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Research Findings on Pedagogical Guidelines for Student Enrollment Sizes in Online Courses

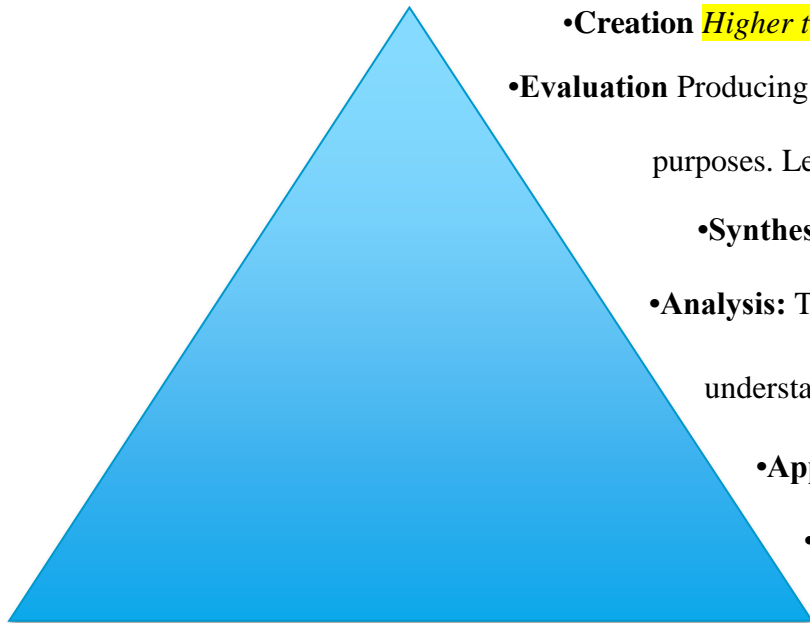
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Supplementary Material: Definitions & descriptions of education theories for Bloom's Taxonomy, Objectivist/Constructivist Pedagogy, and the Community of Inquiry Model that drive class size guidelines



Bloom's Taxonomy: A classification of 6 levels of learning, moving from lower levels (base) to higher-order thinking (peak):

Small class sizes



- Creation** *Higher teaching intensity*. Planning, generating, developing, designing at complex level.
- Evaluation** Producing judgments about or critiques of the value of information and methods for specific purposes. Learning dependent on interaction and dialogue with experts and peers.
 - Synthesis:** Integrating elements and disparate parts so as to form a whole.
 - Analysis:** The breakdown of information into its constituent parts such that the relative hierarchy of ideas is clear, or the relationships between ideas are explicit and understandable.
 - Application:** The ability to use and apply abstractions to particular situations.
 - Comprehension:** An understanding of information and a beginning ability to explain the ideas; novice ability to classify, make generalizations, apply principles.
 - Knowledge acquisition** *Lower teaching intensity*. The recall or recognition of basic and factual information. Lecturing and testing sufficient.

Large class sizes

In any given subject, the higher the level on Bloom's Taxonomy (complex information processing, non-linear and critical thinking, use of judgment), the more students need the knowledge and pedagogical skills of experienced faculty; facilitators and teaching assistants cannot substitute for this expertise. Student-peer interaction in class supplements and extends faculty expertise.

Class sizes and Bloom's Taxonomy:

<u>Level of taxonomy</u>	<u>Recommended Class Size</u>
Upper levels of taxonomy (<i>higher teaching intensity</i>)	Small (analysis, synthesis, evaluation, creation): ≤ 15 students
Middle of Taxonomy (<i>medium teaching intensity</i>)	Medium (application): 24 – 30 students
Lower levels of taxonomy (<i>lower teaching intensity</i>)	Large (knowledge, comprehension): ≥ 40 – students (no known upper limit)



The Continuum of Objectivist vs. Constructivist Pedagogy: neither constructivism nor objectivism is required for any given course; the choice must be based on learning strategies particular to a course's content.

