Establishing a level of trust and clear expectations with students is necessary. Before any exam is administered, the instructor should be clear that students will be treated fairly, and any issues that arise will be resolved in a timely manner, although that does not mean every email or phone call will be responded to immediately. Instructors should provide clear instructions to the students as to what to do in the case of a problem, including immediately emailing the instructor with the details of the occurrence (Berry, 2009; Keramidis et al., 2007). To curb repeated panicked messages, Berry (2009) suggests students wait 15 minutes for an immediate response. If one is not provided in that time frame, the problem should be expected to be addressed within the usual 24-hour period (or other designated time frame). The instructor should also maintain a log of student issues, which can be helpful in identifying students who continue to have these issues.

Professional Practice

Teaching online is different than the traditional classroom. The relationships between student and teacher are more complex and once a mistake has been made in an electronic environment, it is very difficult to recover fully (Dykeman & Davis, 2008). For example, an NYU marketing instructor recently gained international attention when his direct and inflammatory 424-word email to a student went viral with the click of a mouse (Carter, 2010). Instructors need to be aware they set the tone for their online course and are the role model for the sense of community and civility within the course. The observation of netiquette

(network etiquette) can be highly effective in an online course. Positive climate building by the instructor can assist in reducing anxiety about online communication and can result in a good sense of community within the course (Harisam, Hiltz, Teles, & Turoff, 1996).

Online instructors as well as traditional classroom instructors need to be aware of the academic policies and ethical practices of their institutions (Sileo & Sileo, 2008). It is recommended that instructors develop clear academic policies for their classroom and clearly define areas such as what constitutes cheating or plagiarism in the online environment (Higbee & Thomas, 2002; Ruderman, 2004; Sileo & Sileo, 2008). These policies should be available to students on the web site, as well as in the syllabus and in any other relevant material. McCabe and Trevino (1996) indicate students are less likely to cheat when academic standards are provided, and instructors appear to be committed to those standards.

Conclusion

The guidelines for managing very large online courses presented in this paper focus on four broad areas: (1) effective communication, (2) teaching assistants and multiple sections, (3) teaching techniques successful in large online course sections, and (4) professional practice in the online classroom. Teaching online requires working with many elements including the fact that all information is easily distributed on the Internet. Because of this, online educators have the responsibility for creating an environment that is a safe place for open communication, has a sense of community and provides for all students, staff and instructors the assurance of civility.

As online education evolves, instructors must be prepared to teach not only the very large online classes of today but those of the future. Technology will continue to evolve along with expectations of the role of the online instructor. However, regardless of those changes, instructors will still continue to be responsible for conveying course policies to students, training teaching assistants and staff, and making sure that, as instructors, they maintain a current understanding of the new technology required in the online environment.

References

- Arbaugh, J. & Benbunan-Finch, R. (2005). Contextual factors that influence ALN effectiveness. In S.R. Hiltz & Goldman (Eds.), *Learning Together Online Research on Asynchronous Learning Networks*. Mahwah: Lawrence Erlbaum Associates, Inc.
- Berry, R. W., (2009). Meeting the challenges of teaching large online classes: Shifting to a learner-focus. *MERLOT Journal of Online Learning and Teaching*, 5(1), 176-182.
- Bocchi, J., Eastman, J. K., & Swift, C. B. (2004). Retaining the online learner: Profile of students in an online MBA program and implications for teaching them. *Journal of Information Systems Education*, 79(4), 245-253.
- Bongey, S. B., Cizado, G., & Kainbach, L. (2005) Using a course management system (CMS) to meet the challenges of large lecture classes. *Campus-Wide Information Systems*, 22(5), 252-263.
- Burruss, N., Billings, D., Brownrigg, V., Skiba, D., & Connors, H. (2009). Class size as related to the use of technology, educational practices and outcomes in web-based courses. *Journal of Professional Nursing*, 25(1), 33-42.
- Carter, D. (2010). Professors, beware: Your nasty eMail could go viral. *eCampus News: Technology for Today's Higher-Ed Leader*. Retrieved from <http://www.ecampusnews.com/2010/03/09/professors-beware-your-nasty-email-could-go-viral>

