

# Evaluating the Effectiveness of Three Different Course Delivery Methods in Online and Distance Education

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**Keywords:** Online and Distance Education, Online Lectures, Asynchronous Online Discussion Groups, Educational Video Games, on-Line Surveys.

**Abstract:** Students who completed at least one of three introductory Criminology courses offered through Simon Fraser University's Centre for Online and Distance Education (CODE) between May 2013 and April 2014 were invited to participate in an online survey regarding their perceptions of and experiences with these three fully online courses. The three courses varied substantively from each other in their online format and pedagogical approaches. The research indicates that students find interactive exercises, educational video games, online audio-visual instruction (e.g., online lectures or Webcasts) and online quizzes helpful in understanding course content and preparing for examinations. Results regarding participation in online discussion groups were mixed, although students feel these groups give them an opportunity to interact with their peers in the online environment. The survey results have already influenced the format of recently revised and newly designed CODE courses at the university, and are expected to inform the design of future courses.

## 1 INTRODUCTION

This paper reports on an online research survey regarding student perceptions of and experiences with three different (fully online) introductory Criminology courses offered by the Centre for Online and Distance Education (CODE) at Simon Fraser University (SFU). All three online courses were designed by different instructors, offering an opportunity to investigate different pedagogical approaches to online education. To illustrate, two of the courses (CRIM 103 and CRIM 131) made use of online discussion groups, whereas CRIM 104 did not. CRIM 131 required an online (tutorial) presentation, whereas CRIM 103 and 104 did not. Only CRIM 104 had a series of fully-developed online lectures, similar to those delivered in a regular lecture theatre over the course of a semester. This afforded the researchers the opportunity to compare and contrast the effectiveness of asynchronous discussion groups, interactive videos and educational games, online audio-visual instruction, and online quizzes.

The research questions addressed in this study include why students take online and distance education courses, whether students feel that they

benefit from participation in online discussion groups, whether they find interactive videos and educational games to be effective, what benefits they derive from online audio-video instruction, and which quiz formats they think provide the best insight and exam preparation.

## 2 BACKGROUND

The Centre for Online and Distance Education at SFU offers 187 online/distance education courses, including 30 Criminology courses. At the time of the study, there were 17,572 students enrolled in CODE courses, 2,819 of whom were enrolled in Criminology courses. The researchers surveyed the students enrolled in the CODE versions of CRIM 103, 104 and 131.

CRIM 103, the oldest of the three courses, made limited use of interactive/educational video games and on-line audio-visual instruction. The course consisted of 10 (short) online lectures, and three interactive/educational video games. CRIM 103 emphasized participation in weekly online discussions, requiring individual students to

facilitate asynchronous class discussions for two out of eleven weeks (SFU operates on a thirteen week semester system, not including the final exam period). Participation in the weekly online discussions, plus facilitation of two discussions, was worth 20 percent of the grade for the course. The CODE version of CRIM 103 had a weekly online quiz, but unlike CRIM 104 and 131, had no points allocated for performance on the quiz.

The CODE version of CRIM 104 consists of 11 online lectures and 10 online tutorials, plus online modules on how to do the tutorials and how to prepare for examinations. Each lecture is about an hour in length, with presentation slides with a voice-over (audio track). Each online tutorial for CRIM 104 consists of a 20-30 minute audio-visual presentation, an interactive preliminary assessment exercise (a video game designed to assist with learning), a series of interactive flash cards that flip from term to definition, and a timed, 10 minute (5 question) quiz at the end (cf. MacKenzie and Ballard, 2015). Students can earn one point per tutorial for attendance and participation, by going through all four of the required elements and spending at least 30 minutes doing so, and up to one point for their performance on a five question quiz at the end. The CRIM 104 tutorials are worth 20 percent of the overall grade for the course.

