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How to Use Common Technologies to Minimize Perceptual Biases When Grading Essays: A Five-Step Process

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Abstract

Evaluation of student performance is an important component of higher education course work and a major dimension of Ignatian pedagogy. However, the process of grading essay exams (a popular assessment method in both the liberal arts and technical programs) naturally brings the threat of several perceptual biases that harm grading validity and consistency. Thus, we sought a method to collect and organize essay tests to minimize identification bias (make student authors anonymous to the grader) and randomize grading order to minimize systematic error (related to always grading the same students first or last). Specifically, in this paper, we describe a step-by-step innovative approach that uses multiple common computer technologies (NetSupport School, Word, DOS, and Excel) to prepare, administer, and grade essay examinations submitted by students. Within the Appendix, we describe the steps and how to use these common tools, but within the paper, we offer general guidelines to apply our methods using whatever software or technologies schools are currently using. The discussion section presents limitations to our described method, offers ideas of modifications that may meet the same goals, and recommends future research directions.

Most teaching journal articles focus on the delivery of content and experiential methods to help students develop. The assessment or evaluation of such development is seen as something separate. However, a main component of Ignatian pedagogy is *evaluation*,¹ and without it, the process of development is incomplete. Jesuit school instructors evaluate themselves and their methods frequently, and they also evaluate student performance to help direct future efforts. To examine whether learning has occurred, instructors of higher education may use a variety of assessment methods to evaluate a student's mastery of content and skills or growth, such as multiple-choice questions, true-false, matching, fill-in-

the-blank, short answer, and essay questions.² The literature on testing pedagogy describes constructed response (CR) questions as those that require students to "create their own answers rather than select the correct one from a list of prewritten alternatives."³ CR test formats include short answer, essay, and/or problem-solving questions, and these assessment tools are used in the liberal arts and sciences as well as in professional and technical programs. A considerable body of research has documented both the advantages and drawbacks of CR examinations. For example, CR questions allow students to reveal the knowledge or skills that they have attained by organizing and demonstrating

critical thinking as they analyze problems or evaluate decisions.⁴ Moreover, the CR format prevents students from guessing or from working backwards from the given choices, since they must produce a correct answer rather than just recognize the correct answer.⁵ However, the drawbacks pertain to how accurately or consistently these assessments can be graded (validity and reliability concerns).

Unfortunately for university instructors, one of the challenges presented by essay examinations is “how to avoid subjectivity in grading.”⁶ First, the knowledge of the students’ identity (name, gender, race, attractiveness, etc.), may influence the grade.⁷ Although evidence that identity bias is always present in grading is mixed,⁸ the possibility of discrimination due to gender or race is a legal concern under multiple country laws, and we need to be mindful of the methods we use that might have an adverse impact on protected classes. Moreover, when an instructor knows that a student did exceptionally well on a presentation (or previous assignment), that instructor’s positive perception is likely to affect the grading of this student’s next submitted assignment (halo bias),⁹ and the instructor is less likely to give accurate feedback. Additionally, prior research has suggested that the sequence of the papers read by the grader may affect the grade assigned;¹⁰ rather than grading on individual comprehension, instructors may end up grading based on the contrast of comprehension levels or writing skills between students, or fatigue can influence graders to grade differently from the first to the last paper. Finally, but not exhaustively, another major drawback to the CR examination remains the time commitment required for grading handwritten essays;¹¹ for example, additional time is frequently required to decipher handwriting. Not only do we make assumptions of the students’ identities (such as gender) as we see how words are written, but timed essay exams also seem to result in handwriting that deteriorates, making some responses unreadable (which also influences our perceptions of the students’ understanding).

Many of our students do most assignments using word processing programs, but CR exams are often hand-written. Instructors can have students type out their essays, but identity bias may still be an issue in grading depending on methods of exam collection and dissemination. We sought a method to address both of these issues.

If you are reading this paper, it is likely you teach in Jesuit higher education. As a result, you probably have small class sizes and get to know your students through in-class discussions and/or experiential exercises. Naturally, you are likely to form assumptions and attributions about students’ abilities before you read their exams, and for some students our preconceptions of their abilities or thinking about our previous interactions with them could bias how we read their responses. We may not be able to give the most effective feedback if our assumptions and attributions are flawed. Our shared goal in Jesuit higher education is to provide development and guidance for our future leaders. Thus, our performance assessment feedback should minimize latent bias that has the potential to harm the attainment of that shared goal.

