

ASSETT

Arts and Sciences Support of Education Through Technology

University of Colorado at Boulder

Michele Jackson
Director

jackson@colorado.edu

ASSETT Survey Series
Classroom Technologies
Full Report
April 15, 2009

Amanda Porter
Assistant Director for Assessment

Amanda.Porter@colorado.edu

Louisa Katlubeck
Research Assistant

Louisa.Katlubeck@colorado.edu

Karen Suppes
Research Assistant

Karen.Supes@Colorado.EDU

[Mission Statement](#)

Survey Description

The “Classroom Technologies” survey was designed to find out what technologies students like instructors to use both in the classroom and to support their class. ASSETT issued this survey in November of 2008 to the entire campus using buff bulletins and flyers to recruit participants. The survey was delivered online. Survey participants were offered a chance to win a \$100 gift certificate from the CU Bookstore.

The survey asked for the following basic information from students: major, class standing, credit hours usually taken, age, amount of time spent online, and their typical use of laptops in class. The bulk of the survey consisted of two questions that listed a number of techniques/technologies that an instructor might use in class or to support a class. The items were randomized for each respondent to eliminate item order bias. In the first question, students were asked to choose the *top 3-5 techniques/technologies that they like instructors to use* from this list:

PowerPoint	Showing websites in class
Images and pictures	Writing your questions on cards/paper and teacher collects them and answers them
Demonstrations	Pre-made overhead transparencies
Clickers	Small-group discussion
Guest Lecturers	Movies/Videos or video clips
Lectures	Computer simulation
Raising your hand to ask questions	Writing notes by hand on the overhead
Pop quizzes	Audio clips or recordings
Writing notes on the chalkboard/whiteboard	(Other Comments?)

The second question asked students to choose the *top 3-5 technologies that they think instructors should use to support their class* from this list:

Lecture notes on a class website	Lecture notes on CULearn
Online textbook	Blog that students contribute to
Online articles and other assigned documents	Podcasts of class sessions (like YouTube)
Audio recordings of class sessions (like iTunes)	Assignments listed on a class website
Instructor accessible by IM	Image repositories
Posting grades on CULearn	Online syllabus
Assignments listed on CULearn	Instructor's blog
Class wiki	Practice quizzes/tests
Online Simulations	Accepting assignments electronically
Archives of past exams	Using a class email list
Instructor accessible through Facebook	Instructor responding to text messages
	Twitter feed

Respondent Data

1571 CU students responded to this survey. Class standing distribution:

Freshman	447	28.5%
Sophomore	274	17.4%
Junior	277	17.6%
Senior	286	18.2%
Graduate Student	287	18.2%

Table 1

The average reported credit hours per semester were 13.7, with a median of 15. The average age of students was 21.2 years. The median age of students was 20 years. Students reported their major as an open-ended response:

N	Reported Major	N	Reported Major (converted to major codes where applicable)
152	Open Option & None	22	Film, Finance, Open Option Engineering, Geology
114	Psychology	21	Education
83	Business	20	Computer Science, SLHS
57	International Affairs, Integrative Psychology	19	Marketing
56	MCDB	18	Environmental Engineering
55	Environmental Science/Design	17	Accounting, Law School
53	Journalism	15	Math
44	Anthropology, Aerospace Engineering, Communication	14	Architectural Engineering
40	English, Linguistics	13	MBA, Philosophy
35	Economics, History, Evolutionary Biology	12	Advertising
34	Biochemistry	11	Theater & Dance
33	Political Science, Sociology, Electrical and Computer Engineering	9	Astronomy, French, Japanese
32	Mechanical Engineering	6	Humanities, Telecommunications
32	Fine Arts	5	Applied Math, Chemistry, Classics, Ecology, Ethnic Studies, Engineering Physics, Broadcast News
30	Physics	4	Chinese, Music Education, Religious Studies, Women's Studies, Astrophysics
29	Chemical/Biological Engineering	3	Atmospheric & Oceanic Studies, Cognitive Sciences
28	Archeology, Music Performance	2	Continuing Education, German, Italian, Russian
27	Spanish	1	Geophysics, Nursing, Pharmacy
24	Civil Engineering		

Table 2

A total of 821 (52% of 1571) Arts & Sciences students responded to this survey. Distribution of respondents by Arts & Sciences area:

	Primary Major	Secondary Major
Arts & Humanities (AH):	97	39
Social Sciences (SS):	352	49
Natural Sciences (NS):	358	31

Table 3

Survey Results

Top 3-5 techniques/technologies that students like instructors to use:

Students were asked to choose the *top 3-5 techniques/technologies that they like instructors to use*. Table 4 displays the frequencies with which each survey item was selected by respondents.