CRIM 131 is broken down at the beginning of the semester into tutorial groups of 19 students. The ten tutorials for CRIM 131 each involve two or three online readings and a 20 minute (10 question) quiz at the end. Over the course of the semester, each CRIM 131 student is required to provide an online presentation to their group, which relates to their assigned reading, and includes two discussion questions (cf. Huang, 2013). Four times per semester, assigned discussants from the presenter's group respond to these questions, while the presenter facilitates discussion (monitored by the teaching assistants and instructor) (cf. Alammery, Sheard, and Carbone, 2014). The CRIM 131 tutorials are worth 25 percent of the overall grade for the course—the quizzes are worth 10 percent, the presentation, 10 percent, and discussion, 5 percent.

Research indicates that online discussion groups such as those used in CRIM 103 and CRIM 131 can foster more meaningful interaction, and thus promote 'reflective learning,' as students have more time to think about what they want to say than in face-to-face classroom discussions (Comer and Lenaghan, 2012). The type of interactive preliminary assessment exercises (educational video games) employed in CRIM 104 have proven to have

a positive effect on test results, and to be useful to students when reviewing for mid-term and final examinations (Grimley, Green, Nilsen, Thompson, and Tomes, 2011; Means, Toyama, Murphy, Bakia, and Jones, 2010). Online discussion groups, interactive video games and online quizzes are all consistent with 'active learning,' and the notion that students learn better when they assume responsibility for their own education through participation, problem-solving and self-assessment (Handelsman, Miller, and Pfund, 2007).

### 3 METHODOLOGY

Given that this study targeted three fully online CODE courses, it was determined that the only way to survey the students was through an online survey. Apart from sampling students in the current semester, the study sampled students enrolled in these CODE courses in the two preceding semesters, many of whom were no longer available to fill out a 'pencil and paper survey' in person. Also, many of the CODE students were not regularly on campus, if they were on campus at all.

#### 3.1 Survey Design

The survey employed software from fluidsurveys.com, which features 'skip logic,' where required questions are answered by all participants, while topic-specific questions are presented only to those participants who trigger them through their previous responses (Evans et al., 2009; Rademacher and Lippke, 2007). Students who lacked experience with a particular course would automatically be redirected to the next set of questions regarding the course or courses which they had taken.

The online survey consisted of 96 'quantitative' questions regarding student experiences with and perceptions of the three online/distance education courses. Eight of these questions asked why students took CODE courses, how much effort they felt was required for CODE courses, how many hours a week they spent on CODE courses, and how they thought CODE courses compared to on-campus courses. Twenty-three were demographic questions pertaining to age, gender, citizenship, fluency in the English language, credit hours accumulated, and grade point average. Only three students were expected to answer all 96 of the questions, as they were the only ones who had taken all three courses (there would be no point in asking students to answer the 33 course-specific questions on CRIM 131 if they had never taken the course). Similarly, it

was not possible to ask exactly the same set of questions for each course, as the courses had different designs (it would be pointless to ask CRIM 104 students to answer questions about online discussion groups, as CRIM 104 had no such discussion groups). That said, the questions were standardized to the greatest extent possible, and where applicable, were virtually identical for each course. These 'quantitative' questions were straightforward and simple to answer, by pointing and clicking on the desired response (Maloshonok and Terentev, 2016). The data generated by responses to these questions were exported to and analyzed in Excel and SPSS.

Advantages to online surveys include efficiency, cost savings, and ease of data collection and analysis (Anderson and Kanuka, 2003; Evans et al., 2009). Reported problems with online surveys include low response rates and survey abandonment (Adams and Umbach, 2012; Webber, Lynch, and Oluku, 2013). Measures were taken to encourage participation and survey completion, including six modest cash prizes (drawn randomly) for students who completed the survey, and a series of three carefully timed reminders (Best and Krueger, 2004; Joinson, 2005; Pan, Woodside and Meng, 2013).

Participation in the survey was voluntary and anonymous. This research was categorized as "minimal risk" and approved by SFU's Research Ethics Board in January 2014.

### 3.2 Research Sample

Students enrolled in the Summer 2013, Fall 2013 and Spring 2014 offerings of the CODE versions of CRIM 103, 104 and 131 were invited to participate in this online survey through emails sent to 450 prospective participants. There were 161 surveys completed, for a response rate of 35.7 percent, which is considered reasonable for online surveys (Sax, Gilmartin, and Bryant, 2003; Sue and Ritter, 2007).