Discussions on the benefits and drawbacks of making students anonymous for grading have continued for several decades.¹² As stated earlier, although the evidence is mixed as to whether bias always exists, those who would like to maximize the opportunity for consistent, accurate, and fair grading have sought methods to help students perceive fair grading. Specifically, one recent study explored the option to use technology in the form of bar codes to minimize immediate student identity.¹³ Jae and Cowling found that students perceived grading to be fairer knowing that identities were difficult to immediately match to submissions than when their names were on the front of an assignment. The students were given a bar code for the semester to attach to all assignments, and the grades were uploaded by those bar codes. However, creating and tracking bar codes created for specific courses may be unrealistic for many institutions

(including ours). Thus, we sought other methods to minimize identification bias and improve grading accuracy and perceptions of fairness. Eventually, we found a way to use our existing classroom management software and Microsoft Office applications to operationalize suggestions from previous papers that identify grading problems related to identity and handwriting.

The purpose of this paper is to describe our approach to organizing and grading CR essay exams. We wanted to use CR essay exams to assess different learning goals, but given how long essays take to grade, we understood how biases could creep into our feedback, and we wanted a solution. In the following sections, we briefly describe the five steps we use to minimize grading biases related to identity and grading order. We provide detailed instructions in the Appendix so that other instructors can replicate this process immediately if they are already using NetSupport School, Word, and Excel, but we describe more general suggestions in the body of the paper for instructors who lack efficacy, confidence, or the time to change procedures mid-semester. Finally, we include a discussion of implications for instructors and students.

Step 1: Choose a classroom management system

The authors of this paper teach in the School of Business in different disciplines (organizational behavior, human resources, management information systems, and accounting). Because our school has courses in business computing that necessitate the use of a classroom management system to deliver and collect files for learning and assessment of class content in a computer lab, we have learned to use that system to help us facilitate CR exams. Our school has used NetSupport School (NSS) for at least two decades, and our technical staff has not had a reason to look into other classroom management systems for our computer labs. However, your school may use something similar, and so our description should easily translate. NSS delivers a wide range of functionality for management and organization of computer classrooms and is

an established computer classroom management system (around 25+ years). It not only provides instructors with the ability to virtually monitor and interact with students, but it also allows for effortless file distribution and collection.¹⁴ Utilization of the NSS software assures a functionally secure testing environment since the instructor controls parameters that drive the send/collect processes. NSS also allows instructors to limit students' access to the Internet and other programs, and can even limit what features of the local computer are available to the student (even access to flash drives). If teaching or testing virtually, course management software (e.g., Blackboard) may offer instructors the ability to gather CR essay typed test answers anonymously, and instructors could download those documents to also follow the subsequent steps we describe below. The main advantage to NSS or another software used in a computer lab for a same-time, same-place examination is that instructors can be there to answer questions and can control the testing environment more systematically to ensure academic integrity. Otherwise, many options exist to distribute and collect exams. In the next step, we will describe how we use NSS to send and collect exams, which is similar to other software processes.

Step 2: Send and collect exams using well-chosen file names

The initial step in our test procedure requires instructors to prepare an examination file and save to a flash drive or other storage device (like a network drive) so that a test can be uploaded into NSS or whatever system is utilized. We tend to use Microsoft Word for CR essay exams as our students are familiar with its functioning, and so we will present those file names in our examples. However, other word processing systems should translate similarly. The exam file should request the student's ID or some other unique identifier, rather than the student's name (e.g., Your8digitStudentIDNumber.docx). We use our university's student ID numbers because they are a standard number of digits (8), they do not easily identify students by entry year or

international status, and we can more quickly post grades to our course management system (Blackboard) with this common code. An instructor will want a code that students feel will be difficult for the grader to immediately associate with the student name to minimize perceived identity bias, and the grader will want an identifier that can be used to upload grades efficiently. Regardless, it is important that the *file name is precise*. We use DOS command short-cuts for organization and grading in our next steps. Follow instructions in the Appendix regarding how to name your exam and how to tell students to save their files, if using the DOS shortcuts.