Item	All		A & S	
	N	Percentage	N	Percentage
PowerPoint	990	63%	545	66%
Movies/Videos Clips	700	45%	381	46%
Demonstrations	699	45%	343	42%
Images/Pictures	688	44%	382	47%
Lectures	616	39%	371	45%
Clickers	583	37%	295	36%
Writing Notes on the Chalk/Whiteboard	547	35%	275	34%
Small-Group Discussion	457	29%	240	29%
Raising Hand to Ask Questions	376	24%	203	25%
Guest Lecturers	340	22%	176	21%
Computer Simulations	264	17%	114	14%
Hand-Written Overhead Transparencies	239	15%	143	17%
Audio Clips or Recordings	216	14%	111	14%
Showing Websites in Class	214	14%	100	12%
Pre-Made Overhead Transparencies	142	9%	84	10%
Writing Questions on Notecards to be Answered	54	3%	30	4%
Pop Quizzes	40	29%	19	2%
Other (Open Ended Responses)	85	5.5%		

Table 4

Top 3-5 technologies that students think instructors should use to support their class:

Students were asked to choose the *top 3-5 technologies that they think instructors should use to **support** their class*. Table 5 displays the frequencies with which each survey item was selected by respondents.

Item	All		A&S	
	N	Percentage	N	Percentage
Lecture Notes on CULearn	812	52%	435	53%
Practice Quizzes/Tests	809	52%	439	54%
Posting Grades on CULearn	789	50%	415	51%
Archives of Past Exams	659	42%	325	40%
Assignments on CULearn	619	39%	325	40%
Lecture Notes on Class Website	607	39%	310	38%
Online Syllabus	570	36%	303	37%
Assignments on Class Website	508	32%	275	34%
Using a Class Email List	502	32%	267	33%
Accepting Assignments Electronically	422	27%	229	28%
Online Textbook	300	19%	158	19%
Online Articles/other assigned documents	250	16%	149	18%
Podcasts of Class Sessions (ex. YouTube)	233	15%	118	14%
Audio Recordings of Class Sessions	209	13%	111	14%
Online Simulations	157	10%	85	10%
Class Wiki	112	7%	72	9%
Blog for students to contribute to	112	7%	60	7%
Instructor Accessible by IM	102	7%	52	6%
Instructor's Blog	82	5%	41	5%
Image Repositories	54	3%	36	4%
Instructor Accessible through Facebook	41	3%	23	3%
Instructor Responding to Text Messages	33	2%	16	2%
Twitter Feed	8	0.5%	4	0.5%

Table 5

Top 3-5 Classroom Technologies by Class Standing:

Item	Most Selected and % of students selecting the Item (within Class)									
	Freshman		Sophomore		Junior		Senior		Graduate	
Powerpoints	(1)	63%	(1)	70%	(1)	62%	(1)	69%	(1)	51%
Clickers	(2)	49%	(2)	50%	(3)	43%	(8)	29%	(13)	8%
Demonstrations	(3)	48%	(4)	45%	(5)	42%	(4)	45%	(4)	40%
Images/Pictures	(4)	47%	(5)	42%	(4)	43%	(2)	49%	(5)	37%
Movies/Video Clips	(5)	46%	(3)	48%	(2)	48%	(3)	47%	(7)	33%
Lectures	(7)	34%	(6)	40%	(6)	40%	(5)	42%	(2)	47%
Writing Notes on the Chalkboard/ Whiteboard	(6)	37%	(7)	30%	(7)	34%	(6)	31%	(3)	41%

Table 6

Top 3-5 Support Technologies by Class Standing:

Item	Rank Selected and % of Students Selecting the Item (within Class)									
	Freshman		Sophomore		Junior		Senior		Graduate	
Practice Quizzes/Tests	(1)	60%	(3)	54%	(3)	55%	(1)	53%	(9)	31%
Lecture Notes on CULearn	(2)	57%	(2)	58%	(2)	56%	(3)	51%	(7)	33%
Posting Grades on CULearn	(3)	55%	(1)	59%	(1)	62%	(2)	52%	(11)	21%
Online Syllabus	(7)	32%	(7)	31%	(7)	32%	(5)	43%	(1)	45%
Using a Class Email List	(9)	29%	(9)	26%	(9)	28%	(9)	34%	(2)	44%
Assignments on CULearn	(4)	44%	(5)	39%	(5)	41%	(6)	41%	(10)	29%
Archives of Past Exams	(6)	41%	(4)	46%	(4)	44%	(4)	44%	(6)	35%
Assignments on Class Website	(8)	31%	(8)	27%	(8)	30%	(7)	38%	(3)	37%