Of the 147 participants who answered the question on gender, 97 (66%) were female, and 50 (34%) were male. The slight overrepresentation of females is consistent with known enrolment patterns in the courses surveyed. Other researchers have also reported that females are more likely than males to respond to online surveys (Laguilles, Williams, and Saunders, 2011; Sax et al., 2003).

The number of first and second year students was much lower than in the on-campus offerings of CRIM 103, 104 and 131. Of the 145 participants who answered this question, there were only 8 first year students (6%) and 30 second year students

(21%). On the other hand, 57 third year students (39%) and 34 fourth year students (23%) participated. Another 16 (11%) of students were unsure of what year they were in, or were in fifth year, or had already graduated.

Of the 160 participants who responded to the question, 42 (27%) reported that they were Criminology majors or minors, and 61 (38%) that they were intending Criminology majors or minors. Those taking Criminology as a 'breadth' or 'general interest' course (or for other reasons entirely) came from a wide variety of disciplines, such as business administration, psychology, economics, education, communications, political science, and engineering sciences, to name a few.

Of the 145 participants who elected to provide information on their cumulative grade point average (GPA), 23 (16%) reported a GPA of between 3.5 and 4.0 (A-/A), 51 (35%) reported a GPA of between 3.0 and 3.49 (B/ B+), 50 (35%) a GPA of between 2.5 and 2.99 (C+/B-), and 18 (12%) a GPA of between 2 and 2.49 (a C). Only 3 had cumulative GPAs lower than 2.0. These GPAs differ from first year on-campus courses, where you might expect to see more C-s, Ds and Fs. These findings may reflect a slight 'selection bias,' wherein better-than-average students may have taken an interest in and participated in the survey.

## 4 RESEARCH FINDINGS

As noted above, the survey questionnaire was comprised of 96 'quantitative' questions, involving a series of questions regarding student experiences with and perceptions of the three online/distance education courses, demographic data, and their experiences with CODE courses.

### 4.1 Why Do Students Take Online and Distance Education Courses?

The online survey asked why students took online and distance education courses (as opposed to regular on-campus courses), how much effort they felt was required for online and distance education courses (as opposed to regular on-campus courses), how many hours a week they spent on online and distance education courses, and whether they thought that online and distance education courses were the same, better or worse than on-campus courses. The students who responded to this online survey had evidently enjoyed a significant degree of exposure to online and distance education courses,

(see Table 1 below), and thus, were well-positioned to address these questions.

Table 1: Number of CODE courses in which Students were Currently or Previously Enrolled.

Number of Courses	Currently Enrolled		Previously Enrolled	
	Count	Percentage	Count	Percentage
None	68	43%	9	6%
1	58	36%	30	19%
2 to 3	30	19%	63	39%
4 to 5	3	2%	35	22%
6 to 9	1	1%	18	11%
10 or more	0	0%	5	3%
Total	160	100%	160	100%

Some faculty members feel that students take online and distance education courses because their grades are not high enough to get them into the on-campus courses, or because students think that online and distance education courses are easier than their on-campus equivalents (Driscoll, Jicha, Hunt, Tichavsky, and Thompson, 2012; Otter et al., 2013). In the present survey, when asked about their reasons for taking online and distance education courses rather than regularly scheduled on-campus courses, only 21 out of 161 students (13%) indicated that they did better in online and distance education courses, while only 12 students (8%) responded that online and distance education courses were easier than on-campus courses. The predominant reasons offered for taking online and distance education courses were that the courses were more convenient, or that the on-campus courses conflicted with their work schedules or other courses that they wanted to take. Furthermore, when asked to rate the effort required for online and distance education courses as compared to on-campus courses, the vast majority said that online and distance education courses required at least as much effort as on-campus courses, if not more effort (see Table 2 below).

Table 2: Effort Required in CODE Courses.