- Caulking, S. & Kelly, M. (2006). Mentoring and the faculty – TA relationships: Faculty perception and practice. *Mentoring and Tutoring*, 13(2), 259-280.
- Civikly-Powell, J., & Wulff, D. (2002). Working with teaching assistants and undergraduate peer facilitators to address the challenges of teaching large classes. In C. A. Stanley & M. E. Porter (Eds.), *Engaging Large Classes: Strategies and Techniques for College Faculty* (pp. 109-122). Boston, MA: Anker.
- Deithloff, L. (2002). Maintaining intimacy: Strategies for the effective management of TAs in innovative large classrooms. In C. Stanley & M. E. Porter (Eds.), *Engaging Large Classes: Strategies and Techniques for College Faculty* (pp. 109-122). Boston, MA: Anker.
- Drago, W., & Peltier, J. (2004). The effects of class size on effectiveness of online courses, *Management Research News*, 27(10), 27-41.
- Dykeman, C., & Davis, C. (2008). Part one: The shift toward online education. *Journal of Information Systems Education*, 19(1), 11-16.
- Elison-Bowers, P., Henderson, K., Sand, J., & Osgood, L., (2010) Resolving instructor challenges in the online classroom. *The International Journal of Learning*, 17, a339-346.
- Firmin, M.W. (2008). Utilizing undergraduate assistants in general education courses. *Contemporary Issues in Teaching Research*, 1(1), 1-6.
- Gibson, J. W., Tesone, D. V., & Blackwell, C. W. (2001). The journey to cyberspace: Reflections from three online business professors. *S.A.M Advanced Management*, 66(1), 30-35.
- Harasim, L., Hiltz, S., Teles, L., & Turoff, M. (1996). *Learning Networks*. Cambridge: MIT Press.
- Higbee, J. & Thomas, P. (2002). Student and faculty perceptions of behaviors that constitute cheating. *NSPA Journal*, 40(1), 39-52.
- Hepner, F. (2007). *Teaching the Large College Class*. San Francisco: Jossey-Bass.
- Hricko, M. (2002). Developing an interactive web-based classroom. *United States Distance Learning Association Journal*, 16(11), 10-15.
- Leufer, T. (2007). Students' perceptions of the learning experience in a large class environment. *Nursing Education Perspectives*, 28(6), 322.
- Keramidas, C., Ludlow, B., Collins, B., & Baird, C. (2007). Saving your sanity when teaching in an online environment: Lessons learned. *Rural Special Education Quarterly*, 26(1), 28-39. Retrieved from Academic Search Premier database.
- Machemer, P. L. (2007). Student perceptions of active learning in a large cross-disciplinary classroom. *Active Learning in Higher Education*, 8 (1), 9-29.
- McCabe, D. & Trevino L. (1996). What we know about cheating in college: Longitudinal trends and recent developments. *Change*, 28(1), 28-33.
- Nagel, L., & Kotzé, T.G., (2009). Supersizing e-learning: What a CoI survey reveals about teaching presence in a large online class. *Internet and Higher Education*, 13(1), 45-51.
- Palloff, R. & Pratt, K. (1999). *Building Learning Communities in Cyberspace*. San Francisco: Jossey-Bass.
- Panagopoulos, L. (April, 2007). Virtual sections: A creative strategy for managing large online classes. *Online Cl@ssroom*, 1, 5.
- Ryan, M., Hodson-Carlton, K. & Ali, N. (1999). Evaluation of traditional classroom teaching methods versus course delivery via the World Wide Web. *Journal of Nursing Education*, 38, 1-6.
- Ruderman, J. (2004). Faculty play a crucial academic integrity role. *Academic Leader*, 20(3), 13-21.
- Saulnier, B. M., Landry, J. P., Longenecker, H. E., & Wagner, T. A. (2008). From teaching to learning: Learner-centered teaching assessment in information systems education. *Journal of Information Systems Education*, 19(2), 169-175.
- Schneider, H. (1999). Faculty concerns about developing Web-based courses. *Journal of Instruction Delivery Systems*, 13, 21-24.
- Sileo, J., & Sileo, T. (2008). Academic dishonesty and online classes: A rural education perspective. *Rural Special Education Quarterly*, 27(1/2), 55-60.

- Stephens, D.E., O'Connell, P. & Hail, M. (2008). Going the extra mile, 'fire-fighting' or lasisse-faire? Re-evaluating personal tutoring relationships within mass higher education, *Teaching in Higher Education*, 13(4), 449-460.
- Vrasidas, C., & McIsaac, M.S. (1999). Factors influencing interaction in an online course. *American Journal of Distance Education*, 13(3), 22-36.

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