Establish send/collect parameters

When it is time to administer the exam, the NSS software should be activated. Parameter options for both sending files to student computers and collecting the files at the end of the examination period must be set up before the exams are distributed. See the Appendix for specific prompts and options to choose within NSS. The NSS software allows instructors to identify exactly where the examination file should be shared on the classroom computers. Instructors set up separate student and instructor folders in a chosen directory and choose how files will be identified in the collection process. Jae and Cowling maintain that any “situation in which the grader knows whose work is being assessed, bias in grading will be pervasive.”¹⁵ We ask students to put their ID number in their exam and file name, but since students are logged-in to the consoles as themselves, we choose the NSS option to identify and collect files by computer name rather than student name (see Appendix) to minimize potential identification bias. If we did not choose this option, the collection of exams would link the student’s log-in name to the file. Alternatively, facilitators may instruct all test takers to log-in as a generic guest to skip a step, if that option is available in the lab.

Administer exam

Instructors will need to provide students with specific instructions on where to find the

exam on their local machines (verbally or on a board), and students will launch the exam. Once the exam is complete, the students save their exams and log off the local machines. Students do not need to be logged in for exams to be collected when using NSS. Specific instructions on the administration of the examination are found in the Appendix.

We routinely iterate through three separate collections in order to assure that all files are properly collected for each student, but the collection should work the first time. Any instability or disruption to the institution’s network may have an undesirable impact on this process. For example, one time we experienced network/computer disruption, which resulted in some student files missing from the first collection, but properly extracted on the second collection. Within the Appendix, we describe our recommended three collections to compensate for our paranoia, but instructors could also just count the number of expected exams in the first collection. When the collection is finished and all files have been removed from the computers, the exams should be transferred from the instructor console to a flash drive or network drive.

Step 3: Organize exams

This section provides instructions on how to use DOS and Microsoft Office to facilitate the grading process. It assumes instructors are using Microsoft Windows-based computers, Microsoft Word, and Microsoft Excel. However, instructors using a non-Windows platform or using other types of software should still be able to follow our descriptions below to adapt a method that achieves the same ends (albeit with slightly different key strokes).

DOS commands

We know that DOS commands are not commonly used by academics in many disciplines, but we found that they are quite useful to help quickly organize our documents to grade, and the instructions provided in the Appendix will help those unfamiliar with

DOS commands create the shortcuts that automate organization. After using the commands outlined in the Appendix, instructors will get a list of file names in a specified folder (directory) to upload directly into Excel, where we enter our grades for easy computations, randomization, and ease of upload to our grade reporting system. To be able to use these DOS prompts, students needed to save their files using names as instructed during the examination dissemination. We have them rename and save the distributed exam file with their ID number only. Otherwise, instructors may have to do more manual searching and organizing in Excel later, which just increases grading time and frustration.

Prepare your Excel grading spreadsheet

Next, open the Excel spreadsheet. Follow instructions included in the Appendix on how to upload the text file generated using DOS commands into Excel. When opened, there should only be one field (column A), which contains the filename for each student exam. Graders will then want to keep following instructions in the Appendix to quickly create hyperlinks in column B (described in Step 4) to help switch between the grade sheet and the exam files. Next, reading CR exams in a different sequence improves the reliability of scoring.¹⁶ To facilitate grading exams in a random order we use a random number generator by inserting a new column A to the left of the existing column A. Follow the Appendix for how to insert a random number generator. Once this has been accomplished, column A contains a random number, column B contains the exam file name, and column C contains a hyperlink to a student exam. Insert column headings to help with organization (for question points and total points, too).

Step 4: Grade in random order

Walstad suggests that instructors should grade a single question for every student before continuing to subsequent questions in order to assure that the grade given to Question 1 does not influence how Question 2 is graded.¹⁷ When a question has been graded

for all exams, the Excel spreadsheet can be resorted using the generated random numbers in column A, and then instructors can start grading the next question, one exam at a time. Grading one question at a time using a different random order also ensures that instructors do not always grade Student B after Student A. If Student A has excellent or poor responses, the instructor may still grade Student B differently based on a contrast perceptual error (the comparison is Student A rather than a rubric). See the Appendix for instructions on how to navigate Excel and Word to grade one question at a time and in random order. We have included instructions on how to toggle back and forth between file types effortlessly to save time. Make sure that you insert comments directly into the files and save. The process of (a) generating new random numbers, (b) resorting the file order, and (c) grading the next CR question should be repeated until all questions on all exams have been graded. Record the final total on each exam, and the grader should now feel confident concerning grading accuracy and consistency.