Amount of Effort Required	Count	Percentage
Much more effort required for CODE courses	21	13%
More effort required for CODE courses	48	30%
Same effort required for CODE/on campus courses	75	47%
Less effort required for CODE courses	16	10%
Much less effort required for CODE courses	1	1%
Total	161	100%

## 4.2 Participation in Asynchronous Online Discussion Groups

One of the research questions addressed whether students felt that participation in online discussion

groups improved their learning outcomes, and if not, whether online discussion at least increased their enjoyment or sense of engagement in the learning process. The researchers also asked whether students felt that the online discussions were the same or better than discussions in traditional (on-campus) tutorials. This series of questions applied only to CRIM 103 and 131, as CRIM 104 did not employ online discussion groups.

From a purely quantitative perspective, this could best be described as a 'split decision.' Of the 50 CRIM 103 students who responded to the question, 34 (68%) felt that the asynchronous online discussion groups were helpful or very helpful in understanding the course materials, while 14 (34.9%) did not (two said they did not participate in the discussion groups). However, only 23 (46%) of the 50 CRIM 103 students who responded to the question felt that the online discussions were the same or better than discussions in traditional (on-campus) tutorials, while 25 (53.5%) did not. Of the 49 CRIM 131 students who responded to the question, 21 (43%) felt that the online discussion groups were helpful or very helpful in understanding the course materials, while 25 (51%) did not (three, or 6%, said they didn't look at the discussions unless they were required to present). Also, 24 (49%) of the 49 CRIM 131 students who responded to the question felt that the online discussions were the same or better than discussions in traditional (on-campus) tutorials, while 25 (51%) did not.

## 4.3 The Effectiveness of Interactive Videos and Educational Games

Another research question addressed how students felt about the effectiveness of interactive exercises and educational video games. This series of questions applied only to CRIM 103 and 104, as CRIM 131 did not employ any interactive preliminary exercises or educational video games.

There were only three online exercises or 'games' employed in CRIM 103. Of the 50 students who responded to the question, 33 (66%) felt that the CRIM 103 exercises or games were either helpful or very helpful in understanding the course materials, while 34 (68%) again felt that they were either helpful or very helpful in preparing for examinations. Remarkably, 11 out of the 50 respondents (22%) said that they did not do the CRIM 103 exercises or games at all, perhaps because doing the CRIM 103 exercises or games had no influence on the students' grades, whereas doing the interactive preliminary assessment exercises and

interactive flash cards for CRIM 104 counted toward the 10% participation grade.

Of the 59 CRIM 104 students who responded to the question, 54 (92%) felt that the interactive preliminary assessment exercises were either helpful or very helpful in understanding the course materials, while 50 (85%) felt that they were either helpful or very helpful in preparing for examinations. When asked about the interactive flash cards used in CRIM 104, 50 (86%) of the 58 students who answered this question felt that the interactive flash cards were either helpful or very helpful in understanding the course materials, while 51 (88%) felt that they were either helpful or very helpful in preparing for examinations.

#### 4.4 The Benefits of Online Video Instruction

The next research question addressed benefits that students derived from online audio-visual instruction designed specifically for the course (e.g., lectures, mini-lectures, or Webcasts). This series of questions applied only to CRIM 103 and 104, as at the time of the survey, CRIM 131 did not employ any online audio-visual instruction designed specifically for the course.

Of the 51 students who responded to the question, 35 (69%) said they watched/listened to all 10 of the CRIM 103 online lectures, while 8 (16%) watched most of the lectures, and 7 (14%) watched about half of the lectures. Of those, 37 (73%) felt that the CRIM 103 online lectures were either helpful or very helpful in understanding the course materials, while 33 (65%) felt that they were either helpful or very helpful in preparing for examinations. That said, 13 (26%) felt that the CRIM 103 online lectures were either not very helpful or not helpful at all in understanding the course materials, while 17 (34%) felt that they were not very helpful or not helpful at all in preparing for examinations.

In contrast, of the 53 students who responded to the question, 40 (75.5%) said they watched/listened to all 12 of the CRIM 104 online lectures, while 9 (17%) watched most of the lectures, and 4 (.07%) watched half of the lectures or less. Of those, 47 (88.7%) felt that the CRIM 104 online lectures were either helpful or very helpful in understanding the course materials, while 46 (86.8%) felt that they were either helpful or very helpful in preparing for examinations. Only 5 students (9.4%) felt that the CRIM 104 online lectures were either not very helpful or not helpful at all in understanding the

course materials, while 6 (11.3%) felt they were not very helpful or not helpful at all in preparing for examinations.