Table 7

Top 3-5 Classroom Technologies by Area in A&S:

Item	Most Selected and % of students selecting the Item (within Area)									
	A+S Student		Non-A+S Student		Arts + Humanities		Social Sciences		Natural Sciences	
Powerpoints	(1)	66%	(1)	59%	(1)	61%	(1)	67%	(1)	67%
Images/Pictures	(2)	47%	(4)	41%	(3)	54%	(3)	47%	(4)	44%
Movies/Video Clips	(3)	46%	(3)	42%	(2)	55%	(2)	53%	(6)	37%
Lectures	(4)	45%	(7)	34%	(4)	47%	(4)	47%	(5)	43%
Demonstrations	(5)	42%	(2)	47%	(5)	40%	(5)	38%	(3)	45%
Clickers	(6)	36%	(5)	39%	(10)	23%	(8)	28%	(2)	49%

Table 8

Top 3-5 Support Technologies by Area in A&S:

Item	Most Selected and % of students selecting the Item (within Area)									
	A+S Student		Non-A+S Student		Arts + Humanities		Social Sciences		Natural Sciences	
Lecture Notes on CULearn	(2)	53%	(1)	51%	(1)	50%	(1)	56%	(2)	51%
Posting Grades on CULearn	(3)	51%	(3)	50%	(2)	48%	(2)	52%	(3)	49%
Online Syllabus	(7)	37%	(7)	36%	(3)	46%	(5)	39%	(9)	31%
Practice Quizzes/Tests	(1)	53%	(2)	50%	(4)	42%	(3)	50%	(1)	61%
Archives of Past Exams	(4)*	40%	(4)	45%	(11)	28%	(6)	35%	(4)	47%
Assignments on CULearn	(4)*	40%	(6)	39%	(5)	41%	(4)	40%	(6)	38%

* These two support technologies received the same number of “preferred” votes (325)

Table 9

For both ‘by Area’ summaries, students with double majors were included in the Arts and Sciences category if either of their majors was within the school. Non- Arts and Sciences students had no majors in the school. The responses of students who were double majors in different areas of A&S were included in both areas. Minors were not regarded.

The “top three to five” were determined by running a hierarchical cluster analysis on the binary results of all the possible technologies of that type against the student category in question. This generally resulted in a distinguishing tree which had the primary division between the top few “most critical” and the rest. When the “most critical” category was small (one or two items), the secondary division also tended to be small between the “quite critical” items and the rest, so that secondary group was included in the top few.

Additional Findings

Online Presence:

On average 93% of respondents are typically doing stuff online (includes things like email, anything on the web, texting and IM, online gaming, etc.) *Pretty Often or Constantly*.

		How often do you do things online?				Total
		Hardly Ever	Sometimes	Pretty Often	Constantly	
Class Standing	Freshman	1%	7%	52%	40%	100%
	Sophomore	0%	7%	54%	38%	100%
	Junior	0%	8%	53%	39%	100%
	Senior	1%	5%	53%	41%	100%
	Graduate School	0%	5%	55%	40%	100%
Total		1%	6%	53%	40%	100%

Table 10

Cell Phone Use:

On average, 93% of respondents own a cell phone. Figure 1 shows the distribution by class standing. Over 60% of undergraduates report using a cell phone in class. Only 20% of graduate students report doing so.