Step 5: Record and return exams

No names are on the exams, but the student ID is used as the file name and should be on the first page or header in the file. Since we post grades in Blackboard (online course management software), we can record all semester grades by student ID rather than names. One of us distributes hard copies of exams via an administrative assistant so that students can see comments, deducted points, and developmental feedback. Students go to the administrator and show their student ID to receive a copy of their exams. Another of us distributes exams in a class period to go over the grading rubric and respond to questions. Alternatively, if instructors change exam questions frequently, exams do not have to be printed; instead, instructors could deliver exam results virtually using a course management system. Return exams in ways that are most efficient or in ways that students prefer to increase perceptions of confidentiality.

Discussion

Evaluation of student constructed response (CR) essay examinations remains a challenge for instructors of higher education to ensure grading is free of bias, accurate, and consistent. The five-step process outlined in this paper provides a technology-based process to aid instructors in minimizing potential grading biases associated with identity recognition and grading order often found as a downside when grading CR essay exams. We include a description of how we use a computer lab and NSS class management software to administer and collect exams. Then, we explain how we use DOS commands and Excel to organize and document grades of student essays created and saved in Word files. Finally, we describe how we return scores and exams for student review. In this discussion section, we will identify the limitations of our methods, suggest an adaptation that could accomplish similar goals without using DOS commands or hyperlinks, and review the importance of deliberately trying new processes to minimize identification bias in grading.

Limitations and suggestion for adaptation

Time and comfort. For some readers, our description may first appear daunting. If an instructor of liberal arts is unfamiliar with using computer labs for testing, using Excel, or has never heard of DOS commands, that instructor's efficacy for using our Appendix would be understandably low. Each of us has used our own grading methods for years, and an introduction of these tools could seem burdensome and time intensive for some and not for others. It is true that it would take initial set-up time to ensure that this method would work in a class using CR examinations, but it does not necessarily add that much more time to our already busy schedules. The third author of this paper timed each step we describe, and we include estimated time for completion for the first-time implementation within the Appendix. In total, for a first time implementation, all the steps together take about 40 minutes. Grading time would take the same no matter what method an

instructor uses. It is not as if printing copies, organizing exams, collecting exams, entering grades, and so forth takes no time at all. Forty minutes is not in addition to the time we already take to grade; it serves to substitute for other time and also serves to automate the process of random order grading and uploading grades for student review. Thus, the time burden to implement our suggestions when using the described or similar software is minimal, especially after the instructor has gained experience and confidence using the method once.

However, if an instructor's comfort level with technology is too low, or if an instructor despises grading on a computer, we encourage adaptations. For example, one of us uses the computer lab and NSS software to disseminate the exams and block the use of thumb drive, network drive, and Internet access. However, when it comes to collection, she has the students send their documents to the printer. Each exam has the student ID in the header, but all other identifying information is removed. She then grades one question at a time but manually shuffles the exams to mix up grading order. All this can be done in her normal grading spot. This adaptation includes extra steps to upload final grades, and she takes extra time to reflect on individual student performance after identities are revealed in the upload. She can then include additional developmental feedback to students based on their pattern of performance, but the grades assigned to the initially anonymous tests are not changed. By including a description of this adaptation, we hope that readers can think through options that work best with their styles, record-keeping, and student developmental goals.

Not really anonymous. Another limitation is that instructors can always look up student names by ID during the grading process if they were curious why someone left a question blank or wrote something offensive. Although, if instructors find themselves investigating paper identities early, they will have to admit to themselves that they might be grading students differently based on their pre-established perceptions of students. Is

that appropriate? At least they are forced to ask that question.