#### 4.5 Which Quiz Formats Provide the Best Insight and Exam Preparation?

The final research question addressed the issue of which quiz format (or formats) the students found offered them the best insight into whether or not they had met the learning objectives.

The online quizzes for CRIM 103 consisted of five questions. Of the 49 students who responded to the question about online quizzes, 42 (86%) felt that the CRIM 103 quizzes were either helpful or very helpful in understanding the course materials, while 40 (82%) felt that they were either helpful or very helpful in preparing for examinations. The online quizzes in CRIM 103 counted for nothing toward the overall grade for the course, yet 40 out of 49 students who responded to the question (82%) felt that the value of the quizzes was either reasonable or very reasonable based on the amount of work required. A handful of students complained about the quiz not being worth anything, and/or about the five minute time limit, saying that they felt rushed.

The quizzes for CRIM 104 consist of five multiple choice or five true-false questions (or a combination of five multiple choice and true-false questions), with a ten minute time limit. Of the 50 CRIM 104 students who responded to the question, 46 (92%) felt that the quizzes were either helpful or very helpful in understanding the course materials, while 46 (92%) again felt that they were either helpful or very helpful in preparing for examinations. Moreover, 46 (92%) found that the value of the quizzes was either reasonable or very reasonable based on the amount of work required.

The quizzes for CRIM 131 consist of 10 questions, with a 20 minute time limit. CRIM 131 students were not asked about the role of quizzes in exam preparation because the online readings supplement the primary course textbook and students are not re-tested on these readings in examinations. Of the 49 CRIM 131 students who responded to the question about online quizzes, 34 (69%) felt that the quizzes were either helpful or very helpful in understanding the course materials, while 15 (31%) felt that they were either not very helpful or not helpful at all. That said, 35 out of the 49 students (92%) found that the value of the CRIM 131 quizzes was either reasonable or very reasonable based on the amount of work required.

## 5 CONCLUSIONS

As predicted by the literature, this study found that students take online and distance education courses for a variety of reasons, and not necessarily with the expectation that these courses will be easier or require less effort than on-campus courses (cf. Gaytan and McEwen, 2007; Nonis and Fenner, 2012; Pastore and Carr-Chellman, 2009). Most participants said that they took online and distance education courses because they were more convenient, or because on-campus courses conflicted with their work schedules or other courses that they wanted to take. Moreover, the vast majority said that online and distance education courses required at least as much effort as on-campus courses, if not more effort.

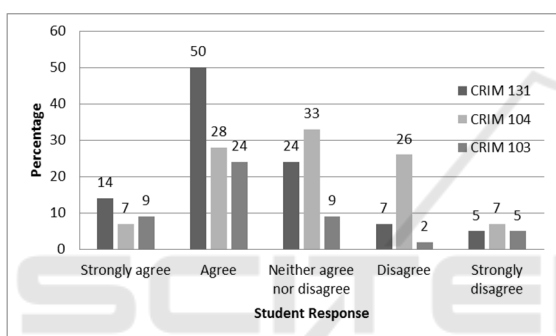


Figure 1: Opportunity for Interaction with Peers.

The results were mixed with respect to student perceptions of the value of asynchronous online discussion groups when it came to understanding course materials and preparing for examinations. However, one of the primary objectives of such discussion groups is to give students the opportunity to interact with their peers in the online environment (cf. 2010; Webb Boyd, 2008). When presented with the statement: 'There were sufficient opportunities to interact with peers in this CRIM 103 course,' 33 out of 49 respondents (67.3%) agreed or strongly agreed with this proposition, while only 16 (32.7%) strongly disagreed, disagreed, or neither agreed nor disagreed. When presented with the same statement, 31 out of 49 CRIM 131 respondents (61%) agreed or strongly agreed with the proposition, while only 19 (39%) strongly disagreed, disagreed, or neither agreed nor disagreed (see Figure 1 above). These asynchronous online discussion groups therefore served the purpose for which they were intended.