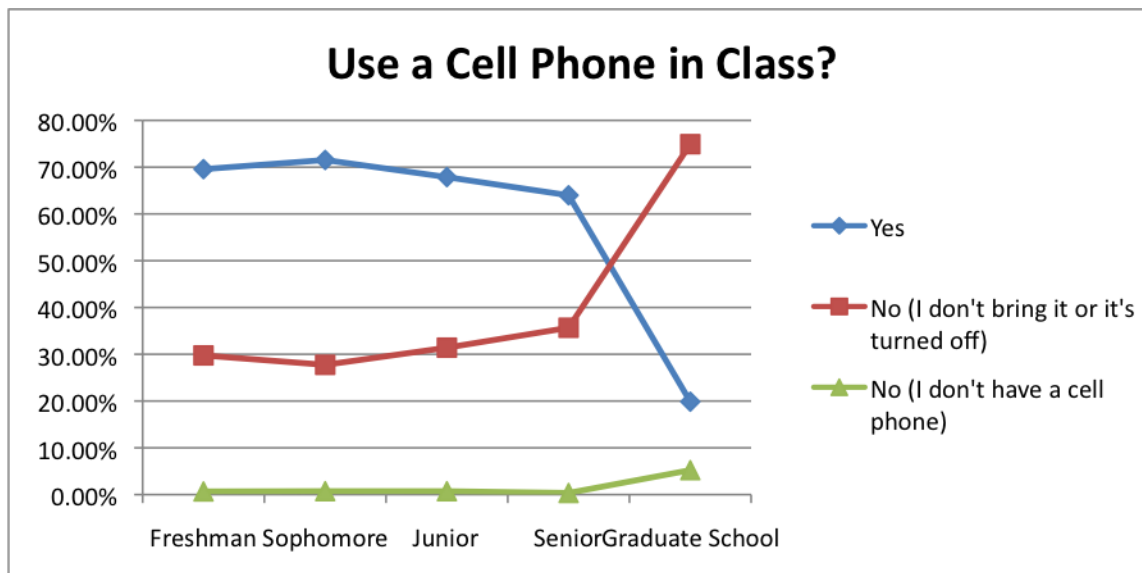


Figure 1

Table 11 shows what students are doing with their cell phones in class based on their class standing. Texting is by far the most common use of a cell phone in class. Graduate students are far below average for all activities, indicating they are not using their cell phones in class as much. Juniors seem particularly active at games, talking, and taking pictures, though not email. All activities but texting are done by a very small percentage of the population (less than 10%). Freshmen also seem about or below average on most activities, excepting talking. Talking experiences a sudden drop for seniors and graduate students, possibly corresponding to a reduction in the size of upper level and graduate courses.

Cell Phone Activity In Class

Activity	Freshman		Sophomore		Junior		Senior		Graduate	
	N	%*	N	%*	N	%*	N	%*	N	%*
Talking	19	4%	14	5%	16	6%	4	1%	3	1%
Texting	314	70%	196	72%	185	67%	186	65%	54	19%
Taking Pictures	10	2%	8	3%	15	5%	9	3%	1	0%
Recording	6	1%	4	1%	4	1%	2	1%	0	0%
Email	24	5%	24	9%	23	8%	25	9%	15	5%
Games	13	3%	13	5%	19	7%	12	4%	1	0%
Websurfing	10	2%	9	3%	10	4%	11	4%	5	2%

* Percent within class standing

Table 11

Laptop Use:

93% of respondents own a laptop computer. Only 23% own a desktop computer. Overall 98.8% own some sort of computer. Table 12 shows the percentage of each class standing that brought their laptop to school the designated frequency (never, sometimes, usually, always).

Freshmen and sophomores have the same tendency to bring a laptop to class, decreasing as frequency of use increased. Juniors have the largest percentage of their class that never brings a laptop to class, and below average percentages for all other frequencies, still decreasing as frequency increased. Seniors are the only class that does not consistently decrease percentage of students bringing a laptop to class as frequency increases – a larger number bring their laptop “sometimes” than “never”, though “usually” and “always” are still below average. Graduate Students have the highest tendency to bring their laptops to class. Table 12 shows....

What are these students doing on their laptops when they bring them to class? The activity most common for laptop use is “Taking Notes.” Table 13 shows the percentage of students that engage in each laptop activity.

Frequency of Laptop Use in Class

Activity	Never		Sometimes		Usually		Always	
	N	%*	N	%*	N	%*	N	%*
Freshman	203	45%	178	40%	46	10%	20	4%
Sophomore	123	45%	112	41%	28	10%	11	4%
Junior	143	52%	105	38%	23	8%	6	2%
Senior	123	43%	132	46%	21	7%	10	3%
Graduate School	115	40%	106	37%	40	14%	26	9%

* Percent within class standing

Table 14 shows that regardless which frequency of laptop use in class the student falls under, they tend to have the same relative tendency to use it for taking notes , accessing CULearn, and following along with the instructor (high frequency)