Moreover, it becomes incredibly difficult for Jesuit school educators not to want to attach identity to the papers we grade or the exams we assess since we spend so much time interacting with our students on a personal basis. Some might criticize and say that identity bias might be appropriate and good when trying to develop our learners, deriving meaning by knowing the source of the message. Specifically, Jesuit pedagogy also includes *context* as an important component in the method to meet students where they are at.¹⁸ However, attaching identity as we grade can be harmful if we are trying to give feedback on clarity of writing, identification of concepts, and critical thinking. We could add meaning as we read and grade CR essay responses, which could be quite harmful to previous high performers if they actually do not understand the material, and we could simultaneously bring pessimism to reading answers of historically poor performers and be unfairly critical. It is usual to “like” some students more than others,¹⁹ and we must be careful to not allow ourselves to correlate grades with liking. On the other hand, we should not stop giving personalized developmental feedback.²⁰ If instructors choose to follow our suggestions to minimize identity bias in CR examination grading, they should still be practicing ways to give personalized performance feedback that students can use to develop their skills and understanding.

Importance and directions for future research

One reason for blind peer reviews in academia or resume screening software purchased by businesses with equal opportunity employment objectives and compliance requirements is that identity bias, more often than not, works in the favor of white males. In the USA, Title IX protects students from gender-related discrimination and harassment²¹ and in the UK, the National Union of Students has continuously advocated and promoted “blind” scoring

(removing identities from the grading process) to minimize the opportunity for discrimination related to classes like race, gender, or sexuality.²² As Weimer and Jae and Cowling remind us, when humans are the assessors, identity bias can only be minimized, not eliminated.²³ To deny that we are infallible in how we assess others is a step in the wrong direction. If we truly want to embrace the Ignatian pedagogy component of *evaluation*, we need to acknowledge and reflect on what we bring to assessment so that we can adjust our methods to reach goals pertaining to student development. Legally, we have an obligation to minimize bias in grading. Ethically, and in the spirit of Jesuit teachings, we have a responsibility to acknowledge and work to rectify constraints to our accuracy of evaluation.

More research is needed regarding student perceptions of identity-reduced grading in Jesuit education. Within this paper, we cited articles that comment on the importance of student perceptions of fairness in grading, but none of those samples have come from the types of students who self-select themselves into a Jesuit university. Our students may perceive fairness differently, and/or they may desire additional feedback opportunities to meet their expectations of the personalized education we promise. We wrote this paper to share how we practice and operationalize suggestions from previous scholarship, but we only have anecdotal evidence that students are satisfied with our grading process. Future research into the expectations of Jesuit student populations is needed. Additionally, although there was one study that found no difference in how students score on hand-written and word processed essay exams, that research was limited to a sample of first-year college students engaging in their first college examination.²⁴ If students had experience with CR essay exams using word processing programs, would they prefer and perform better using that method of testing over handwritten exams, and would their level of education matter, for example, first-years versus fourth or graduate students?

Finally, one practical area of future research compares class and course management software that can meet the objectives we identify: minimizing identity based bias, minimizing time for set-up and grading, minimizing opportunity for cheating, and allowing for developmental feedback. We were limited in what methods we could use based on the technologies already in place at our institution, and we could not find a published analysis and comparison of systems. In fact, our university's technical staff was not familiar with other options to serve our purposes. It may be that the field is unconvinced that bias is an issue, or the lack of comparison research could be related to a lack of interest in assessment of learning methods. It would be useful to know which software(s) is/are helping to meet our teaching and evaluation objectives.

Conclusion

The problem of perceptual bias in grading CR essay exams is real and important in our mission to provide developmental evaluation and feedback to students. By using a class management system in a computer lab to administer examinations, removing names from exams, and automating randomization procedures, instructors can minimize perceptual biases in grading as well as avoid comprehension difficulties caused by deteriorating handwriting. Previous research has explored using bar codes as identifiers, but since our school did not have access to that technology, we sought to share our method using systems already in place in our business computing labs to operationalize recommendations made by the established research in assessment. In all, we feel the challenges related to the time it takes for initial set-up is minimal compared to the benefits we gain from increasing grading consistency, accuracy, and minimizing biases. Additionally, we no longer squint at creative or fatigued handwriting, and students say they perceive the process as fair. Thus, it is our hope that by sharing these steps with readers, our description can offer instructors of all disciplines ideas on how they might adapt the

way they distribute and grade CR essay exams. Future research may want to compare alternatives to minimizing identification bias in different types of classes and with Jesuit university student samples. Additionally, future research might compare different class and course management software systems to help categorize benefits related to the objectives we share. HJE

Notes

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⁴ J. L. Heck and D. E. Stout, "Multiple-Choice vs. Open-Ended Exam Problems: Evidence of Their Impact on Student Performance in Introductory Finance," *Financial Practice and Education* 8, no. 1 (1998): 83-93; Simkin and Kuechle, "Multiple-Choice Tests and Student Understanding"; W. B. Walstad, "Testing for Depth of Understanding in Economics Using Essay Questions," *Journal of Economic Education* 37, no. 1 (2006): 38-47.