The research indicates that interactive exercises and educational video games can be effective teaching and learning tools. However, students

appear less inclined to use them if they do not perceive an immediate advantage when it comes to their grade for the course. This serves to illustrate the importance of assigning a grade value (however small) to online modules in which students are expected to participate (Dennen, 2008; Leflay and Groves, 2013; Rovai, 2003).

It is apparent that the type of online audio-visual instruction employed in CRIM 103 and 104 has its place in online and distance education. The higher percentage of students who felt that the CRIM 104 online lectures were helpful or very helpful in understanding the course materials and preparing for examinations is possibly because the course instructor/supervisor personally prepared and recorded all of the lectures (Kim, Kwon, and Cho, 2011; Mandernach, 2009), whereas most of the CRIM 103 design work was left to the teaching assistants. It is almost axiomatic to say that the more thought, time and effort invested by the designer, the more likely it is that students will find online audio-visual instruction interesting and helpful.

Evidently, students do not object to being tested online. In fact, they find that it helps them to understand the course content and prepare for formal examinations. If there are lessons to be learned in this regard, it is that students prefer shorter (five question) quizzes, with a longer (10 or 20 minute) time limit. Also, students indicated (in their written comments) that they preferred quiz questions that closely addressed subject areas that were likely to be tested on formal examinations.

Overall, when asked to rate the three different CODE courses (see Figure 2 below), and asked whether they would recommend the course in question to someone else, students indicated a clear preference for CRIM 104, with ratings for CRIM 103 and 131 being roughly the same. This suggests that students have an appetite for online and distance education courses that maximize the use of interactive/educational video games and on-line audio-visual instruction (cf. Kim et al., 2011; MacKenzie and Ballard, 2015; Mandernach, 2009).

With the above in mind, a new CODE version of CRIM 101 (designed in the aftermath of this study) adopted a similar format to that employed in CRIM 104, with weekly online lectures plus a series of ten online tutorials, each consisting of an audio-visual presentation, an interactive preliminary assessment exercise, a series of interactive flash cards, and a timed, 10 minute (5 question) quiz at the end. One major difference between the CODE version of CRIM 104 and the new CODE version of CRIM 101 is that the audio-visual lectures were captured from

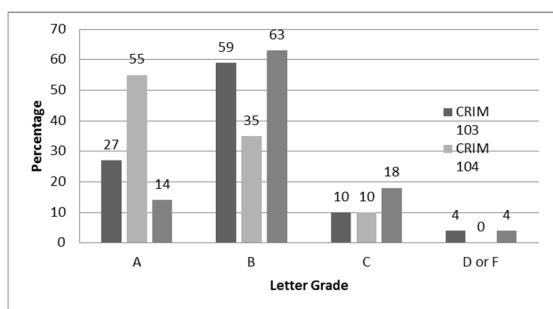


Figure 2: Student Ratings of Overall Experience.

an on-campus iteration of the course, thus giving the online lectures more of a “live” feel. The CODE version of CRIM 131 was also re-designed following the completion of the study; now, it too includes live audio-visual lectures from an on-campus iteration of the course. Other recent revisions to the CODE version of CRIM 131 include alterations to the readings, instructions, and course expectations. Future research will survey students in the newly designed CODE version of CRIM 101 and the recently re-designed CODE version of CRIM 131, to see whether insights gained from this present study have translated into enhanced learning experiences for students in these newer courses.

As always when dealing with student surveys of this nature, we need to ask ourselves whether student satisfaction should be conflated with student learning. Students may simply express a preference for courses that allow them to ‘participate’ anonymously, because they wish to avoid having to engage in scholarly discourse, or to avoid having their thinking challenged by their peers (Bolliger and Erichsen, 2013). Indeed, as Kirkwood and Price (2013) point out in their review of the extant literature on technology-enhanced learning in higher education, there is no clear or consistent evidence that these new learning technologies actually enhance student learning. That said, present-day online and distance education courses by definition have to be seen to be maximizing the use of these online learning technologies, or in the alternative, run the risk of being viewed as out-of-date, or worse yet, obsolete. In any event, it is difficult to deny the attractiveness of these online learning technologies, especially in the face of such strong student endorsement.

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