•**Objectivism:** Teacher-centered. Largely through one-way communication, students learn passively by receiving and assimilating knowledge communicated to them by the professor and through course assignments. Students' knowledge acquisition is assessed by objective testing. *Lower teaching intensity, larger class sizes appropriate.*

•**Constructivism:** Student-centered. Learning of new content results from complex interactions among faculty, students, peers and information. Knowledge is discovered, explored, constructed, practiced and validated by each learner to make it “their own;” over time, students integrate knowledge into their own intellectual frameworks. *Higher teaching intensity. Smaller class sizes appropriate.*

Constructivist instructional design principles are used to create learning environments addressing ill-structured and complex real world problems. Faculty facilitate the generation of multiple perspectives and negotiation of meaning within a social learning context. They encourage ownership in learning by actively engaging students in the process of knowledge construction. Continuous assessment is embedded in the instruction². Requires more time and effort from both the instructor and the students than objectivist-based instruction. Depends upon learning community activities, such as collaboration and interaction, and carries the potential to promote critical thinking, higher-level thinking, and interpersonal and teamwork skills.

Comparison of objectivist and constructivist learning and instruction¹

<u>Objectivist pedagogy</u>	<u>Constructivist pedagogy</u>
The teacher controls the learning process	In collaboration with others, the student manages his/her learning process
Instructional strategies are well-defined and based on stated learning objectives	Learning is embedded in complex, problem-based real-world tasks
The learning environment is structured and sequenced	The learning environment is open and flexible
Goals and objectives are set by the designer/teacher	Degree of attainment of goals and objectives is set by the learner
Faculty assessment of students is aligned with course goals and objectives and conducted at set points of the instruction	Faculty assessment of students is continuous and embedded in learning tasks
The cognitive process of knowledge acquisition is emphasized	Multiple perspectives and social negotiation of understanding are emphasized
Produces efficient learning	Produces meaningful learning

¹Based on: Chen, S-J. (2007). Instructional design strategies for intensive online courses: An objectivist-constructivist blended approach. *Journal of Interactive Online Learning*, 6(1), 72-86.



The Community of Inquiry Framework: Teaching, Cognitive and Social Presence²

A well-established and widely-used theoretical model for online educators. The model proposes that the instructor's role is critical in potentiating student learning; *teaching*, *cognitive*, and *social presence* all contribute significantly to learning effectiveness within an online community.



Teaching presence:

A faculty activity that involves Teaching presence may be wholly (*teaching intensive*), partially, or minimally (*low teaching intensive*) applied.

1. Course design & organization:

- process, structure, evaluation, & interaction components of the course
- setting classroom norms & netiquette, and curriculum expectations, so that students are aware of the implicit & explicit learning goals
- learning methods, e.g. learner activities, mix of group & individual activities, and establishing time parameters
- utilizing the medium effectively

2. Facilitating discourse:

- establishing teacher's social presence
- creating a knowledge-building and positive community; modeling appropriate behaviors, commenting upon/encouraging/reinforcing student responses; stimulating learning
- identifying areas of consensus/shared understanding and differing views
- assessing efficacy of learning
- moving the discussion along, assuring participation by all students, making effective and efficient use of time

3. Direct instruction:

- responding to technical concerns/issues
- focusing discussion on specific substantive issues, providing intellectual and scholarly leadership
- sharing subject matter knowledge/expertise from diverse sources
- directly assisting knowledge constructions, especially application & integration; summarizing knowledge frameworks
- diagnosing and correcting misconceptions, providing formative and summative feedback
- interjecting comments, referring students to information resources, requesting responses

² From: Anderson, T., Rourke, L. Garrison, D.R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, 5(2), 1-17; Garrison, D.R. (2007). Online community of inquiry review: Social, cognitive, and teaching presence issues. *Journal of Asynchronous Learning Networks*, 11(1); Garrison, D.R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(3), 87-105.



Cognitive presence: A student activity

Extent to which students are able to demonstrate construction and integration of new meaning through sustained learning processes. Driven by faculty's teaching and social presence, and by other students' cognitive and social presence. Knowledge construction by individual students is often more visible and trackable in online than in classroom-based courses.



Social presence: A faculty and student activity

Social presence is reflected in the ability of faculty and learners to project themselves socially and emotionally into a course, and create an identity as a "real person" in the online environment. It too is affected by the faculty's teaching and social presence, and by other students' cognitive and social presence.