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¹¹ L. J. Smith, "Grading Written Projects: What Approaches Do Students Find Most Helpful?" *Journal of Education for Business* 83, no. 6 (2008): 325-330; Walstad, "Testing for Depth of Understanding in Economics Using Essay Questions."

¹² Birch, Batten, and Batey, "The Influence of Student Gender on the Assessment of Undergraduate Student Work," 1065-1066.

¹³ Jae and Cowling, "The Use of Bar Code Technology"; Jae and Cowling, "Objectivity in Grading"; D. A. McBane, "Using Technology to Increase Feedback When Grading Assignments," *Marketing Education Review* 6, no. 2 (1996): 45-58.

¹⁴ NetSupport School, "Classroom Instruction, Orchestration, Monitoring & Management," accessed May 24, 2016, <http://www.netsupportschool.com/highered.asp>.

¹⁵ Jae and Cowling, "Objectivity in Grading," 51.

¹⁶ Walstad, "Testing for Depth of Understanding in Economics Using Essay Questions."

¹⁷ Ibid.

¹⁸ Naylor, *Chapter 18 Ignatian Pedagogy*.

¹⁹ M. Weimer, "Solving the Bias Problem," *Teaching Professor* 12, no. 6 (1998): 5.

²⁰ Birch et al., "The Influence of Student Gender on the Assessment," 1077.

²¹ U.S. Department of Education, Office for Civil Rights, "Title IX and Sex Discrimination," revised April 2015, accessed October 19, 2016, http://www2.ed.gov/about/offices/list/ocr/docs/tix_dis.html.

²² P. Baty, "Trust Eroded by Blind Marking," accessed May 25, 2007, <http://www.timeshighereducation.co.uk/209075.article>.

²³ Weimer, "Solving the Bias Problem," 5; Jae and Cowling, "Objectivity in Grading," 52.

²⁴ N. Mogyey and J. Harley, "To Write or to Type? The Effects of Handwriting and Word-Processing on the Written Style of Examination Essays," *Innovations in Education and Teaching International* 50, no. 1 (2013): 85-93.

Appendix: Step-by-Step Prompts and Directions for Using NSS, DOS, Excel, and Word

We carefully timed how long it took to implement the instructions below on a first time basis. It takes approximately 40 minutes for all steps, other than actual reading/grading. The approximate times for each section are listed in parentheses after each major heading. Other methods of dissemination, collection, and organization also take time to complete if using alternative methods, so this 40 minutes should not be interpreted as additional to the time instructors normally take for assessment.

Establish send/collect parameters (10 minutes)

- Start NSS Tutor on the instructor console
- Click on the menu bar option “Send/Collect”.
- Choose from drop down menu options “Send/Collect”.
- Select “New”, and then “Next”.
- Browse for your the examination file; we store ours on a flash drive
- Highlight appropriate file(s) and click “Open” and then click “Next”
- In the “Student Folder” box, enter the path name desired, e.g., “c:\Instructor\ACCTClass” to create of a directory path on each local machine. Also, we typically check the first checkbox field, which deletes all files in the directory path prior to copying the current exam file to the student machines if this folder was in use before. Click “Next”.
- In the “Collect Files to Folder:” box, indicate the path name, e.g., “c:\Instructor1\ExamFolder”. There are two radio button options available in this dialog box. Choose: “Use subfolders based on Machine name”.
- Click “Next” to move to the final wizard step, which requests a description (identifies the parameters established for this particular examination).
- Enter a description, e.g., “Test Administration” and click “Finish”. This allows the instructor to set up parameters

for administration of an exam well before the examination period, particularly important in situations where there is little time between classes in a computer lab.