Frequency of Laptop Use in Class

Activity	Never		Sometimes		Usually		Always	
	N	%*	N	%*	N	%*	N	%*
Taking Notes	61	9%	490	77%	146	92%	69	95%
Following Along with the Instructor	34	5%	340	54%	107	68%	53	73%
Email	28	4%	378	60%	104	66%	54	74%
IMing	3	0%	108	17%	28	18%	17	23%
Facebook, Myspace, etc.	14	2%	330	35%	56	35%	22	30%
Doing Homework	33	5%	275	43%	80	51%	31	42%
Accessing CULearn	39	6%	406	64%	110	70%	46	63%
Websurfing	11	2%	175	28%	47	30%	32	44%
Playing Games	4	1%	52	8%	16	10%	5	7%

*percent within frequency of Laptop use

Open Ended Responses:

Other Top 3-5 Techniques/Technologies You Like Instructors To Use: Comments? What did we forget?

There were two themes from the 85 open-ended responses to this question. First, students want lecture notes provided by the instructor available to them online (N=20). This corresponds with the most chosen item on this survey for technologies to support class, "Lecture Notes on CULearn." Second, students indicate an interest in "active" teaching and learning (N=23). This was indicated by numerous responses asking for things like class discussions, workshops, hands on activities, debates, use of props, and competitive games.

Are there any classroom technologies you especially dislike?

There were 1,065 open-ended responses to this question. This question was not required to be answered by survey respondents. However, 245 respondents said that they did not especially dislike any technologies. Of the remaining 820 responses, 144 indicated a dislike of PowerPoint and 140 indicated a dislike of clickers. Responses indicated that PowerPoint's were disliked especially when instructors read off of PowerPoint slides and moved too fast. It is less clear why students disliked clickers. Some responses indicated that clickers, when used for a grade in class, might be problematic. Finally, 108 respondents disliked overheads and 87 respondents disliked lectures. These open-ended responses are interesting considering that PowerPoint, lectures, and clickers were all among the most selected items for technologies/techniques that students *like* instructors to use. More targeted research is needed to determine what it is about the use of PowerPoint's, clickers, and lectures that are well liked yet problematic in certain circumstances.

Table 15 shows the number and percentage of students who dislike the above technologies by Arts & Sciences students and non Arts & Sciences Students.

Item	Non A&S Student		A&S Student		A&H		SS		NS	
	N	%	N	%	N	%	N	%	N	%
PowerPoint	69	49%	71	51%	12	16%	26	37%	33	47%
Clickers	60	43%	80	57%	9	11%	40	50%	31	39%
Overheads	48	45%	60	55%	7	12%	29	48%	24	40%
Lectures	40	46%	47	54%	8	17%	16	34%	23	49%

Table 15

Should teachers do anything different (in terms of using things on the list) if the class is really large?

There were 897 open-ended responses to this question. This question was not required to be answered by survey respondents. However, 147 respondents said that they do not think teachers should do anything different for large classes. Of the remaining 750 responses, 151 responses indicated that clickers should be used in large classes. However, there seems to be a concern with using clickers for grades. 110 respondents indicated a preference for PowerPoint in large classes. Students also indicate a preference for having notes available online. Having the right equipment in a classroom is also important for students in large classes. Projectors, AV equipment, and microphones are important so that students and hear and see the instructor.

Classes Mentioned as Fantastic Examples of Using Technology in the Classroom:

Major themes emerged for why students think some classes are fantastic examples of uses of technology in the classroom. First, students said that classes where instructors used a combination of technologies were well liked. Instructors who “mixed it up” were recognized as maintaining students interests in the material. Students frequently mention that a “balance” between uses of different technology was important. Primarily, students like a mix of lecture and notes with the use of real world examples. Examples and demonstrations that utilized video and images were most preferred. Technologies mentioned most often include PowerPoint, clickers, and videos. Students indicate that they liked the use of PowerPoint complimented with videos and images. A diversity of mediums is preferred. Overall, any type of video clip or demonstration is preferred if it seems relevant to the material. The use of multimedia is described by students as keeping their interest and as being more “current” and “with the times.” This preference indicates that pedagogically, students want a mix of “show” and “tell.” Another feature of a class that uses technology well was the availability of notes online. Availability to class materials outside of class is important. Many students enjoyed availability to lecture notes before the class. Finally, students indicate that the use of a variety of technologies is most useful when they are integrated with the content. The use of technology in the classroom should be used thoughtfully to support the specific content of the class.