Examples of levels of learning using Bloom's Taxonomy, the Community of Inquiry Model, and Constructivist Pedagogy



A. Lower level learning: learning that demonstrates knowledge of facts and a developing comprehension of factual implications that:

- are based on the dissemination of logical information
- call on students to master facts and share their understandings of facts,
- drive students to compare understandings derived from assigned readings, observations, and opinions associated with limited-variable problems,
- yield statements of agreement and disagreement, identify inconsistencies of ideas and concepts,
- elicit discussions that involve question-and-answer interactions and encourages course peers to respond and elaborate, as able,
- expand knowledge through students' growing command of information,
- call on faculty to summarize the knowledge framework, state conclusions, and identify domains of greater complexity
- encourage the beginning of mutual explorations into unknown applications,
- assess students' mastery of content through quizzes and examinations
- do not require faculty social presence or all elements of teaching presence associated with the Community of Inquiry framework

Faculty work is relatively low teaching intensity, classes may have large numbers of students. Course examples: medical terminology, lower-level science content, basic medical-surgical nursing. Courses may be large or very large.

B. Medium level learning: knowledge application that:

- requires mastery of a mix of factual and interpretive knowledge,
- tends to hover around the application level of Bloom's Taxonomy,
- introduces complexity,
- assesses student mastery via individual factual testing and case study applications.

Requires active teaching presence by faculty (e.g. in areas of drug interactivity and/or case study interventions). Course example: an advanced practice graduate pharmacology course containing a lot of factual information for students to convert to applied knowledge; interspersed with case studies of complex, chronically ill patients that small groups of students problem-solve for a group grade. Course enrollment should be medium sized.

C. Higher level learning: course learning objectives specify student knowledge development that:

- demands going beyond factual understandings and into interpretation of new meaning from diverse sources,
- enters multivariate realms,
- is at the application and higher levels of Bloom's Taxonomy,
- addresses ill-structured issues requiring advanced levels of critical thinking,
- aims to build and, often, restructure students' existing knowledge frameworks,

-depends upon faculty intellectual and scholarly expertise, active and regular faculty interventions in the process of learning (e.g. clarifying ambiguities, diagnosing and correcting misconceptions, providing multifactorial explanations), and frequent formative feedback,
-most successfully develops in a sustained learning community environment.

Faculty work is teaching-intensive and class sizes should be small. Course examples: graduate level research methods, graduate health policy and intervening in the political/policy process, leadership development (not just leadership theory), clinical interventions in advanced practice.

Participant Worksheet

Name of online course: _____

Check applicable level of course: ___UG lower division ___UG upper division ___Masters ___DNP ___PhD ___Other

Describe "Other":

Indicate how you would rate this course on each of the pedagogical theories - **circle the cell/rectangle(s)** most closely describing each of the 3 teaching methods; if the course falls between two rows, circle both:

Level Point allocation	Pedagogical Theory	Bloom's Taxonomy (Column A)	Objectivist-Constructivist (Column B)	Community of Inquiry (Column C)
1 pt.		Knowledge and comprehension levels of taxonomy	Predominantly faculty lecture; students assessed by standardized testing of knowledge	Teaching presence limited to course design and organization, student evaluation. Cognitive presence limited to test performance. Minimal faculty and student social presence.
2 pts.		Knowledge and comprehension levels of taxonomy	Predominantly faculty lecture with selected periods of class discussion; students assessed by testing, quizzes, short answer questions, automated activities	Teaching presence includes course design and organization, facilitating discourse; feedback largely to student group as a whole. Cognitive presence limited to test or quiz performance and brief interactions. Faculty and student social presence limited to episodic interactions.
3 pts.		Knowledge, comprehension, and some application levels of taxonomy	Mix of faculty lecture, class discussion, small group project work; quizzes and/or tests, short papers/essays	Teaching presence includes course design and organization, facilitating discourse, direct instruction; feedback to student group as a whole, some individual feedback. Moderate level of student cognitive presence. Moderate level of faculty and student social presence.
4 pts.		Application and analysis levels of taxonomy. Requires critical	Faculty instruction, class discussion; student debates; student public speaking practice;	Teaching presence includes course design and organization, facilitating discourse, and direct instruction; individualized feedback. <i>cont'd next page ...</i>

	thinking, ability to think holistically, use different perspectives.	writing and/or math assignments; written application/analysis assignments; group project work; individual written term paper	Student cognitive presence in class and on performance assignments. Faculty and student social presence exhibited.
5 pts.	Application level and above of taxonomy. Extensive critical thinking requires reasoning through complexities and ambiguities.	Faculty instruction, extensive substantive class discussion; individual projects and papers, one major; in-depth research on course topic of interest	Teaching presence includes course design and organization, facilitating discourse, and direct instruction; individualized student feedback. Extensive student cognitive presence. Well-developed faculty and student social presence.