Administer exam (5 minutes in addition to whatever time you normally use at the beginning of an exam)

- Students should only log-on after you have started the NSS program.
- Click on the menu bar option “Send/Collect”, followed by “Send/Collect” again from the drop down menu.
- Select the “Test Administration” operation and click “Send Work...”. This operation will establish the specified path on student machines, delete any old files within the path, and copy the examination file(s).
- Select “all students”. Click “OK”.
- Provide students with specific instructions on where to find the exam on their local machines, and students will launch the exam.
- It is incredibly important that students save their exams with a specific name. You will want to name your original file a recognizable name without a space (e.g., Exam1 or Midterm). The file will automatically save an extension (e.g., .doc or .docx). You will want to tell students the class period before and during this exam period to save their file by adding a period and then their ID. So, “Save as Midterm.8digitID”. Also, have them include their ID number in the header of the exam but do not include their name (some may ignore you and still put their name in the file).
- Once the exam is complete, the students save their exams using the updated file name you specified, and they log off of the local machines.

Collect exams (10 minutes for all three collections, here and below)

- To collect from within the NSS software, choose the “Send/Collect” menu bar option, followed by “Send/Collect” from the drop down menu.
- Select the “Test Administration” operation, and click on “Properties” and then “Advanced”. Choose “Collect all files from students” and check box “Only collect files that are new or have changed”. Click “OK”. Click “OK” again.
- Now click “Collect Work”.
- Verify that the local folder for the instructor’s computer is correctly entered, e.g., “c:\Instructor1\ExamFolder”. Then, choose “Student files sent to” and click “OK”.

Collect again to see if there were network errors

- For the second collection, alter the instructor’s subdirectory name (Properties, collect files to local folder, and edit new name) to indicate the second collection, e.g., “c:\Instructor2\ExamFolder”
- For a third collection, modify the subdirectory name to indicate the third collection. Additionally, for the last collection (when you have confirmed all exams were collected), check “Remove files from Student after collecting” so that no exam files remain on any of the classroom computers. Also click to “Advanced” and uncheck only “collect files that are new” to remove the original test. Click “OK”. Click “OK” again.
- Transfer the student exam folders from the instructor computer in the computer lab to your flash drive or other storage device.
- The folder you created on all the student machines will remain, but empty, until lab administrators choose to remove it. You can reuse this folder for future exams by following the same process above.
- Remove “Test Administration” procedure before exiting out of NSS.

Examination organization

This section assumes the instructor has a Microsoft Windows-based computer, Microsoft Word, and Microsoft Excel.

DOS commands (5 minutes)

- Transfer the examination folders and files from the flash drive to a folder in the root directory of your computer, with full path name, e.g., c:\EssayGrading.
- Click the Windows icon or Start button. Type “cmd” and choose the cmd.exe or command prompt option.
- In the resulting Command Prompt box there will typically be a command prompt something like “c:\Documents and Settings\YourUsername>”. Type in “cd \EssayGrading” to access the folder (directory) containing all of the examination folders and files.
- Assuming you chose to name your original file “ExamFile,” Type “dir/s/b ExamFile.?????.doc* > filelist.txt” in the command prompt line in order to obtain a listing of all exam files. That is the name + . + 8 ? for the ID + . + doc* The question marks indicate a wild card in Windows. If you specify eight numbers, this command will make a list of all the documents. If your original exam files show up in your list because of how you initially saved it, you will be able to remove those either manually in your txt file or in the Excel file you will create. If you had everyone use the original exam file and just imbedded their ID number in the file name after the original name (e.g., ExamFile.76483825), you will be able to isolate the changed from the original files.
- The “dir” command prepares a list of folders and filenames in the current folder (directory). The “/s” parameter directs the “dir” command to list all folders and files in the current folder and all subfolders. The “/b” parameter directs the “dir” command to prepare the list in “bare” format (no header or summary information). The “ExamFile.doc” filename directs the “dir” command to list only files with the specific name “ExamFile.doc.” Consistent file names

facilitate the process of preparing the filename listing, and that is why we indicated earlier that we request students to follow our instructions on naming files. The “>” directs the “dir” command to send its output to the file named after the “>” (in this case, “filelist.txt”), rather than to the computer screen. You can open this text file in your c drive, or you can see it immediately in DOS by typing “type filelist.txt”. An abbreviated listing of the contents of filelist.txt will look something like this:

- C:\EssayGrading\ACCTClass\JEPSON-021-01\ExamFile.12345678.doc
- C:\EssayGrading\ACCTClass\JEPSON-021-02\ExamFile.23456789.doc
- . . .
- C:\EssayGrading\ACCTClass\JEPSON-021-45\ExamFile.98765432.doc
- C:\EssayGrading\ACCTClass\JEPSON-021-46\ExamFile.87654321.doc
- To exit from the DOS command prompt box, type in “exit” at the command prompt, and hit the “Return” or “Enter” key.