Interpretation

The technology that students like instructors to use in class is PowerPoint. This is the most selected technology regardless of class standing or area in Arts & Sciences (A&S). PowerPoint is important to use in really large classes. However, open-ended responses indicate that “effective” use of PowerPoint is key. Students actually dislike PowerPoint when instructors go too fast or simply read off of the slides.

Clickers are the second most chosen item for freshman and sophomores. The popularity of clickers declines after sophomore year. Importantly, clickers are the second most chosen item for non-Arts & Sciences (A&S) students and Natural Sciences students. The other areas of A&S did not select clickers in their top 3-5 items. The nature of freshman and sophomore classes as larger lecture-style classes suggests that clickers may be most preferred in large classes in the sciences. Clickers may have been chosen less by Arts & Humanities and Social Sciences students because clickers have been slower to enter these disciplines.

Videos, images, and demonstrations are important technologies and techniques to use in the classroom. Students selected all of these as a top 3-5 across class standing, with the expectation of graduate students. This is also true across areas in A&S. Demonstrations are preferred slightly by non-A&S students. Open-ended responses indicate that the use of video, images, and demonstrations are important because students want real world applications of concepts. The use of these technologies and techniques also stimulate students. However, students prefer the use of multimedia tools when they are pertinent and relevant to the topic of the course. This means that instructors should be discerning in their choices of what video and images to use to support and enhance their course content.

It is important to note that the largest percentage of respondents (28%) were freshman. The preference for technologies and techniques such as PowerPoint and lecture could reflect the nature of the freshman classroom experience. Often, many freshman level courses are the larger, lecture-style classes. Also, the popularity of PowerPoint does not necessarily mean that it is the most useful tool to support teaching and learning. Rather, this could indicate that PowerPoint is simply the tool that is *most expected* by students to be used in the classroom. Regardless, if students expect instructors to use PowerPoint, it becomes important for instructors to learn to use PowerPoint in a manner that most effectively supports the learning goals of the class. Classes that students recognized as being “fantastic examples” of technology use in the classroom were those where instructors used a variety of technologies. This indicates that the use of PowerPoint alone is probably not the most preferred use by students. Rather, an effective “balance” of multiple technologies was offered by students as most engaging.

Access to lecture notes in CULearn was the most selected technology/technique that students selected for instructors to use to *support* their class. Within A&S, lecture notes on CULearn was the most selected item for Arts & Humanities and Social Sciences

students. However, Natural Sciences students selected practice quizzes and tests most often. Overall, practice quizzes/tests and grades on CULearn were chosen in the top 3-5 across class standing, with the exception of graduate students. The same trend held for areas in A&S with the exception of Arts & Humanities (A&H). A&H students selected online syllabus more than practice tests and quizzes. Open-ended responses support these findings. Students like having access to lecture notes so that they can use them to reference outside of class. These results also indicate that CULearn is an important technology for posting notes and grades. The selection of practice quizzes and tests as a well-liked technique to support class may have interesting implications for instructors. Further research is needed to determine how technology may be best able to support this student preference.

Newer 2.0 technologies such as facebook, twitter, and blogs were some of the technologies selected least by students as important for instructors to use to support class. There may be several possible reasons for this. One is that students have less familiarity with using these tools for classroom and educational uses. More research is needed to determine why newer 2.0 technologies were not selected as much as other technologies/techniques.

Over half of the students responding to this survey are typically doing stuff online (emailing, texting, gaming, etc.) pretty often. Most students own a cell phone and most students use them in class. Graduate students are the only exception, not bringing their phones to class or keeping their phones turned off. By far, the greatest use of cell phones in class are for texting. All other uses of cell phones (email, games, websurfing, talking, recording, taking pictures) drop well below the use of cell phone for texting. Around 70% of students are texting during classes. Instructors should be aware of this and consider including a cell phone use policy in their syllabus.

Most students own a laptop, yet very few actually use their laptops in class. For those who do bring laptops to class, they are using the laptops primarily to take notes. Taking notes remains constant across class standing. Taking notes is followed by accessing CULearn, emailing, and using the laptop to follow along with the instructor. The use of facebook is relatively low in comparison to taking notes, and drops considerably as students progress in class standing. Overall, those students who report bringing their laptop to class “always” are websurfing, emailing, and IMing more often than those who report bringing their laptops to class “usually” or only “sometimes.” The relatively low use of laptops in class overall could be due to a number of reasons. Instructors may have policies that restrict the use of laptops in class. However, the data in this report indicate that the even if students are not using their laptops, they are still spending time in class engaging in texting activity that likely does not pertain to the class.