Indicate score for each column:

 Column A

 Column B

 Column C

Note: when scores fall *between* 2 rows, circle both and score with a number between the two points.

Sum the scores from the 3 columns: Column A + Column B + Column C = Total course score of _____. (Score range = 3-15).

Total Score - The class size "diagnosis": In the range of course sums below, circle the appropriate size for your course.

Course Score (Sum):

3 = Large-sized course, 40 students >> no known upper limit

4

5

6 = Medium/large-sized course, 31-39 students

7

8

9 = Medium-sized course, 24-30

10

11

12 = Small/medium-sized course, 16-23 students

13

14

15 = Small course, ≤ 15 students

Evidence-based Class Size Guidelines:

Online Class Size

Number of Students

Small courses:

≤ 15

Small/medium courses:

16-23

Medium courses:

24-30

Medium/large courses:

31-39

Large courses:

40-no known upper limit

Interdisciplinary journals reviewed 2012-2017 for this research (n = 43):

<i>Academy of Management Learning and Education</i>	<i>Journal of Interactive Online Learning</i>
<i>American Journal of Distance Education</i>	<i>Journal of Management Education</i>
<i>British Journal of Educational Technology</i>	<i>Journal of Nursing Education</i>
<i>Computers and Education</i>	<i>Journal of Professional Nursing</i>
<i>Computers & Education: Distance Education,</i>	<i>Journal of Scholarship of Teaching and Learning</i>
<i>Distance Education (Australian)</i>	<i>Management Learning</i>
<i>Distance Learning</i>	<i>Management Teaching Review, 2016 (year of inception)</i>
<i>Educational Technology Research and Development</i>	<i>(Merlot) Journal of Online Teaching and Learning (JOLT)</i>
<i>Educause Review</i>	<i>Nursing Education Perspectives</i>
<i>European Journal of Open Distance and e- Learning (EURODL)</i>	
<i>Higher Education: The International Journal of Higher Education</i>	<i>Online Journal of Distance Learning Administration</i>
<i>and Educational Planning</i>	<i>Online Journal of Nursing Informatics,</i>
<i>Higher Education Research and Development</i>	<i>Open Learning: The Journal of Open, Distance and e-Learning (OL)</i>
<i>Instructional Science</i>	<i>Online Learning: The Official Journal of the Online Learning Con-</i>
<i>International Journal of E-Learning and Distance Education</i>	<i>sortium (previously The Journal of Asynchronous Learning Networks)</i>
<i>(previously called the Journal of Distance Education)</i>	<i>Quality Assurance in Education</i>
<i>International Journal on E-Learning</i>	<i>Quarterly Review of Distance Education</i>
<i>International Journal of Nursing Education Scholarship</i>	<i>Review of Educational Research</i>
<i>International Journal of Teaching and Learning in Higher Education</i>	<i>Research in Higher Education</i>
<i>International Review of Research in Open and Distributed Learning</i>	<i>Studies in Higher Education</i>
<i>The Internet and Higher Education</i>	<i>Teaching in Higher Education</i>
<i>Journal of Computer Assisted Learning</i>	<i>Management Teaching Review, 2016 (year of inception)</i>
<i>Journal of Computer and Education Research</i>	<i>Journal of Online Teaching and Learning (JOLT) (Merlot)</i>
<i>Journal of Distance Education (Canadian)</i>	<i>Nursing Education Perspectives</i>
<i>Journal of Higher Education</i>	<i>Online Journal of Distance Learning Administration</i>
<i>Journal of Information Systems Education</i>	

Additional material on this research available: Summary of Articles reviewed re: class sizes (n =58, 14 pages)

Obtain either from Susan Taft, or access the archived files on the AACN website from webinar on class size presented 4/20/17 at

http://www.aacnnursing.org/Professional-Development/Webinar-Info/sessionaltcd/WFR17_04_20