Preparation of Excel grading spreadsheet
(10 minutes)

- Start Excel, and then open the file “filename.txt”.
- In Excel 2007 or later, click on the “Office Button”, then “Open”.
- In the “Open” dialog box, navigate to the EssayGrading folder (in the C: root folder).
- Select “Text Files” from the “Files of type:” drop-down menu, and double-click on “filelist.txt” in the file listing showing in the “Open” dialog box.
- In the “Text Import Wizard” choose “Fixed width” for the original data type, and click “Next”. There should only be one field, which contains the filename for each student exam, in the file. If there are no spaces in the file names, simply click

“Next”. If there are spaces in the filenames, follow the directions in the wizard to remove any extraneous column breaks, and then click “Next”.

- Click on “Finish” in the final wizard box.
- The listing of exam filenames will be in column A.
- Enter in cell B1 =hyperlink(A1, “ExamFile.doc”)
- Copy cell B1 to additional cells in column B, so that there is a hyperlink in column B for each filename in column A.
- Insert a new column “A” to the left of the existing column “A”. This new column will be used to randomize grading order each time you are ready to grade a new CR question.
- Next, the “=rand()” function is entered into cell A1 and copied into the remaining cells in column A.
- Once this has been accomplished, column A contains a random number, column B contains the exam file name, and column C contains a hyperlink to a student exam.
- Insert a row at the top of the spreadsheet, then insert column headings for each exam question, a “Total” heading for total scores, and “=sum()” functions in the “Total” column to automatically accumulate the scores for each student’s questions.
- Additionally, at this point we hide column B, which contains the long filenames, just to make it easier to work with the spreadsheet.

Grading process

- Position the cursor over the first hyperlink in column C; the cursor should switch from a “+” to a hand icon.
- Clicking on the hyperlink will open the respective exam file in Word. The first exam question can be graded, with comments inserted directly into the file. If the “Track Changes” feature has been enabled, the inserted text will display in a different color, underlined.
- After the question has been graded, the instructor can return to the grading spreadsheet (using <Alt>-<Tab>) and

enter the score for that question for that exam. This prompt will only be efficient if you engage in non-stop grading without checking other email or documents.

- The Windows <Alt>-<Tab> command allows the instructor to toggle between the Excel spreadsheet and the Word exam file. Typing “<Alt>-F” (without the quotes) will activate the dropdown file menu; “c” (without the quotes) will close the individual student’s file, but keep Word open. This provides the instructor with a quicker opening time for subsequent exam files. <Alt>-<Tab> again returns the instructor to the spreadsheet file; clicking on the next hyperlink opens the next file for grading.
- When a question has been graded for all exams, the spreadsheet file can be randomly “shuffled” using the random numbers in column A. It is critical to establish the correct sort region before doing any sorting. Excel remembers the sort region, so if care is taken in identifying the sort region initially, it will save much effort and frustration down the road. Even though at this point most of the columns are empty, the sort region should be established initially to include all non-header rows and all columns from A (containing the random numbers) through the “Total” column. In this way, each time a sort is implemented, the contents of a given row will be kept together, so each student’s scores on separate questions will remain together, and the “Total” column will accumulate a final score for the respective student.
- Enter the <F9> key to generate a new set of random numbers, which can then be used to re-sort the file. This establishes a new grading order, so that a unique sequence is used in grading each question.
- The process of (a) generate new random numbers, (b) sort the file, and (c) grade the next question is repeated until all questions on all exams have been graded. Each student’s total score is automatically tabulated by the “=sum()” function. A final pass through all the files could be used, during which the instructor would

enter the respective total score from the spreadsheet into each student’s Microsoft Word file.